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# Women's economic empowerment in action: Evidence from a randomized control trial in Africa

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Employment  
and Labour  
Market Policies  
Branch



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## Preface

The primary goal of the ILO is to work with member States towards achieving full and productive employment and decent work for all. This goal is elaborated in the ILO Declaration 2008 on *Social Justice for a Fair Globalization*,<sup>1</sup> which has been widely adopted by the international community. Comprehensive and integrated perspectives to achieve this goal are embedded in the Employment Policy Convention of 1964 (No. 122), the *Global Employment Agenda* (2003) and – in response to the 2008 global economic crisis – the *Global Jobs Pact* (2009) and the conclusions of the *Recurrent Discussion Reports on Employment* (2010 and 2014).

The Employment Policy Department (EMPLOYMENT) is engaged in global advocacy and in supporting member States in placing more and better jobs at the center of economic and social policies and growth and development strategies. Policy research and knowledge generation and dissemination are essential components of the Employment Policy Department's activities. The resulting publications include books, country policy reviews, policy and research briefs, and working papers.<sup>2</sup>

The *Employment Policy Working Paper* series is designed to disseminate the main findings of research on a broad range of topics undertaken by the branches of the Department. The working papers are intended to encourage the exchange of ideas and to stimulate debate. The views expressed within them are the responsibility of the authors and do not necessarily represent those of the ILO.

Azita Berar Awad  
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<sup>1</sup> See [http://www.ilo.org/public/english/bureau/dgo/download/dg\\_announce\\_en.pdf](http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf)

<sup>2</sup> See <http://www.ilo.org/employment>.



## Foreword

In response to the global youth jobs crisis, governments, employers and labour unions identified youth employment the central topic of the 101st International Labour Conference in 2012. Entitled ‘The Youth Employment Crisis: A call for action’ the resolution reminds the international community that investing in young people is crucial for development.

The ILO has responded to this call by investing more into understanding “what works” in youth employment, including through a focus on the generation of evidence in the “Area of Critical Importance on Jobs and Skills for Youth” and through its technical cooperation portfolio. Since 2010, the ILO has, with the support of the Danish Government, implemented the Youth Entrepreneurship Facility (YEF) programme, focusing on Kenya, Tanzania and Uganda. The ambition of YEF is to unleash entrepreneurial potential of young people and to turn their energies and ideas into productive businesses while recognizing that encouraging productive wage employment is part of a holistic development strategy. An important objective of YEF is to support youth employment policy makers and promoters make evidence-based decisions for better resource allocation and programme design. To achieve this, YEF has supported the use of rigorous impact evaluation methods to build the evidence that will lead to informed investments in youth. The following paper is the result of such an impact evaluation, unveiling the main policy and programmatic questions on what works, why, and how, providing answers which help policy makers and practitioners in the region design and deliver better policies for young people.

The following paper *Women’s economic empowerment in action: Evidence from a randomized control trial in Africa* by Oriana Bandiera et al. evaluates a programme delivered by the international NGO, BRAC called “Empowerment and Livelihood for Adolescents”. The programme offered a comprehensive package of life skills, vocational training and microloans to Ugandan adolescent girls aged 14 to 20. In a context where adolescent girls face severe vulnerabilities, from lack of economic opportunities to social stigmatization, the program aimed at improving health knowledge, reducing risky behaviours, and increasing the engagement of girls in income-generating activities. The ILO partnered with BRAC on this study to learn how young women could be empowered to become successful entrepreneurs, contributing to their community both as business owners, employers and leaders.

The study used a randomized control trial design, selecting 100 villages to participate in the intervention and 50 villages as a control. Training was delivered in “Adolescent Development Centres”, safe play and learning centres where young woman can socialize. Results of the intervention are striking. Girls that participated in the program showed:

A higher probability of being engaged in income generating activities: 98 per cent were more likely to be self-employed and there was a 50 per cent increase in self-reported entrepreneurial abilities relative to control and baseline values.

Greater empowerment, which is depicted by highly significant increases on girls’ control over their body: early childbearing rates fell down by 26 per cent, marriage and cohabitation rates by 58 per cent, and there was evidence of a drastic decrease in the number of girls reporting having had sex unwillingly.

These results are of significant importance to the ILO in its quest for promoting more and better jobs for inclusive growth and improved youth employment prospects. They highlight the opportunity that multi-pronged interventions, in this case the combination of life skills and vocational training, bring about a successful transition of girls into self-employment and a positive change in the quality of their relationships and self-confidence, necessary conditions to achieving durable and positive labour market outcomes.

We thank the authors, Oriana Bandiera, Niklas Buehren, Robin Burgess, Markus Goldstein, Selim Gulesci, Imran Rasul and Munshi Sulaiman, for their contribution to this important topic.

