

Women’s Empowerment in Action: Evidence from a Randomized Control Trial in Africa[†]

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We evaluate a multifaceted policy intervention attempting to jump-start adolescent women’s empowerment in Uganda by simultaneously providing them vocational training and information on sex, reproduction, and marriage. We find that four years postintervention, adolescent girls in treated communities are more likely to be self-employed. Teen pregnancy, early entry into marriage/cohabitation, and the share of girls reporting sex against their will fall sharply. 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 I25, J12, J13, J16, J23, J24, O15)

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 (Fernández 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

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[†]Go to <https://doi.org/10.1257/app.20170416> to visit the article page for additional materials and author disclosure statement(s) or to comment in the online discussion forum.

progressed more slowly and might be reversing in some countries (Doepke, Tertilt, and Voena 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 2006; Doepke, Tertilt, and Voena 2012; Jayachandran 2015). The types of technological advances that drove demand for female labor in 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 toward women is more prevalent and acceptable (Anderson and Ray 2010; Doepke, Tertilt, and Voena 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 toward 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, Jayachandran, and Pande 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 them 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 whether they must 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 to limit their future participation in skilled jobs (Field and Ambrus 2008, Bruce and Hallman 2008).¹ Economic empowerment 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 toward 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 women's empowerment and hence might

¹ Baird, McIntosh, and Özler (2011) documents that marriage and schooling are mutually exclusive activities in Malawi, and Ozier (2018) provides similar evidence from Kenya. In Bangladesh, Field and Ambrus (2008) shows that each additional year that marriage is delayed is associated with 0.3 additional years of schooling and 6.5 percent higher literacy rates.

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 policymakers 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 one of the lowest median ages of countries and one of the highest child dependency ratios, as shown in panel A of Figure 1 (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 panel B of Figure 1 highlights, relative to their contemporaries in richer economies, Ugandan women have a fertility rate that 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 and (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 skill relevant to the labor market. The program also recognizes the 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 dropouts as well as girls currently enrolled in school. Moreover, these clubs can serve as safe spaces for girls to meet and socialize with other adolescent girls, free from pressures exerted by adolescent and older men.

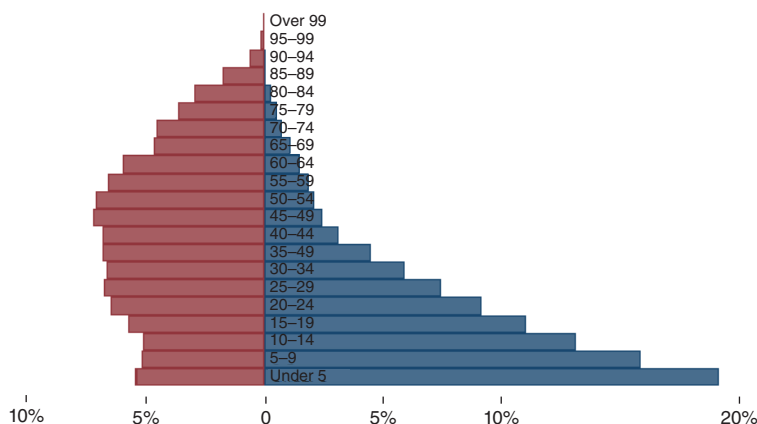
The program was developed in another country, Bangladesh, where female disempowerment is also a major issue. Since 1993 in Bangladesh, BRAC, one of the world’s largest nongovernmental organizations, has established 9,000 clubs that have reached over 1 million adolescent girls. We worked with BRAC to evaluate the program in an African setting, where women face challenges similar to those in

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 percent since 1995. Nowhere is this phenomenon more pronounced than in sub-Saharan Africa, where 60 percent of the population is now aged below 20 (World Bank 2009). The continued rise in the numbers of young people in the global population has led policymakers to consider responses to what has now become termed the “youth bulge” (World Bank 2006). The central policy challenge is to provide increasing numbers of young people the skills and job opportunities that will enable them to lead fulfilling 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 recently throughout North Africa and the Middle East (Fuller 1995, Goldstone 2002).

³Demographic and Health Survey data indicate 38 percent of the 52 million women aged 20–24 in developing countries were married before age 18 (Mensch, Singh, and Casterline 2005), and these girls are often subject to unprotected sex. Girls aged 15–24 are almost eight 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 breastfed babies, is responsible for the vast majority of new HIV infections in the region.

⁴Lybbert and Wydick (2018) provides 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).

Panel A. Female population by age, 2010



Panel B. Age-specific fertility rate, 1995–2010

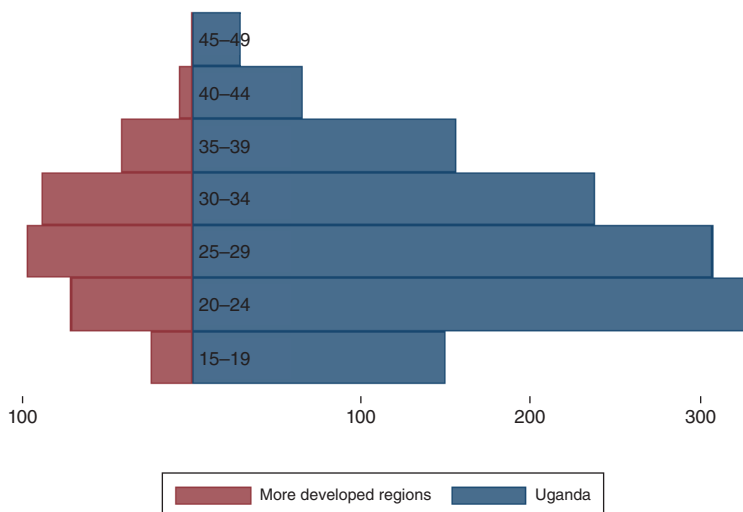


FIGURE 1

Notes: Panel A: more developed regions comprise Europe, Northern America, Australia/New Zealand, and Japan. Panel B: 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.

Source: The 2010 UN World Population Prospects database

Bangladesh. The program has proved to be transportable across countries as well as scalable and cost effective. To date, BRAC has started 1,200 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

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

girls at baseline, midline (two years postintervention), and endline (four years postintervention), allowing us to chart the program's longer term dynamic impacts on empowerment. Club participation is voluntary and unrelated to other BRAC activities.

At baseline, we documented the low levels of empowerment adolescent girls had across all spheres of life. In terms of economic independence, few girls (6 percent) reported being self-employed, and rates of wage employment were even lower. Given that around 30 percent of the girls were not in school, this suggests most girls that had left the formal education system were not successfully transitioning into work and remained unemployed, underemployed, or reliant on casual work. Indeed, 60 percent of girls worried they would not find a job in adulthood. On dimensions of empowerment related to control over the body, 14 percent reported having had sex unwillingly in the past year. Girls also displayed limited knowledge related to pregnancy and HIV; only half reported always using a condom if they were 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 found that girls themselves strongly held views that assigned gender roles in the main spheres of life. Adolescent girls believed 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 Empowerment and Livelihood for Adolescents (ELA) program is 21 percent, suggesting that a sizable 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 postintervention, 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. Intent-to-treat (ITT) estimates imply girls in treated communities are 4.9 percentage points (pp) more likely to engage in income-generating activities relative to girls in control communities, corresponding to a 48 percent increase over baseline levels that is driven predominantly by additional engagement in self-employment activities; at midline, rates of self-employment are near double those in control communities at baseline (12.2 pp versus 6.3 pp), and at endline, these rates remain 50 percent higher (at 9.5 pp) 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 girls lowering their investment in formal education.

The program significantly improves control over the body; by endline the probability of having a child is 3.8 pp lower in treated communities, corresponding to 34 percent of the baseline mean rate of early (teen) pregnancy. The midline ITT estimate shows girls in treated communities to be 6.9 pp less likely to be married/cohabiting, corresponding to 53 percent of the baseline mean. This divergence in trends continues to endline, at which point they are 8 pp less likely to be married or cohabiting. Most dramatically, the share of adolescent girls reporting having had sex

unwillingly in the past year is 5.3 pp lower in treatment versus control communities by endline, starting from a baseline level of 17 percent. 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 affects most dimensions in the short term, these effects 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: those related to adolescent girls' views on ideal ages at marriage for women and on 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 the ELA program as a tool to aid women's empowerment: its spillovers to nonparticipants, unbundling of 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 percent. The findings raise the question of whether the documented impacts arise from ELA participants alone or whether they suggest spillovers onto nonparticipating 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 nonexperimental comparison of differences in outcomes between nonparticipants in treatment and control communities. This hints at spillovers existing, at their being greater in magnitude for dimensions of empowerment captured in aspirations and control over the body indices, and at their being 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 homogeneous or heterogeneous returns to ELA participation and on the nature of self-selection into participation (the girls driving spillovers), and it allows us to construct other relevant treatment effects from which to assess the strength of any spillover effects. The estimated MTEs rule out homogeneous 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 that 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 kick-start a virtuous cycle of gains. The downside is that it becomes harder to disentangle whether 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 it also suggests that providing a safe space for girls, or enabling them access to older female mentors, might also be crucial. 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. For context, this corresponds to less than 1 percent of household annual incomes at baseline. If the per girl benefits to adolescent girls in communities offering 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, Tertilt, and Voena 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. 2018; Dhar, Jain, and Jayachandran 2018).⁶ A strength of the ELA approach is to try to tackle multiple, interlinked constraints simultaneously. The intervention also targets adolescents in a critical stage of the life cycle as they transition 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 skills training for women's outcomes, although our intervention extends beyond skills deemed relevant for labor market outcomes and measures impacts up to four years postintervention (Groh et al. 2016; Adhvaryu, Kala, and Nyshadham 2018).⁷ Our intervention also builds on existing work examining the impacts of stand-alone, vocational skills training programs, for which meta-analyses

⁶Two recent evaluations of interventions specifically designed to empower young women are Ashraf et al. (2018) and Dhar, Jain, and Jayachandran (2018). Both evaluate school-based interventions with a focus on improving the negotiation skills of girls or reshaping their attitudes toward gender, respectively. Ashraf et al. (2018) evaluates 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. The study finds 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. It does not report effects on girls' labor market outcomes. Dhar, Jain, and Jayachandran (2018) evaluates a school-based intervention for adolescents in Haryana, India, designed to reshape their gender attitudes. The intervention involved a series of 45-minute sessions during which children discussed gender equality (and were prompted to think about their own views and societal norms on the matter). The study finds the intervention has a powerful impact in reshaping gender attitudes among the sample of both boys and girls.