Iyanatul Islam  
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## Abstract

Women in developing countries are disempowered relative to their contemporaries in developed countries. High youth unemployment and early marriage and childbearing interact to limit human capital investment and enforce dependence on men. In this paper we evaluate an attempt to jump-start adolescent women's empowerment in the world's second-youngest country: Uganda. In this two-pronged intervention, adolescent girls are simultaneously provided vocational training and information on sex, reproduction and marriage. Relative to adolescents in control communities, after two years the intervention raises the likelihood that girls engage in income-generating activities by 72 per cent (mainly driven by increased participation in self-employment), and raises their monthly consumption expenditures by 41 per cent. Teen pregnancy falls by 26 per cent, and early entry into marriage/cohabitation falls by 58 per cent. Strikingly, the share of girls reporting sex against their will drops from 14 per cent to almost half that level and preferred ages of marriage and childbearing both move forward. The findings indicate that women's economic and social empowerment can be jump-started through the combined provision of vocational and life skills, and is not necessarily held back by insurmountable constraints arising from binding social norms.

JEL Classifications: I25, J13, J24, O12.





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# 1. Introduction

Women's empowerment has three core dimensions: political empowerment, economic empowerment 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 (Doepke and Tertilt 2009; Fernandez 2013). This situation is almost entirely reversed in many developing countries today: universal suffrage for women was typically achieved at independence, yet empowerment along economic and reproductive dimensions has progressed far more slowly and might even be reversing in some parts of the developing world (Doepke *et al.* 2012).

In these countries, female labour force participation is strikingly low and the majority of women have children and marry at much younger ages relative to their contemporaries in developed nations (World Bank 2007; Doepke *et al.* 2012; Duflo 2012). The types of technological advances that drove demand for female labour in the developed nations have spread less far in the developing world (Goldin 2006), access to contraceptive methods, which enable control over reproduction and facilitate human capital investment, is more limited (Goldin and Katz 2002) and violence towards women is more prevalent and acceptable (Doepke *et al.* 2012).<sup>1</sup> Many women in these countries appear trapped in an equilibrium where the phenomena of low human capital investment and labour force participation and limited control over their bodies reinforce each other, leading to dependence on men for opportunities.

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

Targeting adolescents is key to empowering women. As dependence on parents comes to a close during adolescence, there is a central tension between whether women choose to delay childbearing and pursue some form of career, or become dependent on men (either as a wife or via temporary relationships). This is the period when women become fertile and when human capital investments critical to careers are taking place, or not. A lack of future labour market opportunities can reduce the incentives for young girls to invest in their human capital (Jensen 2012), leading to early marriage and childbearing, and potentially increasing their dependency on older men (Dupas 2011). In turn, teen pregnancy and early marriage are likely to have a decisive impact on the ability of young girls to accumulate human capital, and limit their future labour force participation (Field and Ambrus 2008; Bruce and Hallman 2008).<sup>2</sup> Economic empowerment and control over the body thus interact in a powerful way during adolescence. In consequence, interventions targeted towards girls at this stage of their life cycle might have higher returns than later timed interventions.

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<sup>1</sup> Indeed, Anderson and Ray (2010, 2012) point to violence towards women as a major cause of missing women among older cohorts in the developing world.

<sup>2</sup> Baird *et al.* (2011) document that marriage and schooling are mutually exclusive activities in Malawi, and Ozier (2011) provides similar evidence from Kenya. In Bangladesh, Field and Ambrus (2008) show that each additional year that marriage is delayed is associated with 0.3 additional years of schooling and 6.5 per cent higher literacy rates.

Whether or not adolescent girls can avoid early marriage and pregnancy and pursue meaningful careers will not only affect the quality of their individual lives but also influence the trajectory of economic development within a country, and can ultimately feed back into the further reinforcement of women's control over their bodies (Duflo 2012). Breaking women out of this low-empowerment equilibrium has become a priority for policy-makers in developing countries because of burgeoning youth populations and concerns over high rates of youth unemployment.<sup>3</sup> This is true throughout sub-Saharan Africa and especially in Uganda, the focus of this study. Uganda has the second lowest median age of all countries and the highest child dependency ratio, as shown in figure 1A (UNAIDS 2010). Uganda also has one of the highest rates of young women out of the labour force (86 per cent vs 58 per cent in 14 sub-Saharan countries). For those in the labour force, figure 1B shows that women tend to have higher unemployment rates than men, and this is especially pronounced in the youngest age cohorts. Finally, as figure 1C highlights, relative to their contemporaries in richer economies, the fertility rate of Ugandan women is three to four times higher and the gap is most pronounced among adolescents aged 15–19.<sup>4</sup>

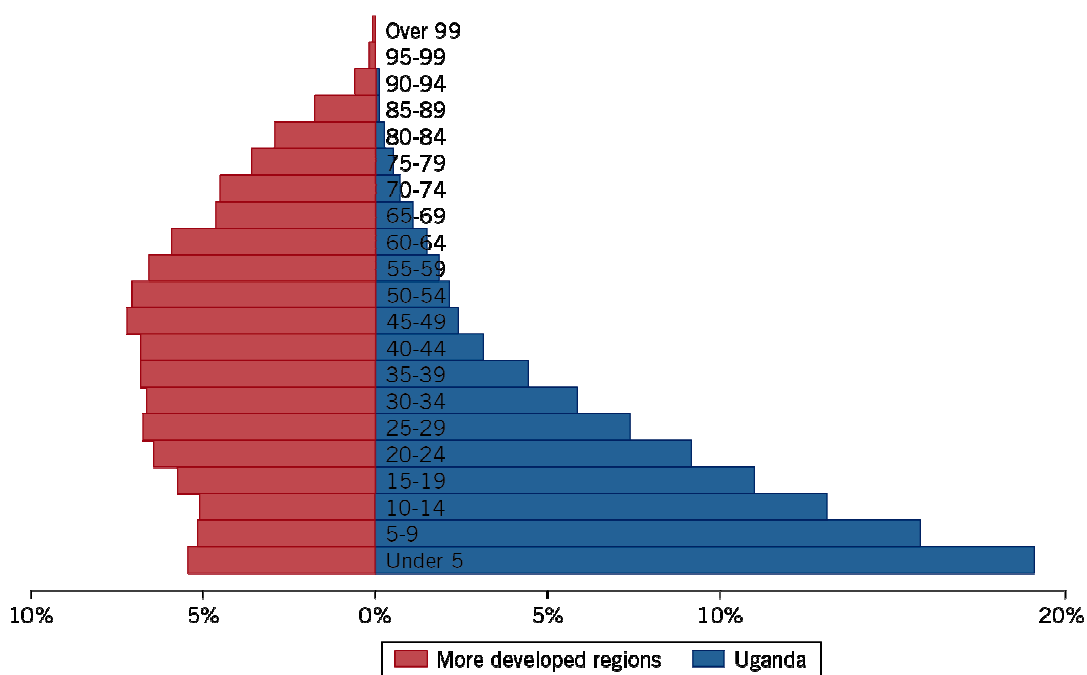
Against this background, the programme we evaluate aims to break the vicious circle between low labour force participation and high fertility by kick-starting human capital accumulation along two dimensions through the provision of: (i) vocational skills to enable adolescent girls to start small-scale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

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<sup>3</sup> The number of young people in the developing world is increasing: one billion people on the planet are aged between 15 and 24 and reside in a developing country, an increase of 17 per cent since 1995. Nowhere is this phenomenon more pronounced than in sub-Saharan Africa, where 60 per cent of the population is now aged below 25 (World Bank 2009). Youths face severe economic challenges, as they account for most of the region's poor and unemployed: in sub-Saharan Africa, 60 per cent of the total unemployed are aged 15–24, and on average 72 per cent of the youth population live on less than \$2 per day. The continued rise in the numbers of young people in the global population has led policy-makers to consider responses to what has now become termed the “youth bulge” (World Bank 2007). The central policy challenge is to provide increasing numbers of young people the skills and job opportunities to enable them to lead fulfilled and economically self-reliant lives in adulthood. There are a parallel set of concerns, emphasized more in the sociology and political science literatures, is that ever-rising numbers and proportions of young people in developing countries will be a key factor driving alienation, social unrest and demands for political reforms, as has been observed throughout North Africa and the Middle East recently (Fuller 1995, Goldstone 2002).

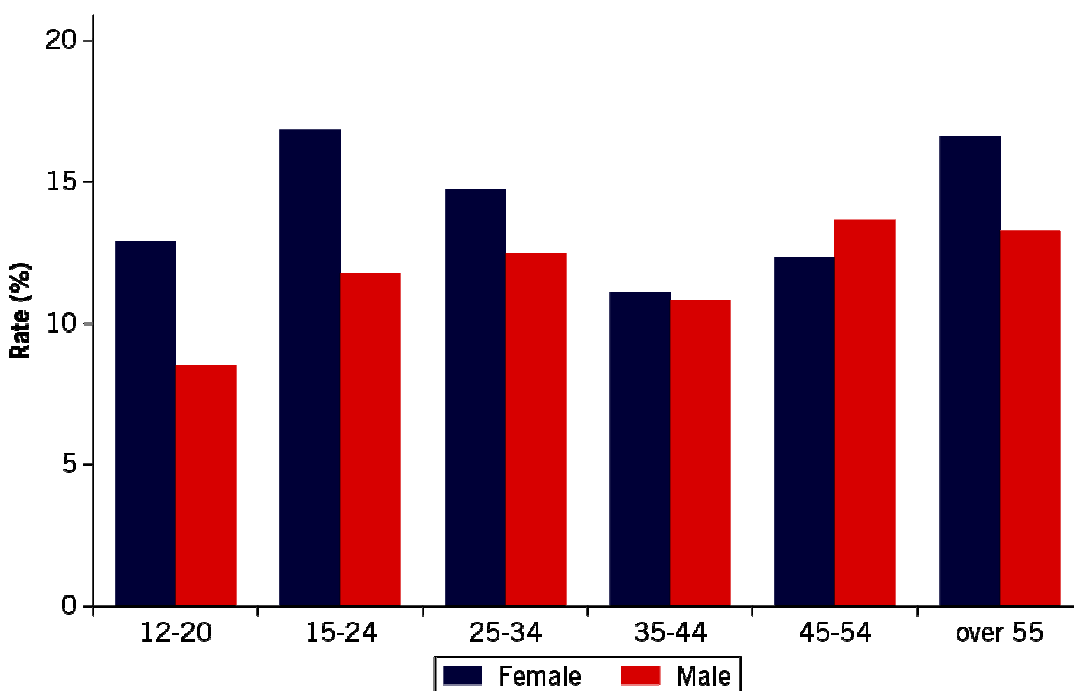
<sup>4</sup> Demographic and Health Survey data indicate that 38 per cent of the 52 million women aged 20–24 in developing countries were married before age 18 (Mensch *et al.* 2005) and these girls are often subject to unprotected sex. Girls aged 15–24 are almost eight times more likely than men to 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 breast-fed babies is responsible for the vast majority of new HIV infections in the region.