⁷Groh et al. (2016) evaluates a soft skills training program targeting young women in Jordan, covering skills oriented toward improving labor market outcomes (e.g., business writing, time management, and 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, Kala, and Nyshadham (2018) evaluates a workplace-based, soft skills training program on female garment workers' productivity in India that 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 that 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 nontreated workers in treated production lines were also more productive and were assigned to complex tasks.

have pointed to low or short-lived returns in low-income settings (Card, Kluge, and Weber 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, Poobalan, and van Teijlingen 2008; Cornish and Campbell 2009; McCoy, Kangwende, and Padian 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, McIntosh, and Özler (2011) finds a cash transfer of \$10 per month conditional on school attendance for adolescent girls in Malawi led to significant declines in early marriage, teenage pregnancy, and self-reported sexual activity after a year, while an unconditional cash transfer had generally weaker impacts. Baird et al. (2016) reports beneficial impacts on the economic and social empowerment of adolescent girls in Malawi who 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

Closer to our evaluation in terms of other multifaceted interventions targeting adolescents are programs evaluated in Duflo, Dupas, and Kremer (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

⁸Baird et al. (2014) provides a systematic review of the effects of the cash transfer program on schooling outcomes, using data covering 35 studies. The authors find that both conditional cash transfers and unconditional cash transfers improve the odds of being enrolled in and attending school compared with a no cash transfer program. The effect sizes for enrollment and attendance are always larger for conditional cash transfers compared with unconditional cash transfers, but the difference is not statistically significant.

⁹Duflo, Dupas, and Kremer (2015) investigates a school-based HIV prevention program in Kenya coupled with subsidies to attend school and presents evidence highlighting the joint determination of schooling and pregnancy outcomes for adolescent girls. The authors show that 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) evaluates 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 was disadvantaged young men and women (aged 16 to 29). The authors study impacts up to 36 months postintervention. 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) evaluates another adolescent girls' empowerment program in Bangladesh. The content 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

The paper is organized as follows. Section I details the intervention and its implementation. Section II describes the research design, data, and estimation strategy. Section III presents estimates of the program's two- and four-year impacts on adolescent girls' economic empowerment, control over the body, expectations, and aspirations. Section IV discusses spillovers, unbundling the components of the ELA program, and cost effectiveness. Section V 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.

I. The Design of the ELA Program

The 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, and a safe space to meet and socialize with other adolescent girls. The program is implemented by the nongovernmental organization 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 week and are 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 by 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, Dick, and Ferguson 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,

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 ultrapoor 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).

¹¹There is little incentive for adolescent girls to join the ELA program 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.

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 they do not receive further training.

Vocational skills training comprises a series of courses on income-generating activities including hairdressing, tailoring, computing, agriculture, poultry rearing, and small trades operation. Although many of the skills are applicable for either wage employment 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 by 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 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, and 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 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 adolescent girls by enhancing the control that they 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, which aims to have more direct impacts on girls' economic empowerment.

¹²The provided vocational skills overlap with those studied in the literature on stand-alone business skills training (Field, Jayachandran, and Pande 2010; Karlan and Valdivia 2011; Drexler, Fischer, and Schoar 2014). However, there are some key differences between this intervention and the kind of business training/entrepreneurship skills program reviewed in McKenzie and Woodruff (2013), which has 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; and (iv) it bundles vocational skills with life skills and the provision of a safe space for girls to meet.

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.

II. Design, Data, and Estimation

A. 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, 15 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, 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 postintervention, BRAC staff, mentors, and adolescent club participants were unaware of the potential future offer of microfinance. In practice, what occurred was that two years postintervention, 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 preexisting 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) and control communities. We later provide evidence confirming that the future offer of microfinance does not drive any of the two-year findings.

B. Data, Attrition, and Descriptives

Surveys.—A census of adolescent girls in the 150 evaluation communities was conducted in early 2008. There were around 130 eligible adolescent girls resident in the average community. We used 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 from May to July 2012. Each survey was conducted face to face, was designed to capture multiple dimensions of empowerment, and covered topics related to: (i) the vocational skills component, such as financial literacy, analytical ability, and labor market and income-generating activities; (ii) the life skills component, such as engagement in sex, childbearing, and marriage/cohabitation, as well as HIV-related knowledge; and (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 adolescent girls at baseline. Girls in our study were on average aged 16; just over 70 percent were enrolled in school full time; and despite their young age, 10 percent already had at least one child and 10 percent were already married or in a cohabiting relationship. The baseline sample is well balanced on these characteristics.

Adolescent Girls' Empowerment at Baseline.—The remaining panels of Table 1 show a range of outcomes related to how empowered adolescent girls were in their lives preintervention, 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 were confident about having the necessary business-related skills preintervention. Despite this confidence, only 6 percent of girls reported being self-employed in control communities (the type of income-generating activity the program fosters by offering vocational skills), and rates of wage employment were even lower. Given that around 30 percent of the girls were not in school, these low levels of labor market activity suggest most girls that had left the formal education system were not successfully transitioning into work and remained unemployed, underemployed, or reliant on casual work. Indeed, the next row shows that 60 percent of girls worried they would not find a job in adulthood.¹⁵

Panel C relates to the dimensions of empowerment related to control over the body. The data illustrate the high incidence of girls having sex against their will: in control

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 the ELA program. We later discuss results from a follow-on experiment that sheds light on some potential spillovers to boys in the same communities.

¹⁴The entrepreneurial index consists of cumulative ranks (scaled from 1 to 10, with 10 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," and "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-year-olds are 7 percent.

TABLE 1—ADOLESCENT GIRL EMPOWERMENT AT BASELINE

| | Treatment (1) | Control (2) | Difference (3) | Normalized difference (4) |
|---|------------------|----------------|-------------------|------------------------------|
| <i>Panel A. Characteristics</i> | | | | |
| Age | 16.3 [2.80] | 16.4 [2.96] | −0.063 [0.150] | −0.015 |
| Currently enrolled in school | 0.71 | 0.72 | −0.010 [0.027] | −0.016 |
| Has child(ren) | 0.105 | 0.101 | 0.003 [0.017] | 0.008 |
| Married or cohabiting | 0.094 | 0.113 | −0.020 [0.014] | −0.046 |
| <i>Panel B. Economic empowerment</i> | | | | |
| Entrepreneurial ability index [0–100 score] | 69.5 [24.7] | 71.9 [24.9] | −2.48 [1.64] | −0.071 |
| Self-employed | 0.072 | 0.061 | 0.011 [0.010] | 0.032 |
| Wage employed | 0.055 | 0.035 | 0.020 [0.009] | 0.067 |
| Never worry to get a good job in adulthood | 0.425 | 0.401 | 0.024 [0.026] | 0.035 |
| <i>Panel C. Control over the body</i> | | | | |
| Had sex unwillingly in the past year | 0.198 | 0.144 | 0.054 [0.022] | 0.102 |
| Pregnancy knowledge index [0–1 score] | 0.738 | 0.742 | −0.004 [0.025] | −0.006 |
| HIV knowledge index [0–6 score] | 3.82 [1.24] | 3.76 [1.25] | 0.055 [0.076] | 0.032 |
| If sexually active, always uses condom | 0.511 | 0.517 | −0.006 [0.039] | −0.009 |
| If sexually active, uses other contraceptives | 0.153 | 0.169 | −0.016 [0.026] | −0.032 |
| <i>Panel D. Beliefs and aspirations</i> | | | | |
| Gender empowerment index [0–100 score] | 28.5 | 31.3 | −2.81 | −0.081 |
| Suitable age at marriage for a woman | 24.0 | 23.9 | 0.115 | 0.026 |

Notes: The sample is based on adolescent girls who are surveyed at baseline [$N = 5,966$]. We report standard deviations in brackets in columns 1 and 2 and standard errors clustered by community in brackets in column 3. 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,” and “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?” “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.

communities, 14 percent reported 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* answered a very basic question related to pregnancy knowledge, which asked whether “A woman cannot become pregnant at first intercourse or with occasional sexual relations.” Girls scored around 3.8 on a 0–6 scale of HIV knowledge on average, yet there was considerable variation in this metric. At the tails of the knowledge distribution, 5 percent of girls correctly answered all the questions, and 2 percent provided no correct answers. Only 52 percent of adolescent girls reported always using a condom if they were sexually active, and only 17 percent reported using some other form of contraceptive in control. These self-reports help explain why teen pregnancy is relatively common for adolescent girls in this context.¹⁶

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 preintervention, adolescent girls themselves held views that assigned strong gender roles in the main spheres of life. The final row reveals that adolescent girls believed 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. Online Appendix Table A1 presents a complete set of balance checks and shows that girls in treatment and control communities are balanced on observables. The null of equal means is rejected for only 2 out of the 21 outcomes considered. In all cases, the normalized differences are small relative to the sample variation, and below the rule-of-thumb value of 0.25 (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 convert each subcomponent into a *z*-score, average across subcomponents, and then reconstruct 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 are the core focus of our empirical analysis.