**Figure 1A. Female population by age, 2010**



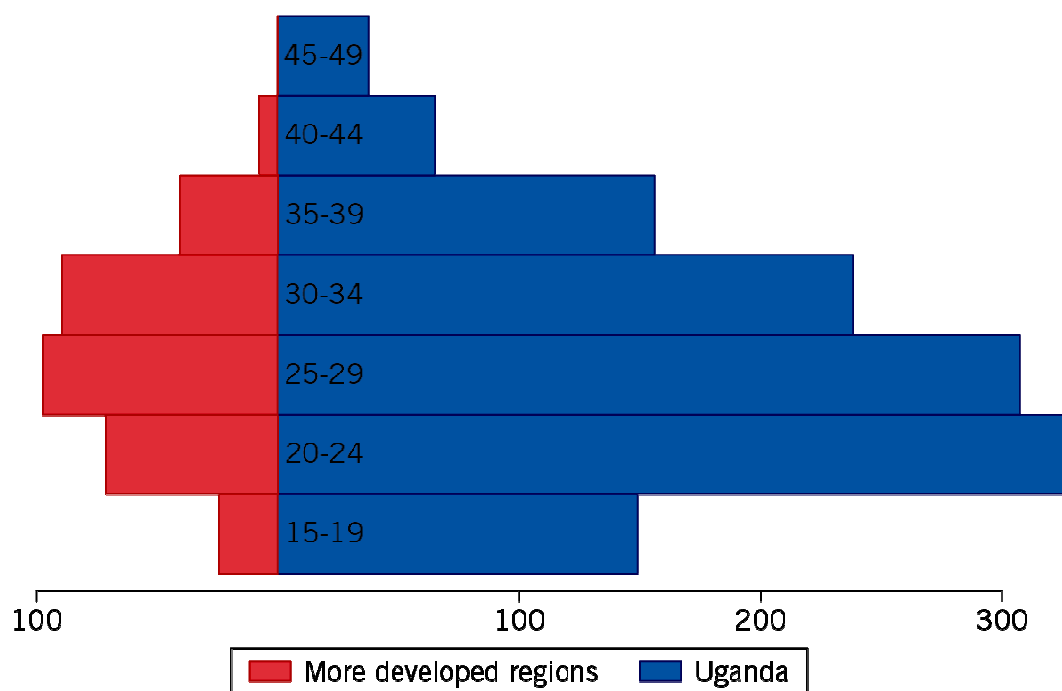
Notes: The data stems from the 2010 UN World Population Prospects database. More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.

**Figure 1B. Unemployment rates (%), by age and gender, Uganda 2005/6**



Notes: The data source is the Uganda National Household Survey (UNHS). Unemployment is defined as those who actively wanted a job but did not participate in any employment activities, inclusively self-employment and agricultural works. The UNHS is a nationally representative sample of 7,246 households.

Figure 1C. Age-specific fertility rate, 1995–2010



Notes: The data stems from the 2010 UN World Population Prospects database. 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.

The programme was developed in another country, Bangladesh, where female disempowerment is also a major issue. Between 1993 and 2013, the Bangladesh Rural Advancement Committee (BRAC), one of the world’s largest non-governmental organizations (NGOs), started almost 40,000 clubs that have reached one million adolescent girls. We worked with BRAC to evaluate the programme in an African setting where women face similar challenges to those faced in Bangladesh. Our aim is to examine whether combining vocational and life skills can empower Ugandan women along economic and reproductive dimensions. To date BRAC has started 1,200 clubs in Uganda which have reached 50,000 girls. BRAC has also started the programme in Tanzania, South Sudan and Sierra Leone, and it has been emulated by other NGOs in other African countries. There is thus a sense that an idea that originated in Bangladesh is now spreading across the African subcontinent where it may become a significant force for female empowerment.

We collaborated with BRAC to randomly assign the clubs across communities in our evaluation sample. In treatment and control communities we surveyed a representative sample of adolescent girls at baseline and two years later. Our evaluation is based on a panel of 4,800 adolescent girls. Participation is voluntary and unrelated to other BRAC activities. Participation rates are then informative of the latent demand for the vocational and life skills on offer. The take-up rate is 21 per cent, suggesting that a sizeable share of eligible girls are not held back by binding social norms over women’s labour force participation, teen childbearing and marriage.

Our findings indicate that the combined provision of vocational and life skills through the programme leads to quantitatively substantial advances in economic and social empowerment for adolescent girls in treated communities relative to girls in control communities. In terms of economic empowerment, intention-to-treat estimates imply that girls in treated communities are 7 percentage points (pp) more likely to engage in income-generating activities relative to girls in control communities: this corresponds to a 72 per cent increase in engagement in such activities over the baseline. This is almost entirely driven by additional engagement in self-employment activities. These labour market changes are accompanied by significant increases in monthly consumption expenditures

(by 41 per cent of their baseline value) and significant reductions in self-reported anxieties about finding a good job in adulthood.

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

The programme significantly improves control over the body for adolescent girls: there is a 26 per cent reduction in rates of early childbearing, and a 58 per cent reduction in rates of marriage/cohabitation. Most dramatically, the share of adolescent girls reporting having had sex unwillingly is 6 pp lower in treatment versus control communities, starting from a baseline level of 14 per cent. This is perhaps the clearest marker that the combination of life skills and vocational training successfully improves the adolescent girls' relationships quality. In line with the hypothesis that the life skills training underpins these changes, knowledge related to HIV and pregnancy significantly improves and self-reported condom usage increases by 28 per cent over baseline levels,

Finally, we evaluate changes in girls' expectations for ages at marriage and expected fertility, as well as aspirations for their own daughters (and sons). We find that among unmarried adolescent girls, suitable ages at marriage significantly increase, and desired fertility drops by 7 per cent (corresponding to around 0.2 of a standard deviation). The programme thus offers potential to set into motion processes and beliefs that delay age at first marriage and childbearing. As such, these girls' lives might then improve along dimensions that have been shown to be associated with such delays such as improved marriage quality, increased decision-making within households and reduced exposure to domestic violence (Goldin and Katz 2002; Jensen and Thornton 2003; Field and Ambrus 2008). Girls' expectations about their own daughter's age at marriage also increase, offering a mechanism through which such impacts on social empowerment might be compounded into a virtuous cycle over generations.

Taken together, our findings indicate that low levels of human capital are key to limiting women's labour force participation and control over the body in this context. The fact that the programme changes girls' lives on dimensions of economic and social empowerment in a short span of time casts doubt on the hypothesis that slow changing social norms are insurmountable hurdles that keep women out of the labour force and push them towards teen pregnancy and early marriage.

Our paper contributes to the literature evaluating the impact of mostly single-pronged life skills and vocational training interventions, which are two major policy instruments being utilized to address economic and health challenges for youth around the developing world. As a body of randomized control trials suggest, these single-pronged programmes have met with, at best, rather mixed success (Gallant and Maticka-Tyndale 2004; Cornish and Campbell 2009; McCoy et al. 2010; Card et al. 2011; Groh et al. 2012).

Our findings complement a small body of research that use large-scale randomized control trials to provide evidence on the interlinkages between economic and reproductive challenges that adolescent girls face in developing countries. Closely related to our work, Duflo et al. (2012) also investigate a two-pronged intervention: a school-based HIV prevention programme in Kenya coupled with subsidies to attend school, and present evidence highlighting the joint determination of schooling and pregnancy outcomes for adolescent girls. The idea that improvements in income-generating activities among girls



might reduce teen pregnancy and marriage is in line with the nascent literature using field experiments to estimate income elasticities of these outcomes.<sup>5</sup>

The paper is organized as follows. Section 2 details the adolescent club intervention and its implementation. Section 3 describes the research design, data and estimation strategy. Section 4 presents estimates of the programme's two-year impacts on income-generating activities, on sex, reproduction and marriage, and on adolescent girls' aspirations. It also provides a cost-benefit analysis of the programme. Section 5 discusses the broader implications of our findings for policies designed to address the economic and reproductive challenges facing the ever-growing numbers of young people in the developing world today. The Appendix presents robustness checks dealing with multiple inference, heterogeneous treatment effects and sample attrition.