¹⁶The HIV knowledge index is based on the number of statements correctly identified as true or false. The 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.”

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?” “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 both sexes should be responsible for the mentioned activities.

The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or 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, or had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is 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 and 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 for her daughters to marry, and the 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 centered 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 to shift empowerment on multiple dimensions simultaneously. Further assessing the correlation of these indices with household wealth (using a measure based on household assets), we find the correlation with each empowerment index to be less than 0.05. Hence, participation in the ELA program might not simply be predicted by family background (as confirmed later, there is no striking evidence of selection on observables into participation).

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 who 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 percent (65 percent).

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 each 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, as well as the three empowerment indices that are our key outcomes). None of these characteristics predicts 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 ($p = 0.712$)).

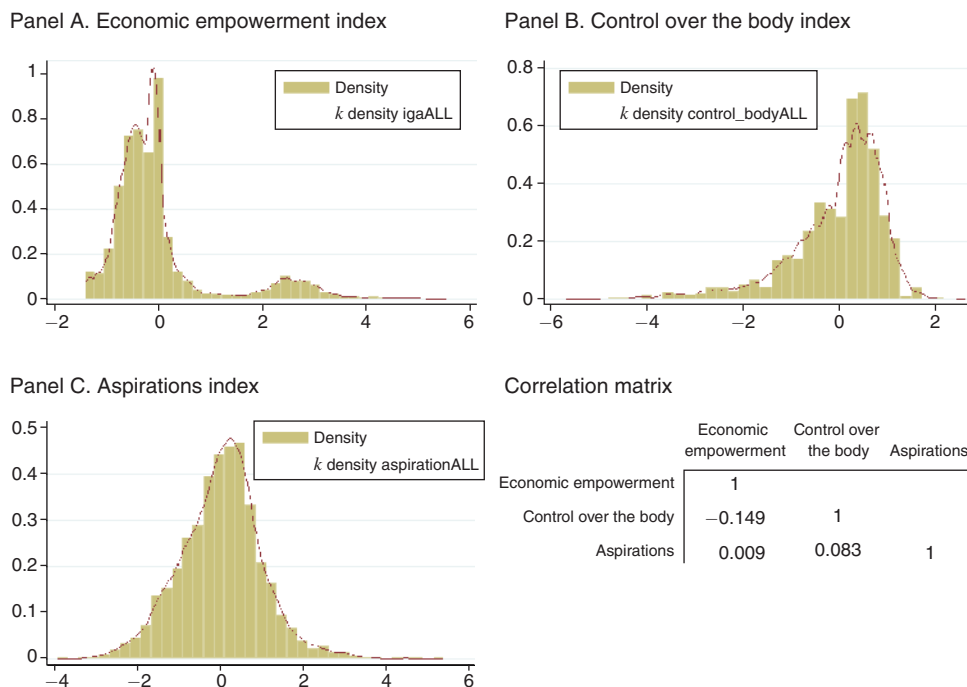


FIGURE 2. ADOLESCENT GIRL EMPOWERMENT AT BASELINE

Notes: The indices for economic empowerment, control over the body, and aspirations each aggregate information over a range of relevant outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the 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 [$N = 5,966$].

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 percent level). These interactions are still jointly insignificant ($p = 0.156$). 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 bias our estimates upward or downward. To address issues of selective attrition, we therefore present Lee bounds estimates of all the midline and endline impacts for

TABLE 2—ATTRITION: OLS ESTIMATES

| | 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 | 0.023 [0.030] | 0.024 [0.027] | -0.01 [0.101] | -0.013 [0.045] | -0.013 [0.022] | -0.154 [0.100] | -0.011 [0.043] | -0.011 [0.024] | -0.117 [0.109] |
| Age | | | -0.0005 [0.004] | | | -0.006 [0.004] | | | -0.004 [0.004] |
| Currently enrolled in school | | | -0.024 [0.031] | | | -0.036 [0.030] | | | -0.023 [0.033] |
| Married or cohabiting | | | 0.043 [0.035] | | | 0.02 [0.042] | | | 0.045 [0.043] |
| Has child(ren) | | | 0.023 [0.040] | | | -0.004 [0.055] | | | 0.007 [0.060] |
| Economic empowerment index | | | -0.012 [0.009] | | | 0.016 [0.010] | | | 0.014 [0.011] |
| Control over the body index | | | 0.012 [0.015] | | | 0.016 [0.015] | | | 0.02 [0.017] |
| Aspiration index | | | 0.005 [0.010] | | | 0.019 [0.012] | | | 0.012 [0.011] |
| Treatment × age | | | -0.0001 [0.005] | | | 0.006 [0.005] | | | 0.005 [0.006] |
| Treatment × currently enrolled in school | | | 0.058 [0.040] | | | 0.043 [0.040] | | | 0.039 [0.043] |
| Treatment × married or cohabiting | | | -0.043 [0.044] | | | -0.001 [0.052] | | | -0.028 [0.054] |
| Treatment × has child(ren) | | | 0.002 [0.053] | | | 0.052 [0.066] | | | 0.035 [0.073] |
| Treatment × economic empowerment index | | | 0.016 [0.012] | | | -0.02 [0.012] | | | -0.02 [0.014] |
| Treatment × control over the body index | | | -0.013 [0.0019] | | | -0.009 [0.019] | | | -0.012 [0.021] |
| Treatment × aspiration index | | | -0.004 [0.013] | | | -0.026 [0.015] | | | -0.02 [0.015] |
| Mean of dependent variable | | 0.819 | | | 0.647 | | | 0.588 | |
| Branch dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 5,966 | 5,966 | 5,661 | 5,966 | 5,966 | 5,661 | 5,966 | 5,966 | 5,661 |
| F-statistic [p-value] | | | 0.652/0.712 | | | 1.55/0.156 | | | 1.25/0.279 |

Notes: Standard errors clustered by community are in brackets. The dependent variable in columns 1–3 is a dummy that is equal to one if the adolescent girl is tracked between the baseline and midline surveys, 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 aggregate information over a range of relevant outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl’s entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the 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.

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 online Appendix Figure A1. The horizontal line in online Appendix Figure A1 is the attrition rate in our two-year follow-up (18 percent). This is below or similar to the attrition rate in most related studies, although there are a few studies that report lower attrition (Dupas 2011, Dupas et al. 2017, Brudevold-Newman et al. 2017).¹⁸ In contrast to some of these studies, around 30 percent of our baseline sample of girls were already out of school. Hence, they were at a stage of the life cycle when geographic mobility might be high, as they moved to find employment or to 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, Dupas, and Kremer 2015; Baird, McIntosh, and Özler 2016; Friedman et al. 2016; Duflo et al. 2017). In contrast, we attempted to track all adolescent girls from our baseline.¹⁹

Online Appendix 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 at midline and endline that are used for the core ITT analysis. This shows that on most dimensions in the estimation sample, treatment and control groups are balanced. In this sample, the null of equal means is rejected for only 1 out of the 21 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.

¹⁸Dupas (2011) tracks a sample of girls and boys in Kenya who recently graduated from primary school. The attrition rate is 2 percent over one year. Dupas et al. (2017) tracks a sample of teenage girls in Cameroon who were attending eighth grade at baseline. To reduce attrition, the investigators 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 percent over approximately one year. For face-to-face interviews (as in our study), the attrition rate was 13.4 percent. Brudevold-Newman et al. (2017) tracks 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 percent 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 with geographical mobility, this could explain their lower attrition rate.

¹⁹Duflo, Dupas, and Kremer (2015) reports an attrition rate of 11 percent over seven years for a sample of young women in Kenya (the attrition rate is 7 percent for boys of same age group). Part of the sample was selected for intensive tracking, which involved teams of field officers traveling to various locations in Kenya and Uganda to identify and interview selected respondents. In the sample without intensive tracking, the attrition rate was 45 percent. Baird, McIntosh, and Özler (2016) reports an attrition rate of 16 percent over ten years (for the Kenya Life Panel Survey Round 2). Similar to Duflo, Dupas, and Kremer (2015), a random subsample was tracked intensively. Friedman et al. (2016) tracks a sample of adolescent girls aged 13–17 in Kenya, reporting an attrition rate of 18 percent over four to five years. To minimize attrition, they followed a similar strategy to Duflo, Dupas, and Kremer (2015) in which a random subsample of baseline respondents was selected for intensive tracking. Finally, Duflo et al. (2017) reports an attrition rate of 9 percent over eight 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 the phone every year in order to update their contact information.

TABLE 3—PARTICIPATION IN ELA CLUBS

| | Girls tracked to midline [$N = 4,831$] | | | | Girls tracked to endline [$N = 3,474$] | | | |
|--|--|----------------|-------------------|---------------------------------|--|----------------|-------------------|---------------------------------|
| | Treatment (1) | Control (2) | Difference (3) | Normalized difference (4) | Treatment (5) | Control (6) | Difference (7) | Normalized difference (8) |
| Have heard about club? | 0.59 | 0.4 | 0.189 [0.036] | 0.272 | 0.795 | 0.613 | 0.182 [0.042] | 0.287 |
| Have ever participated in club activities, conditional on having heard about club? | 0.207 | 0.047 | 0.159 [0.016] | 0.349 | 0.246 | 0.083 | 0.163 [0.024] | 0.318 |
| Conditional on ever having participated in an ELA club: | | | | | | | | |
| Continued participation | 0.629 | | | | 0.356 | | | |
| Attended club meetings at least three times a week | 0.273 | | | | 0.421 | | | |
| Attended club meetings one or two times a week | 0.494 | | | | 0.337 | | | |
| Received life skills training | 0.846 | | | | 0.758 | | | |
| Received vocational skills training | 0.526 | | | | 0.602 | | | |
| Received life and vocational skills training | 0.507 | | | | 0.569 | | | |

Notes: Standard errors clustered by community are in brackets. 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 [$N = 4,831$]. 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 [$N = 3,474$]. 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 vocational skills training 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 skills training include learning about pregnancy or HIV. Training area examples mentioned for the vocational training include training in hairdressing, computer, and poultry rearing. Continued participation is coded as one if the girl reports still attending the ELA club on the survey date.