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<sup>5</sup> For example, Baird *et al.* (2011) find that 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. As in our work, this highlights the efficacy of providing adolescent girls information on how to reduce their exposure to pregnancy risks, is larger when reinforced by programme components that *simultaneously* empower girls to lead economically independent lives.

## 2. Background

The Empowerment and Livelihood for Adolescents (ELA) programme is designed to improve the lives of adolescent girls through a twin-pronged provision of skills. The programme is implemented by the NGO, BRAC Uganda.<sup>6</sup> In contrast to school-based information campaigns on adolescent health, the ELA programme operates through adolescent development clubs, a fixed meeting place in each community. Clubs are typically open five afternoons per week and timed so that girls enrolled full-time in school can attend. Club activities are led by a female mentor. Mentors are selected by programme staff from within the community, tend to be slightly older than the target population of girls, and receive a small lump-sum payment for their work. They are prepared for their role during a week-long initiation programme, as well as monthly refresher courses. The fact that mentors are close in age to mentees and have often successfully confronted challenges related to economic and social empowerment is likely to facilitate the transfer of knowledge.

Club participation is voluntary and unrelated to participating in other BRAC activities. Eligibility is based on gender and age: only adolescent girls aged between 14 and 20 are permitted to participate. Given the difficulties of verifying ages in this setting and the demand for club activities arising from other girls, in practice some girls outside of the 14-20 age range also attend the clubs. The two forms of skills training provided in the ELA programme are life skills training, and vocational skills training, both of which take place within the clubs. In addition, the clubs also host popular recreational activities such as reading, staging dramas, singing, dancing and playing games. As such, the clubs serve as a protected local space in which adolescent girls can meet, socialize and privately discuss issues of concern, and continue to develop their skills.<sup>7</sup>

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

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

The key topics covered in the life skills training sessions include sexual and reproductive health, menstruation and menstrual disorders, pregnancy, sexually transmitted infections, HIV/AIDS awareness, family planning, rape; other sessions cover enabling topics such as management skills, negotiation and conflict resolution, and leadership

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<sup>6</sup> The ELA programme has now been scaled up by BRAC to operate in Tanzania, Sierra Leone and South Sudan. Other organizations have also scaled up the ELA model to countries in sub-Saharan Africa and South Asia. Our results are likely to have external validity to these settings where girls' economic and social empowerment also starts out at very low levels.

<sup>7</sup> There is a nominal fee the girls are encouraged to pay to attend, although in practice this is often waived. Hence binding credit constraints are unlikely to be the main driving force behind non-participation.

among adolescents; a final class of life skills training focuses on providing girls with legal knowledge on women's issues such as bride price, child marriage and violence against women. These life skills training sessions are conducted either by the trained mentors and/or BRAC's own professional staff.<sup>8</sup> The overarching aim of the life skills component of the programme is to socially empower girls by enhancing the control that adolescent girls have over their own bodies.

Two further points are of note. First, given the age range of targeted girls, some of them are enrolled in school, others have graduated, while others have dropped out. Although the clubs operate outside of school times, emphasis is still placed on ensuring girls do not drop out of school, or reduce the hours they devote to studying, in order to join the club and engage in its activities. We later provide evidence that the programme had no adverse impact on the educational investments of participants, and indeed the evidence suggests that the two activities might be complements.

Second, the current evaluation examines the impacts of the programme on outcomes related to income-generating activities, sex, childbearing and marriage/cohabitation two years after the initiation of the ELA programme in treated communities. Subsequently, the programme has expanded to include a (randomly assigned) microfinance component that offers participating older adolescents the opportunity to take on credit in order to capitalize on their entrepreneurial potential and newly acquired skills during the vocational training. At the time of this evaluation, adolescent club participants were unaware of the potential future offer of microfinance. BRAC staff were also unaware of which clubs would be randomly assigned to receive microfinance. Thus the evaluation we conduct is based solely on the provision of vocational skills and life skills training over the first two years of the programme. We later confirm that the anticipation of microfinance does not drive any of our core findings.

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<sup>8</sup> The skills provided overlap those studied in the separate literature on basic business skills training (Field *et al.* 2010; Drexler *et al.* 2010; Karlan and Valdivia 2010) and earlier studies focused on health-related education programmes (Gallant and Maticka-Tyndale 2004; Cornish and Campbell 2009; Dupas 2011). We later review our findings relative to each of these literatures.

### 3. Design, data and estimation

#### 3.1 Research design

We evaluate the ELA programme using a randomized control trial. BRAC has established branch offices throughout Uganda, ten of which were chosen for the evaluation. Five of these branches are located in the urban or semi-urban regions of Kampala and Mukono; the other branches are located in the mostly rural region around Iganga and Jinja. In each branch, 15 communities with the potential to host an ELA club were identified. From this list, ten locations within each branch office were randomly assigned to the receive the treatment, i.e. to set up a club and deliver the ELA programme, with the remaining five locations randomly assigned as controls. In each treatment community, a single club was opened up. Hence, the research design delivers 100 treatment and 50 control communities, stratified by branch office.<sup>9</sup>

The practicalities of programme implementation led to possible non-compliance with the research design: an adolescent girl resident in a control community wishing to attend a club in a treated community is always able to do so.<sup>10</sup> However, in practice the number of participants from control communities is negligible, and such non-compliance biases the estimated impact towards zero. Of course in treated communities, as club participation is voluntary, not all eligible girls will comply with the design and decide to take up the offer of receiving the ELA programme. We therefore later estimate both intention-to-treat (ITT) and treatment-on-treated (TOT) impacts.

#### 3.2 Data, attrition and descriptives

The primary data sources are a survey administered to adolescent girls conducted at baseline, and a follow-up survey two years after the ELA programme was initiated. Baseline interviews were conducted from March to June 2008. The vast majority of ELA clubs were established between June and September 2008, and the follow-up survey was fielded from March to June 2010. The questionnaire covers topics including: (i) those directly related to the vocational skills component, such as financial literacy, analytical ability, labour market and income-generating activities; (ii) those related directly to the life skills component, such as engagement in sex, childbearing and marriage/cohabitation, HIV-related knowledge; (iii) other margins such as educational investments, time use, expenditures, and further measures of economic and social empowerment.

In total, at baseline 5,966 adolescents were surveyed: 3,964 reside in treatment communities, and 2,002 girls in controls, with an average of 39.9 (39.7) girls being surveyed in each rural (urban) community. Despite the high degree of geographic mobility of girls in Uganda in this age range, 4,888 adolescents were tracked to follow-up, corresponding to a two-year tracking-rate of 82 per cent.

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<sup>9</sup> For exposition purposes, we will refer to *communities* as the unit of randomization. For the rural branches these correspond to villages. For the branches located in urban or semi-urban regions of Kampala and Mukono, the randomized units often correspond to smaller urban areas or slums.

<sup>10</sup> In some urban areas, the distance to the nearest club might be quite similar in treatment and control communities. In rural locations, although BRAC places much emphasis on finding suitable club locations in the centre of treatment locations, inevitably some clubs are located in more peripheral village locations – due to a lack of available space in the village centre.

This is comparable to tracking rates from studies in similar contexts.<sup>11</sup>

Table A1 (see Appendix) shows the correlates of two-year attrition. The dependent variable is a dummy equal to one if the girl attrits. Column 1 shows that residing in a treatment community does not predict attrition. Column 2 shows this to be robust within branch, and column 3 shows that the result holds conditioning on individual characteristics at baseline. Moreover, these characteristics (age, current enrolment in school, being married/cohabiting or having children) themselves do not predict attrition. Column 4 examines how individual characteristics differentially relate to attrition between treated and control communities. We find no evidence that some adolescent girls in treated communities are differentially likely to attrit by age, current enrolment, whether they are married/cohabiting at baseline, nor by whether they have children at baseline. This result continues to hold when attrition is predicted using a probit specification, as shown in column 5. We later present robustness checks on our core findings that account for attrition.

### *Baseline characteristics*

Table 1 shows the baseline characteristics of adolescent girls, by treatment status. Panel A shows that girls in our sample are on average 16 years old. Panel B presents evidence on an index of “gender empowerment”, scaled from 0 to 100. This is based on multiple questions relating to gender roles in labour markets, education and household chores. A higher index value corresponds to girls believing that tasks should be gender neutral or more equally split by genders.<sup>12</sup> In control communities, the index average is just 32 (out of 100). Panel B also contains evidence on girls’ own assessment of their entrepreneurial ability, which is 72 (out of 100).<sup>13</sup>

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<sup>11</sup> Friedman *et al.* (2011) achieve an effective tracking rate of nearly 80 per cent after four years for a sample of Kenyan females of ages similar to those we study. Duflo *et al.* (2012) report an attrition rate of 49 per cent from during their follow-up six to seven years after the initial interview in their sample of female Kenyans (aged 14 at baseline). Second-round intensive tracking lifts the effective tracking rate to 89 per cent.

<sup>12</sup> The empowerment index is a variable that cumulates the number of times a respondent answers “Both/Same” to the following questions: “Who should earn money for the family?”, “Who should have a higher level of education in the family?”, “Who should be responsible for wash-ing, cleaning and cooking?”, “If there is no water pump or tap, who should fetch water?”, “Who should be responsible for feeding and bathing children?”, “Who should help the children in their studies at home?” and “Who should be responsible for looking after the ill persons?” The other possible answers given to the respondent were “Male” and “Female”. The index is then rescaled such that 100 indicates that the respondent answered that both sexes should be responsible for the mentioned activities.