Participation in ELA Clubs.—Table 3 documents participation in ELA clubs at midline and endline. The majority of adolescent girls had heard of the clubs by midline. At that time, the participation rate for ELA clubs among eligible adolescents in treated communities was 21 percent: this was the period over which vocational skills and life skills were provided. There was no drop-off in continued participation to endline, suggesting there was value to girls in being able to enjoy the safe space the clubs provided.

The practicalities of program implementation, especially in more urban districts, led to a small possibility that an adolescent girl residing in a control community was able to attend an ELA club.²⁰ As Table 3 shows, 4.7 percent of girls in control communities (77 girls) had *ever* participated in ELA club activities by midline. This participation did not persist: more than 75 percent 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

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.

regular participants from control communities is negligible. In treated communities, the majority of adolescents who had ever participated in ELA club activities continued to be engaged through to midline. Nearly half of all participants had attended club meetings one or twice a week over the first two years of the club's operation. Hence, the intervention amounted 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 percent (85 percent) of club participants had taken part in the vocational skills (life skills) training. The majority (51 percent) reported having received both forms of training; we infer that 33 percent took up *only* life skills training, and nearly all who took up vocational skills training also took up life skills training. Revealed preference therefore suggests the two training components were complementary for just over half the girls, while the others took up the offer of one form of training. Of course, all girls could also potentially benefit from the safe space ELA clubs provided.²¹

Online Appendix Table A2 shows characteristics of participants and nonparticipants in treatment communities (as measured at midline, once all training had been delivered, and using the sample of girls tracked 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 MTEs, shedding light on the nature of participation in the ELA program.²²

C. Estimation

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

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

The variable treat_{ij} equals one if individual i is in a community assigned to be treated and zero otherwise. The terms 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. The variable X_{ij0} controls for the adolescent's age at baseline ($t = 0$), and we also include a series of dummies for our randomization

²¹This variation in skills training is not driven by supply-side constraints. In nearly all treated communities, we observed: (i) some eligible girls taking up a component and other girls not doing so, and (ii) the vast majority of eligible girls reporting life and vocational skills training as being available even if they didn't themselves take up the course(s). In addition, we did not find school enrollment at baseline to be a significant determinant of enrollment in the vocational training component: this is as expected given clubs operate out of school hours.

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 nonparticipation.

strata (i.e., branch) (Bruhn and McKenzie 2009). Finally, 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 in 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

III. Core Results

A. 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 percent over its baseline value, and at endline this is sustained at a 3 percent increase. Figure 3 presents spider graphs showing the midline and endline ITT impacts (and their associated 95 percent 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 skills—in terms of being able to run a business, identify business opportunities, obtain and manage capital, manage employees, bargain over input and output prices, protect assets, and collect debts—than girls in control communities. Hence, relative to girls in control communities

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.

TABLE 4—ECONOMIC EMPOWERMENT

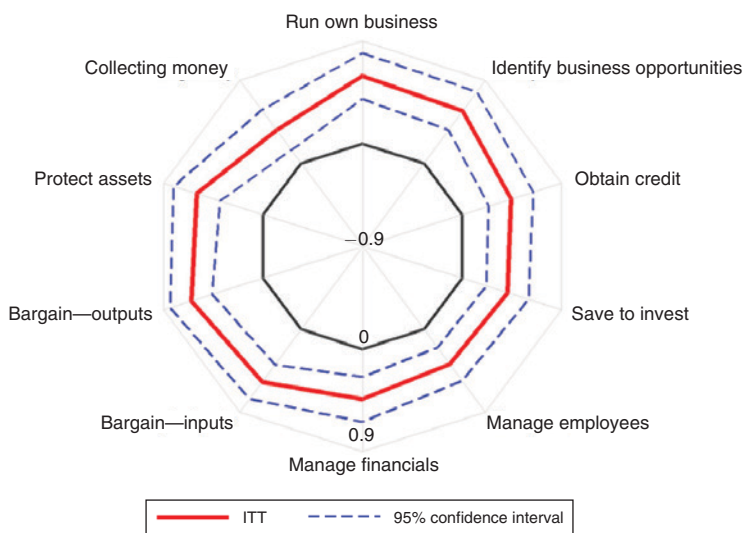
| Lee bounds estimated using panel inclusion at midline/endline as the selection indicator | | | | | | |
|--|-----------------------------|--|------------------|------------------|---|--|
| | Baseline, control (1) | Sample size, midline/ endline (2) | Midline (3) | Endline (4) | Midline (5) | Endline (6) |
| 1. Entrepreneurial ability index [0–100 score] | 71.8 [24.7] | 4,797/3,455 | 5.63 [0.982] | 1.8 [0.951] | 5.76 [2.17] 4.820 7.310 [0.931] [1.12] | 1.29 [1.80] 0.279 2.130 [0.964] [0.962] |
| 2. Any income- generating activity | 0.102 [0.302] | 4,831/3,474 | 0.068 [0.016] | 0.049 [0.020] | 0.07 [0.019] 0.049 0.076 [0.016] [0.012] | 0.05 [0.024] 0.044 0.068 [0.017] [0.023] |
| 3. Self-employed | 0.063 [0.243] | 4,831/3,474 | 0.059 [0.012] | 0.032 [0.017] | 0.06 [0.013] 0.039 0.065 [0.015] [0.010] | 0.033 [0.019] 0.030 0.054 [0.014] [0.023] |
| 4. Wage employed | 0.04 [0.196] | 4,831/3,474 | 0.009 [0.007] | 0.018 [0.012] | 0.008 [0.013] -0.017 0.009 [0.015] [0.007] | 0.017 [0.014] 0.015 0.039 [0.011] [0.023] |
| 5. Expenditure on goods in the last month (UGX) | 11,916 [18,850] | 4,791/3,411 | 4,676 [950] | 982 [1,814] | 4,972 [1,357] 2,365 5,519 [1,347] [803] | 1,117 [2,155] 270 5,088 [1,352] [2,247] |
| Economic empower- ment index | 0.032 [1.03] | 4,831/3,474 | 0.269 [0.043] | 0.131 [0.056] | 0.282 [0.058] 0.203 0.319 [0.048] [0.037] | 0.123 [0.066] 0.09 0.186 [0.046] [0.062] |
| Adolescent girl controls and branch dummies | | | Yes | Yes | No | No |

Notes: Brackets contain standard deviations in columns 1–3 and standard errors clustered by community in columns 5–6. 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," and "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/tea shops/cafés, talk time for your mobile phone, and presents/gifts. The top 1 percent 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 aggregates information over all outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or 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.

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 6.8 pp (4.9 pp) more likely to be engaged

Panel A. The ITT impact at midline of the ELA program on entrepreneurship measures



Panel B. The ITT impact at endline of the ELA program on entrepreneurship measures

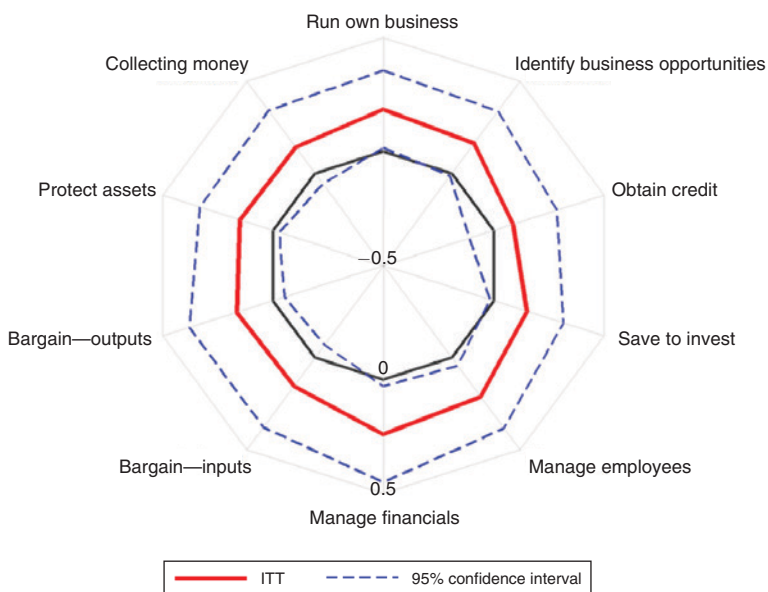


FIGURE 3

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 how well they can do the following activities on a scale of 1 to 10, where 1 means they cannot do this activity and 10 means 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.”

in any income-generating activity at midline (endline), a 67 percent (48 percent) 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, Tertilt, and Voena 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 (12.2 pp versus 6.3 pp). At endline these rates remain 50 percent higher (at 9.5 pp). Taking into account selective attrition, the Lee bounds estimates remain away from zero: the lower-bound endline estimate corresponds to a 48 percent 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 percent 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 (forthcoming). That study collates data from 16 panel surveys in 12 low-income countries, documenting that small firms die at an average rate of 8.3 percent per year over their first five years of establishment. The authors find that younger firms are more likely to die (17 percent of firms die in their first year), and that death rates are higher for younger entrepreneurs and for female owners (their firms are 2 pp 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 a 39 percent increase 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 above, 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 0.269 SD that is significant at the 1 percent level; by endline this falls to 0.131 SD, but the impact remains significant at the 5 percent level. Columns 5 and 6 show both

²⁵The first row in online Appendix 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 UGX85,000, corresponding to US\$50 in 2008 prices, which is economically significant. We have also explored treatment effects on earnings from self-employment 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 4.5 pp (3.6 pp) more likely to have some earnings from self-employment, corresponding to a 102 percent (79 percent) increase over baseline levels, and (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.

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 0.186 SD; (ii) if attrited girls are positively selected, then the lower-bound ITT estimate on economic empowerment is 0.090 SD; and (iii) both bounds are significantly different from zero at conventional levels.

Overall, these results suggest that a multifaceted skills intervention such as the ELA program has quantitatively significant impacts on adolescent girls' economic empowerment. The documented impacts are encouraging relative to the impact evaluations of programs delivering stand-alone entrepreneurship training (see, e.g., Field, Jayachandran, and Pande 2010; Karlan and Valdivia 2011; Drexler, Fischer, and Schoar 2014; Fairlie, Karlan, and Zinman 2015; and Bruhn, Karlan, and Schoar 2018; see also the review of such evidence in McKenzie and Woodruff 2013).²⁶ This is despite the fact that other programs are often specifically *targeted* toward 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 provide 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 online Appendix Table A3 examines education-related impacts. This confirms: (i) the ELA program 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; and (iii) among those who have dropped out of school at baseline, the program motivates a significantly higher proportion 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 increased rates of self-employment documented above do not come at the expense of school enrollment.

²⁶Field, Jayachandran, and Pande (2010) evaluates the provision of basic financial literacy training to female entrepreneurs in India. Only a socially unrestricted subgroup benefited in terms of business income and borrowings. Drexler, Fischer, and Schoar (2014) finds that teaching accounting principles to microborrowers 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) investigates 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 affect business outcomes. Fairlie, Karlan, and Zinman (2015) finds that providing entrepreneurs training has no long-run measurable impact on business operations. On the other hand, Bruhn, Karlan, and Schoar (2018) suggests granting small and medium enterprises in Mexico access to consulting services that are much more costly than the forms of business intervention described above and have large positive impacts on profits but not on employment.

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

B. 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 2.7 pp lower in treated communities than in control communities: given that at baseline 11.3 percent of girls have at least one child, this corresponds to a 24 percent drop in fertility rates over a two-year period. If we consider that fertility rates rise between baseline and endline from 10.5 percent to 12.3 percent in control communities as girls get older, the ITT estimate implies this natural rate of increase is eliminated in treatment communities where adolescent girls largely forego reproduction once the program is offered. These trends continue to endline, at which point girls in treated communities are 3.8 pp 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, McIntosh, and Özler 2011). Along this margin the program also has noteworthy impacts: the midline ITT estimate shows girls in treated communities to be 6.9 pp less likely to be married/cohabiting at follow-up, corresponding to 53 percent of the baseline mean. In control communities, marriage rates for adolescent girls rise naturally from 12 percent to 18 percent 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 participants are 8 pp 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 6.1 pp lower in treated communities at midline and 5.3 pp lower at endline. Starting from a baseline of 17 percent in control communities, this corresponds to a 30 percent 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 raising girls' engagement in and earnings from self-employment, and such economic empowerment likely reinforcing girls' control over their bodies (Baird, McIntosh, and Özler 2011; Baird et al. 2014); and (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 girls' 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 13 pp higher, although again this impact dies out by endline. On the other hand, Lee bounds estimates at endline (that do not control for any

TABLE 5—CONTROL OVER THE BODY

| Lee bounds estimated using panel inclusion at midline/endline as the selection indicator | | | | | | |
|--|-----------------------------|--|-------------------|-------------------|---|---|
| | Baseline, control (1) | Sample size, midline/ endline (2) | Midline (3) | Endline (4) | Midline (5) | Endline (6) |
| 1. Has child(ren) | 0.113 [0.317] | 4,806/3,415 | -0.027 [0.010] | -0.038 [0.013] | -0.031 [0.017] -0.054 -0.029 [0.016] [0.010] | -0.04 [0.022] -0.043 -0.02 [0.013] [0.023] |
| 2. Married or cohabiting | 0.129 [0.335] | 4,713/3,263 | -0.069 [0.013] | -0.08 [0.015] | -0.071 [0.018] -0.094 -0.069 [0.017] [0.011] | -0.082 [0.032] -0.086 -0.070 [0.016] [0.023] |
| 3. Had sex unwillingly in the past year | 0.174 [0.380] | 1,847/1,655 | -0.061 [0.028] | -0.053 [0.025] | -0.071 [0.024] -0.102 -0.067 [0.033] [0.019] | -0.031 [0.027] -0.033 -0.023 [0.018] [0.038] |
| 4. Pregnancy knowledge index [0–1 score] | 0.737 [0.441] | 4,750/3,386 | 0.048 [0.021] | 0.025 [0.016] | 0.058 [0.026] 0.051 0.077 [0.015] [0.018] | 0.029 [0.034] 0.009 0.035 [0.023] [0.016] |
| 5. HIV knowledge index [0–6 score] | 3.79 [1.26] | 4,831/3,474 | 0.471 [0.047] | 0.109 [0.045] | 0.507 [0.079] 0.452 0.611 [0.053] [0.070] | 0.115 [0.078] 0.036 0.160 [0.081] [0.061] |
| 6. If sexually active, always uses condom | 0.446 [0.498] | 1,781/1,630 | 0.13 [0.038] | 0.035 [0.039] | 0.194 [0.030] 0.192 0.198 [0.027] [0.031] | 0.089 [0.039] 0.081 0.099 [0.032] [0.034] |
| 7. If sexually active, uses other contra- ceptives | 0.203 [0.403] | 1,781/1,630 | 0.028 [0.031] | -0.019 [0.049] | 0.047 [0.028] 0.046 0.053 [0.020] [0.032] | -0.042 [0.037] -0.048 -0.03 [0.029] [0.036] |
| Control over the body index | -0.018 [1.03] | 4,831/3,474 | 0.535 [0.038] | 0.269 [0.034] | 0.54 [0.052] 0.521 0.611 [0.033] [0.041] | 0.265 [0.060] 0.193 0.305 [0.064] [0.047] |
| Adolescent girl controls and branch dummies | | | Yes | Yes | No | No |

Notes: Brackets contain standard deviations in columns 1–3 and standard errors clustered by community in columns 5–6. 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 convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is 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.

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

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 0.535 SD at midline and by 0.269 SD 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 stand-alone HIV education programs. However, meta-analyses generally report weak impacts of such stand-alone programs, irrespective of whether they are delivered via classroom-based courses (Gallant and Maticka-Tyndale 2004; McCoy, Kangwende, and Padian 2010; Duflo, Dupas, and Kremer 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) uses a regression discontinuity design to estimate the impacts of a school-based HIV prevention course in Cameroon. The estimated impacts on childbearing and condom usage are slightly above the ITT estimates we find. Second, Dupas (2011) uses a randomized control trial 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. That study finds that exposure to this curriculum causes a 28 percent 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 effects on childbearing and marriage) and other effects attenuating over time (such as effects on contraceptive use). We directly address the issue below, once we have also discussed the program's impacts on girls' beliefs and aspirations.

²⁸ As argued in Dupas (2011), childbearing is not a perfect proxy for the incidence of risky sex because (i) adolescent girls in long-term relationships are more likely to get pregnant than girls in several short-term relationships; (ii) teenage girls might be more likely to abort if the father is a teenage boy who cannot provide economic support; and (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.

²⁹ A recent trend in the literature examining interventions to reduce risky behaviors has been toward the collection of biomarkers rather than relying on self-reports, which are often argued to be more unreliable. Corno and de Paula (2019) tests this claim by developing and calibrating a model of sexually transmitted infections: they identify conditions under which self-reports can be more reliable than biomarkers, where these conditions depend on the prevalence of sexually transmitted infections and properties of the epidemiological model of infection.

C. Aspirations

We complete our core analysis by considering ITT effects on girls' perception of gender roles and aspirations related to marriage and childbearing: these serve as markers for the program affecting deep-rooted social norms about girls' roles 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 that reflects how girls perceive their role in various tasks related to the labor market and in the household. The other outcomes are girls' aspirations regarding ages at marriage for themselves and their children, desired fertility, and aspirations regarding 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 is that although the program has impacts on most dimensions in the short term, these tend to nearly always die out by endline, as seen in 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 0.269 SD (an effect size comparable to that found in Dhar, Jain, and Jayachandran 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 has improved in treated communities.

There are, however, two notable dimensions of aspirational changes that do persist, and these both relate to the impacts documented above in terms of control over the body. The first is shown in row 2: girls' views on ideal ages at marriage for women in *society* as a whole. Adolescent girls in treated communities report significantly higher ages, increased by 0.77 and 0.23 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 percent (8 percent) of a standard deviation at midline (endline). If they were 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 relates 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

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 are being sought, and that the timing of marriage is changing.

TABLE 6—ASPIRATIONS

| Lee bounds estimated using panel inclusion at midline/endline as the selection indicator | | | | | | |
|--|-----------------------------|--|-------------------|------------------|-------------------|-------------------|
| | Baseline, control (1) | Sample size, midline/ endline (2) | Midline (3) | Endline (4) | Midline (5) | Endline (6) |
| 1. Gender empowerment index [0–100 score] | 32.9 [24.4] | 4,831/3,474 | 2.86 [0.932] | −2.25 [1.59] | 2.63 [1.26] | −2.56 [2.08] |
| | | | | | 1.10 [0.996] | −0.969 [1.53] |
| | | | | | 3.45 [0.789] | −3.24 [1.08] |
| 2. Suitable age at marriage for a woman | 23.9 [3.08] | 4,790/3,457 | 0.77 [0.116] | 0.231 [0.132] | 0.826 [0.145] | 0.176 [0.252] |
| | | | | | 0.679 [0.116] | 0.32 [0.153] |
| | | | | | 1.01 [0.134] | −0.006 [0.188] |
| 3. Suitable age at marriage for a man | 28.0 [3.74] | 4,789/3,453 | 0.693 [0.125] | 0.199 [0.149] | 0.747 [0.198] | 0.139 [0.366] |
| | | | | | 0.546 [0.135] | 0.363 [0.189] |
| | | | | | 1.01 [0.163] | −0.109 [0.238] |
| 4. Preferred number of children | 4.11 [1.43] | 4,774/3,416 | −0.279 [0.052] | 0.013 [0.052] | −0.296 [0.089] | 0.028 [0.086] |
| | | | | | −0.394 [0.051] | 0.137 [0.084] |
| | | | | | −0.247 [0.048] | −0.053 [0.072] |
| 5. Suitable age for women to have the first child | 23.5 [3.20] | 4,781/3,445 | 0.619 [0.110] | 0.272 [0.158] | 0.681 [0.168] | 0.277 [0.213] |
| | | | | | 0.538 [0.107] | 0.431 [0.144] |
| | | | | | 0.88 [0.118] | 0.101 [0.152] |
| 6. Preferred age at which daughter(s) get married | 24.8 [2.64] | 4,757/3,380 | 0.718 [0.118] | 0.123 [0.116] | 0.749 [0.126] | 0.059 [0.209] |
| | | | | | 0.605 [0.109] | 0.184 [0.136] |
| | | | | | 0.928 [0.119] | −0.101 [0.156] |
| 7. Preferred age at which son(s) get married | 28.4 [3.13] | 4,761/3,378 | 0.12 [0.113] | 0.025 [0.116] | 0.185 [0.167] | −0.014 [0.311] |
| | | | | | −0.003 [0.126] | 0.185 [0.195] |
| | | | | | 0.431 [0.156] | −0.204 [0.184] |
| Aspirations index | −0.015 [0.967] | 4,831/3,474 | 0.269 [0.038] | 0.059 [0.045] | 0.29 [0.055] | 0.045 [0.095] |
| | | | | | 0.233 [0.038] | 0.106 [0.060] |
| | | | | | 0.361 [0.043] | −0.014 [0.060] |
| Adolescent girl controls and branch dummies | | | Yes | Yes | No | No |

Notes: Brackets contain standard deviations in columns 1–3 and standard errors clustered by community in columns 5–6. 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?" "Who should be responsible for looking after the ill persons?" Answers are coded as one if the respondent chooses "Both/Same" 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 convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the 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.

endline: the ITT estimates are 0.619 and 0.272, respectively, corresponding to 20 percent and 9 percent of the baseline standard deviation, respectively.

Both longer-lasting changes in aspirations related to age at marriage and age at first child were picked up earlier 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.

D. Robustness

We briefly describe robustness checks on the impacts of the ELA program 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 postintervention survey waves.³¹ Online Appendix Table A4 shows that the quantitative and qualitative pattern of results remains the same as discussed above: all three indices are affected 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 online Appendix 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; and (iii) girls aged above/below 16 at baseline. We find the impacts to be largely *homogeneous* across these dimensions (consistent with the description above 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 online Appendix Table A5 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 with how girls respond to the program. For example, parental beliefs about the ideal age of marriage for a woman, or beliefs related to gender norms, might constrain girls to lower levels of empowerment (Bursztyrn and Coffman 2012; Ashraf et al. 2018; Dhar, Jain, and Jayachandran 2018). Online Appendix 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

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

beliefs, and this is the case for the three indices of empowerment (panel A) as well as education-related outcomes (panel B).

E. Experimenter Demand Effects

As described above, 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 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 online Appendix Table A5, where we documented relatively homogeneous impacts across indices and time periods, between rich/poor and rural/urban households.

Social drivers relate to subjects being motivated to adjust reports toward what they expect researchers want to observe. To address this, we follow the approach suggested in Dhar, Jain, and Jayachandran (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 respondents 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 Online Appendix Table A7 then shows whether the ITT impacts of the ELA program vary with respondent's social desirability score: we do not find any evidence of heterogeneous 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 varying in sign) and precisely estimated.³⁴

³²To validate some answers during data collection, enumerator team leaders checked parts of the data for accuracy by revisiting respondents. During these revisits, 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 whether 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, Jain, and Jayachandran (2018) evaluates the effects of a school-based gender equality training program in India on adolescents' gender attitudes. To test for social desirability bias, the authors use an index of social desirability based on Crowne and Marlowe (1960). They do not find evidence of such respondent behavior.

³⁴De Quidt, Haushofer, and Roth (2018) develops a methodology to quantify experimenter demand effects in laboratory experiments. By providing explicit cues about the hypotheses associated with the experiment to randomly selected subsamples, the authors' 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 (2019) also explicitly tests for experimenter demand effects and also finds 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.

TABLE 7—SPILLOVERS, NONPARTICIPATION, AND OTHER TREATMENT EFFECTS

| | ITT (1) | 2SLS (2) | Participants (3) | Nonparticipants (4) | ATE (5) | ATT (6) | ATU (7) |
|---|------------------|------------------|---------------------|------------------------|-------------------|------------------|-------------------|
| <i>Panel A. Midline</i> | | | | | | | |
| Economic empowerment index | 0.269 [0.043] | 1.72 [0.283] | 0.91 [0.070] | 0.152 [0.042] | 1.57 [0.338] | 0.909 [0.404] | 1.91 [0.546] |
| Control over the body index | 0.535 [0.038] | 3.41 [0.419] | 0.939 [0.057] | 0.436 [0.039] | 2.32 [0.260] | 3.45 [0.335] | 1.63 [0.415] |
| Aspirations index | 0.269 [0.038] | 1.72 [0.298] | 0.395 [0.396] | 0.24 [0.039] | 1.05 [0.323] | 1.91 [0.405] | 0.555 [0.530] |
| Adolescent girl controls and branch dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 4,831 | 4,831 | 2,184 | 4,086 | | 3,984 | |
| <i>Panel B. Endline</i> | | | | | | | |
| Economic empowerment index | 0.131 [0.056] | 0.836 [0.340] | 0.435 [0.077] | 0.054 [0.058] | 0.885 [0.492] | 1.17 [0.398] | 0.767 [0.776] |
| Control over the body index | 0.269 [0.034] | 1.71 [0.307] | 0.388 [0.042] | 0.212 [0.035] | 0.834 [0.454] | 2.19 [0.372] | 0.276 [0.716] |
| Aspirations index | 0.059 [0.045] | 0.377 [0.296] | 0.03 [0.060] | 0.061 [0.049] | -0.149 [0.441] | 0.518 [0.359] | -0.406 [0.697] |
| Adolescent girl controls and branch dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,474 | 3,474 | 1,646 | 2,812 | | 2,942 | |

Notes: 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 aggregate information over a range of relevant outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the 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 nonparticipants in control communities. The sample in column 4 is based on ELA nonparticipants in treated communities and nonparticipants in control communities. Columns 5 to 7 are derived from the MTE estimates.

IV. Discussion

A. 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 just over 20 percent (Table 3). These combined findings raise the question of whether the documented impacts arise from participants alone, or whether there are spillovers onto nonparticipating adolescent girls in treated communities. To see the issue most starkly, column 2 in Table 7 reports the two-stage least squares (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 magnitudes of these effect sizes are hard to reconcile with low participation rates if there are homogeneous returns to participation.

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

Impacts on Nonparticipants.—To build a more detailed picture of the nature of any spillovers, we consider the following nonexperimental comparisons: (i) participants in treated communities to nonparticipants in control communities, and (ii) nonparticipants in treated and control communities. Participation is endogenous, so these comparisons are likely driven by selection on unobservables and do not represent causal impacts (there are, albeit, few *observable* differences between participants and nonparticipants; see online Appendix 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 nonparticipants across treatment and control communities. For all indices: (i) the impacts are smaller than the baseline ITT estimates, and (ii) comparing columns 3 and 4, the ratio of the impacts on nonparticipants to the impacts on participants is highest for the aspirations index (at midline this is 61 percent), next highest for the control over the body index (46 percent), and rather low for the economic empowerment index (17 percent). These results are suggestive of the presence of 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.

Selection into Participation.—To understand selection on unobservables into participation, we estimate MTEs. This sheds light on whether there are heterogeneous returns to ELA participation and on 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 setup can be explained using the standard potential outcomes framework.³⁵ Let Y_{ji} denote the potential outcome (empowerment) for girl i in

³⁵The method of MTEs was developed in Bjorklund and Moffitt (1987) and Heckman and Vytlačil (2005, 2007). We closely follow the exposition in Belfield and Rasul (2018), which itself is a simplified version of the excellent overview on MTE methods provided in Cornelissen et al. (2016).

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, $D_i^* = \mu_D(X_i, Z_i) - V_i$; $D_i = 1$ if $D_i^* \geq 0$, and $D_i = 0$ otherwise. The instrument Z_i is excluded from the potential outcomes equation, and V_i is an i.i.d. error term. The unobserved trait V_i therefore makes girl i less likely to participate in the ELA program. Rewriting the participation model as $\mu_D(X_i, Z_i) \geq V_i$ and applying the cumulative distribution function 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, $F_V(V_i)$, gives quantiles of the distribution of unobserved traits, denoted U_{Di} . The participation decision can thus be rewritten 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 affect participation (V_i). The MTE is identified by the derivative of the outcome with respect to the propensity score (Heckman, Urzua, and Vytlacil 2006; Carneiro, Heckman, and Vytlacil 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 nonparticipating individuals, conditional on $X_i = x_i$.

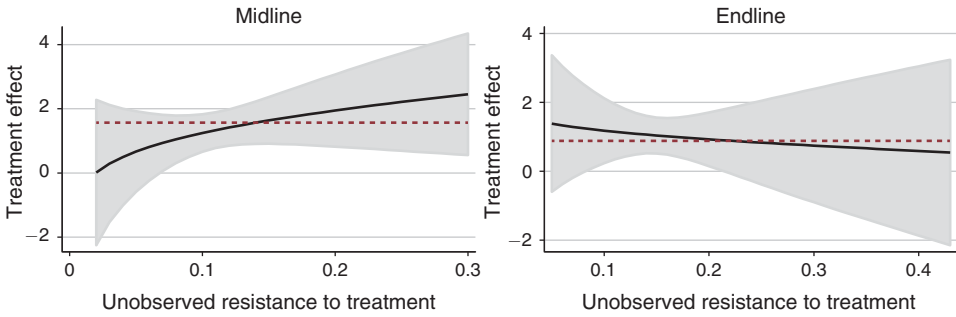
Following earlier applications of MTEs on the returns to college/schooling (Carneiro, Heckman, and Vytlacil 2011; Nybom 2017), as instruments we use the distance between a girl's home and the nearest ELA club (in her community or a control community), distance squared, the treatment dummy, and interactions 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. Online Appendix Table A8 shows the six first-stage probit regressions, and online Appendix Figure A2 graphs the estimated propensity scores for participants and nonparticipants 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 nonmonotonic gains over U_D , the parametric model is more precisely estimated given our relatively small sample.

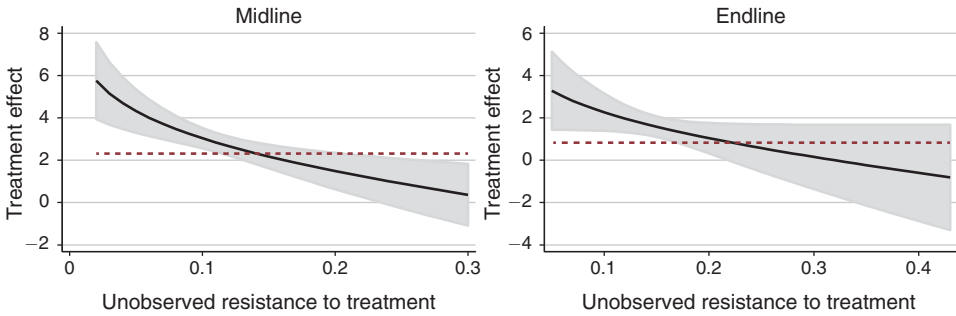
Figure 4 shows the MTEs at midline and endline for each empowerment index. On each x-axis we have U_D , which is negatively related to unobserved traits making participation more likely and is therefore referred to as the unobserved resistance to treatment. The y-axis shows the effect-size impacts for an adolescent girl with

³⁶For the first stage in online Appendix Table A8, we note that distance measures are available for 81 percent (83 percent) of girls tracked to midline (endline). The instruments predict participation (obviously, more so for those in treated communities). Online Appendix Figure A2 shows the predicted propensities are right-shifted for participants relative to nonparticipants, but as in many MTE applications, we have only partial coverage of the propensity over (0, 1).

Panel A. Economic empowerment index



Panel B. Control over the body index



Panel C. Aspirations index

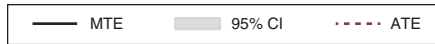
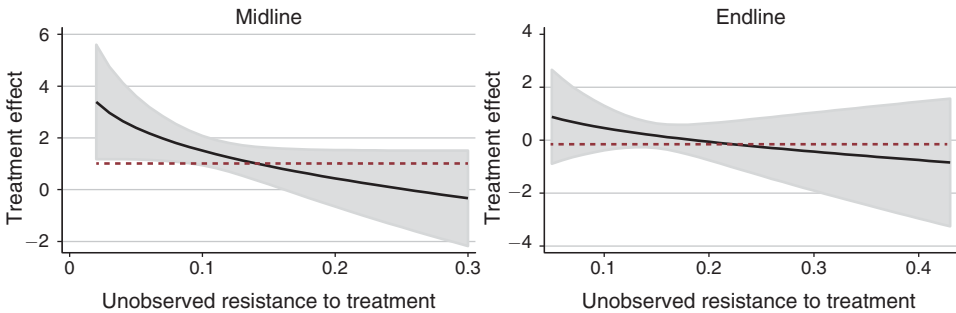


FIGURE 4. MARGINAL TREATMENT EFFECTS

Notes: The indices for economic empowerment, control over the body, and aspirations; each aggregates information over a range of relevant outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the preferred age for her sons to marry. Each panel shows the MTEs for the index, either at midline or endline, along with a 95 percent 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.

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 the ELA program (namely, those with the highest unobserved traits at the left-hand side of the x-axis) gain less from the program on this dimension of empowerment than those less likely to participate (at the right-hand side of the x-axis). However, the gains from participation are nonnegative 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 downward biased given selection on unobservables, and the ITT estimate in column 4 on nonparticipants is likely upward 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 who 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 the ELA program. 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 upward biased given selection on unobservables, and the estimates in column 4 on nonparticipants are likely downward 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 the ELA program. First, the MTEs rule out homogeneous gains to ELA participation across adolescent girls. While the evidence suggests no girls lose from the ELA program, 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 nonparticipants relative to their gains from counterfactually participating, we can integrate over relevantly weighted MTEs to derive: (i) the average treatment effect (ATE), which is the average effect of participation if all eligible adolescent girls attended; (ii) the average treatment on the treated (ATT), which is the average treatment effect on participating girls; and (iii) the average treatment on the untreated (ATU), which is what would have been the counterfactual gains to participation for nonparticipants.

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 the control over the body and aspirations dimensions, with stronger positive self-selection, it follows that $ATT > ATE > ATU$.

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

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 the ELA program. Comparing the ratio of ATEs to 2SLS estimates, the ATEs are 91 percent as large on economic empowerment, 68 percent as large on control over the body, and 61 percent as large on aspirations (with all three being statistically different from zero). These more plausible ATEs reflect the average gains from the ELA program if *all* eligible girls would have participated in the program. They range from 1.05 SD to 2.32 SD at midline, falling to 0.8 SD 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 the ELA program 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 nonparticipant. Finally, we note that at midline, the ATUs shown in column 7 are all much larger than the impacts on nonparticipants from column 4. Given the biases described above in the ITTs on the nonparticipant sample, this suggests that on economic empowerment, spillover effects onto nonparticipants are at least 8 percent of the impact had nonparticipants counterfactually actually participated in the ELA program, with these ratios being at most 27 percent for the control over the body index and 43 percent for the aspirations index. These provide useful bounds on any spillover effects.

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, so we cannot provide direct evidence on the matter. However, Buehren et al. (2016) conducts a follow-up experiment in the same communities, this time sampling girls and boys. In particular, these authors choose a random subsample of girls and boys listed either as the panel respondents in this evaluation or their siblings. Buehren et al. (2016) then uses a lab-in-the-field experiment to elicit a measure of individuals' willingness to compete and examines how this is impacted by the ELA intervention. On girls' competitiveness, the authors find no impact of the ELA program. However, on boys' competitiveness, they find: (i) in control communities, having an additional sister correlates with a lower competitiveness score, and (ii) in treated communities (i.e., those where the ELA program was implemented and girls had become economically and socially empowered), this pattern is reversed. The results in Buehren et al. (2016) suggest that, in a context where siblings compete for limited parental resources, empowering adolescent girls might trigger boys to exhibit greater sibling rivalry and increase 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

³⁸There is a nascent evidence base examining how improvements in the human capital of children might lead to within-household spillovers onto siblings (e.g., through changing parental behavior) (Barrera-Osorio et al. 2011,

B. *Unbundling the ELA Components*

Women's empowerment is a multidimensional concept, and there are good reasons why these dimensions might be interlinked. The ELA intervention is a multifaceted intervention designed to raise empowerment simultaneously along these dimensions. A key strength of the approach is its potential to give a big push to adolescent girls' empowerment along these dimensions and to kick-start a virtuous cycle of gains. The downside is that it becomes harder to disentangle whether 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 is participation in the life skills training and participation in vocational training. As shown in Table 3, 51 percent of girls receive both forms of training, those participating in life skills training nearly always receive vocational training, and 33 percent of participating girls obtain only life skills 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 training remains a significant mediator for economic empowerment. Second, for each dimension of empowerment, there remains a large fraction of the baseline ITT estimates that are unexplained by the mediators. For example, this share is $0.178/0.269 = 66$ percent (76 percent) 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 that examines economic returns to social interaction or safe spaces (Feigenberg, Field, and Pande 2013; Ashraf et al. 2018; Cai and Szeidl 2018; Bandiera et al. 2018).³⁹

Das et al. 2013, Ashraf et al. 2018).

³⁹Feigenberg, Field, and Pande (2013) shows that the frequency of social interaction between microfinance group members positively affected the financial performance of the group. Cai and Szeidl (2018) documents 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

TABLE 8—MEDIATION ANALYSIS

| | Midline (1) | Endline (2) |
|---|-------------------|--------------------|
| <i>Panel A. Economic empowerment index</i> | | |
| 1. Baseline ITT impact | 0.269 [0.043] | 0.131 [0.056] |
| 2. Unrestricted estimate (includes mediators as controls) | 0.178 [0.041] | 0.1 [0.053] |
| 3. Total mediated effect (difference between ITT and unrestricted effect) | 0.091 [0.011] | 0.031 [0.009] |
| 4. Mediator: participation in life skills training | 0.092 [0.015] | 0.025 [0.009] |
| 5. Mediator: participation in vocational skills training | −0.001 [0.010] | 0.006 [0.008] |
| <i>Panel B. Control over the body index</i> | | |
| 1. Baseline ITT impact | 0.535 [0.038] | 0.269 [0.034] |
| 2. Unrestricted estimate | 0.476 [0.038] | 0.262 [0.035] |
| 3. Total mediated effect | 0.059 [0.008] | 0.006 [0.005] |
| 4. Mediator: participation in life skills training | 0.063 [0.011] | 0.005 [0.006] |
| 5. Mediator: participation in vocational skills training | −0.004 [0.006] | 0.002 [0.007] |
| <i>Panel C. Aspirations index</i> | | |
| 1. Baseline ITT impact | 0.269 [0.038] | 0.059 [0.045] |
| 2. Unrestricted estimate | 0.242 [0.038] | 0.059 [0.045] |
| 3. Total mediated effect | 0.026 [0.008] | −0.0004 [0.004] |
| 4. Mediator: participation in life skills training | 0.033 [0.011] | 0.008 [0.007] |
| 5. Mediator: participation in vocational skills training | −0.006 [0.009] | −0.009 [0.008] |
| Observations | 4,831 | 3,474 |

Notes: Standard errors clustered by community are in brackets. The indices for economic empowerment, control over the body, and aspirations each aggregate information over a range of relevant outcomes, where we convert each subcomponent into a z-score, average across subcomponents, then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether she engages in any income-generating activity, whether she is self-employed or wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents based on whether the adolescent has children; whether she is married/cohabiting; whether she had sex unwillingly in the last year; her pregnancy knowledge; her HIV knowledge; and, if she is sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents based on the gender empowerment index, what she views as a suitable age at marriage for a woman and for a man, her preferred number of children, what she views as a suitable age for a woman to have her first child, the preferred age for her daughters to marry, and the 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 skills 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.

In addition, ELA clubs bring adolescent girls into contact with mentors, who might further provide useful role models to influence behavior. The ability of various kinds of role models to improve women's empowerment has been shown in other contexts (Jensen and Oster 2009; Beaman et al. 2012; La Ferrara, Chong, and Duryea 2012).

These results are intriguing and at a minimum allowed us to take a first step toward 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 the complementarities between them.

C. Cost Effectiveness

The ELA program has proved to be transportable across countries (with modification): it started in Bangladesh, was tailored to other contexts in South Asia and East Africa, and is now being piloted in postconflict countries such as Liberia and Sierra Leone. In Uganda, the scalability and potential cost effectiveness of the program have also been demonstrated through its expansion to over 1,200 clubs.⁴⁰

Given that the gains to adolescent girls accrue through channels of economic and social empowerment, many of the gains are unpriced, and others will be realized over the life cycle, as vocational and life skills are accumulated, entry into self-employment is accelerated, and marriage and childbearing are delayed. It is precisely events such as getting married or having children during adolescence that 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 that suggests that having sex against one's will seriously lowers lifetime incomes (McMillan 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

was shared and partnerships were 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. (2018), which evaluates the effects of two interventions targeting adolescent girls enrolled in primary schools in Zambia: (i) a negotiation skills training, and (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) evaluates 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 churches 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 the quality of the vocational training were other implementation challenges. Adoho et al. (2014) evaluates a program somewhat similar to the ELA program in Liberia; that study's independent replication of the short-run (six-month) impacts finds that adolescent girls in treated communities increased their employment by 47 percent and earnings by 80 percent relative to girls in control communities. The study's 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.

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 dollars.

Rows 1 to 3 show the costs associated with the initial program investment of setting up a program office, training program staff, and developing program manuals. The second set of fixed costs, in rows 4 to 14, comprises 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 onward as some setup 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 have been reallocated to other uses, we include them all as program costs and so bias the results against yielding a positive net gain.

Our prebaseline census listing of all households revealed that around 130 eligible adolescent girls resided in the average community. Given that 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 9, rows 21 and 22 show the average fixed and variable costs per eligible girl. The overall cost per eligible girl is shown in row 23. Given that 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 percent 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 thus hard to value. The impacts of the 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 online Appendix Table A3; it 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 above, the bundled ELA intervention appears to improve outcomes at least as well

⁴¹ We do not factor in the opportunity cost of time spent 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 online Appendix Tables A4 and A6.

TABLE 9—COST EFFECTIVENESS, IN 2008 US DOLLARS

| | | | Nonrecurring (1) | Recurring monthly (2) | Year one (3) | Year two onward (4) | |
|---|---|------------------------|---------------------|-----------------------------|-----------------|---------------------------|----|
| <i>Panel A. Fixed costs</i> | | | | | | | |
| [1] | Office space and equipment | 10 branch offices | 4,000 | | 4,000 | | |
| [2] | Program assistant training | 10 assistants | 2,250 | | 2,250 | | |
| [3] | Training and operational material development | 2 manuals | 4,000 | | 4,000 | | |
| [4] | Program management compensation | 2 coordinators | | 780 | 9,360 | 9,360 | |
| [5] | Program assistant compensation | 10 assistants | | 1,690 | 20,280 | 20,280 | |
| [6] | Adolescent leader compensation | 100 adolescent leaders | | 1,200 | 14,400 | 14,400 | |
| [7] | Adolescent leader training | 100 adolescent leaders | 22,500 | | 22,500 | | |
| [8] | Adolescent leader training (for replacements) | 20 adolescent leaders | 4,500 | | | 4,500 | |
| [9] | Adolescent leader refreshers | 100 adolescent leaders | | 400 | 4,800 | 4,800 | |
| [10] | Club rent | 100 clubs | | 1,000 | 12,000 | 12,000 | |
| [11] | Club materials | 100 clubs | 42,000 | | 42,000 | | |
| [12] | Club materials (replenishment) | 100 clubs | 16,800 | | | 16,800 | |
| [13] | Branch office overhead | 10 branch offices | | 800 | 9,600 | 9,600 | |
| [14] | Country office overhead | 1 country office | | 4,000 | 48,000 | 48,000 | |
| <i>Panel B. Variable costs</i> | | | | | | | |
| [15] | Financial literacy courses | 2,500 members | 12,500 | | 12,500 | 12,500 | |
| [16] | Vocational training (year 1) | 2,000 members | 100,000 | | 100,000 | | |
| [17] | Livelihood training inputs (year 1) | 2,000 members | 60,000 | | 60,000 | | |
| [18] | Vocational training (year 2) | 1,000 members | 50,000 | | | 50,000 | |
| [19] | Livelihood training inputs (year 2) | 1,000 members | 30,000 | | | 30,000 | |
| <i>Panel C. Total costs</i> | | | | | | | |
| [20] | ELA program costs for the 100 studied communities | | | | 365,690 | 232,240 | |
| <i>Panel D. Yearly per unit average costs</i> | | | | | | | |
| [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 | |
| <i>Panel E. Yearly benefits</i> | | | | | | | |
| [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 US\$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.

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 is the *Jovenes* programs implemented throughout Latin America. For example, Attanasio, Kugler, and Meghir (2011) finds that for the *Jovenes* program in Colombia, among women, the likelihood of being employed increases by 6.1 pp, 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 \$2,000 per participant served (World Bank 2009). These costs are an order of magnitude larger than the \$17.9 per eligible girl costs of the ELA program, or given a 21 percent 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, Fiala, and Martinez (2014), which presents evidence from the Youth Opportunities program using a randomized control trial in which youth were given unconditional and unsupervised cash transfers.⁴² This study finds that almost 80 percent 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 percent on average. There are of course many differences between the treated individuals in the ELA and Youth Opportunities programs: the Youth Opportunities program targets both genders and those aged 16 to 35, individuals form groups to apply for the unconditional transfers, and the per person transfer is/costs \$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

V. 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 (Duflo 2012). A lack of future labor market opportunities can reduce the

⁴² Similarly, Baird et al. (2012) reports 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 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.

⁴³ For example, the International Financial Statistics of the International Monetary Fund 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 percent in 2008, 9.75 percent in 2009, and 7.69 percent 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 percent according to the Bank of Uganda (2008).

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 that 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 are 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 toward 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 is currently being researched as ELA-style programs have been piloted in multiple sub-Saharan countries. The program offers some promise to policymakers, 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 for 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, which 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 their

bargaining power improves in existing relationships, perhaps because of a direct impact of women's earned income and their autonomy in relationships (Anderson and Eswaran 2009); or whether men change attitudes toward 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, Tertilt, and Voena 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, Tertilt, and Voena 2012; Duflo 2012; Jayachandran 2015).

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⁴⁴Dupas (2011) documents how the provision of information on relative risk of HIV infection by partner's relative age to adolescents in Kenya led to substitution away from higher-risk older partners. Anderson and Eswaran (2009) presents evidence from Bangladesh that increases in women's earned income (rather than unearned income) significantly improve the level of autonomy they enjoy in the household.

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