<sup>13</sup> The entrepreneurial index consists of cumulative ranks (scaled from one to ten with ten being the highest) of the following activities: “Run your own business”, “Identify business opportunities to start up new business”, “Obtain credit to start up new business or expand existing business”, “Save in order to invest in future business opportunities”, “Make sure that your employees get the work done properly”, “Manage financial accounts”, “Bargain to obtain cheap prices when you are buying anything for business (inputs)”, “Bargain to obtain high prices when you are selling anything for business (outputs)”, “Protect your business assets from harm by others”, “Collecting the money someone owes you”. We then rescale the sum of these scores to run from 0 to 100.

**Table 1. Descriptive statistics on adolescent girls, by treatment status means (standard errors in parentheses, standard deviations in brackets)**

		(1) Treatment	(2) Control	(3) Difference	(4) Normalized difference
A. Demographics	Age	16.3 [2.80]	16.4 [2.96]	-0.094 (0.168)	-0.023
B. Indices	Gender empowerment index (0–100 score)	28.5 [24.2]	31.6 [24.5]	-3.12 (2.03)	-0.091
	Entrepreneurial ability (0–100 score)	69.6 [24.6]	71.6 [25.0]	-1.94 (1.78)	-0.055
C. Income generation	Engaged in any IGA (yes = 1)	0.124 [0.330]	0.095 [0.293]	0.029* (0.015)	0.066
	Self-employment (yes = 1)	0.070 [0.255]	0.060 [0.237]	0.010 (0.010)	0.029
	Wage employment (yes = 1)	0.057 [0.233]	0.036 [0.186]	0.021** (0.010)	0.071
D. Welfare	Satisfaction with earnings/income (0–6 score)	1.17 [1.70]	1.38 [1.87]	-0.203 (0.126)	-0.080
	Never worry about getting a good job in adulthood (yes = 1)	0.418 [0.493]	0.400 [0.490]	0.018 (0.027)	0.026
	Expenditure on goods in the last month (UGX)	12397 [19181]	11454 [18487]	943 (1031)	0.035
E. Education	Currently enrolled in school (yes = 1)	0.713 [0.452]	0.712 [0.453]	0.0008 (0.028)	0.001
	If enrolled, hours spent on going to and attending school, homework and study per week	61.9 [18.2]	61.5 [20.0]	0.446 (2.00)	0.016
	If dropped out, plan to start/go back to school (yes = 1)	0.522 [0.500]	0.539 [0.499]	-0.017 (0.039)	-0.025

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression using the baseline data only and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge (2009).

The gender empowerment index is a variable that cumulates the number of times a respondent answers “Both/Same” to the following questions: “Who should earn money for the family?”, “Who should have a higher level of education in the family?”, “Who should be responsible for washing, cleaning and cooking?”, “If there is no water pump or tap, who should fetch water?”, “Who should be responsible for feeding and bathing children?”, “Who should help the children in their studies at home?” and “Who should be responsible for looking after the ill persons?” The other possible answers given to the respondent were “Male” and “Female”. The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities.

The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): “Run your own business”, “Identify business opportunities to start up new business”, “Obtain credit to start up new business or expand existing business”, “Save in order to invest in future business opportunities”, “Make sure that your employees get the work done properly”, “Manage financial accounts”, “Bargain to obtain cheap prices when you are buying anything for business (inputs)”, “Bargain to obtain high prices when you are selling anything for business (outputs)”, “Protect your business assets from harm by others”, “Collecting the money someone owes you”. The index for satisfaction with earnings/ income is the reversed and rescaled respondent’s self-assessment on a 7-point score (where originally “1” is completely happy and “7” is not at all happy) The top 1% outliers of the expenditure variable have been removed. All monetary variables are deflated and expressed in terms of the price level in January 2008 using the monthly consumer price index published by the Uganda Bureau of Statistics.

		(1) Treatment	(2) Control	(3) Difference	(4) Normalized difference
F. Childbearing and marriage	Has child(ren) (yes = 1)	0.105 [0.307]	0.105 [0.306]	0.0002 (0.018)	0.0006
	Married or cohabiting (yes = 1)	0.095 [0.293]	0.120 [0.325]	-0.026* (0.015)	-0.058
G. Sexual violence	Had sex unwillingly in the past year (yes = 1)	0.205 [0.404]	0.142 [0.350]	0.062*** (0.024)	0.117
H. Knowledge	Pregnancy knowledge (0–1 score)	0.739 [0.439]	0.746 [0.436]	-0.006 (0.027)	-0.010
	HIV knowledge (0–6 score)	3.82 [1.24]	3.78 [1.24]	0.047 (0.082)	0.027
I. Contraception	If sexually active, always uses condom (yes = 1)	0.514 [0.500]	0.514 [0.500]	0.0004 (0.042)	0.0006
	If sexually active, uses other contraceptives (yes = 1)	0.145 [0.353]	0.175 [0.380]	-0.030 (0.028)	-0.057
J. Marriage	Suitable age for marriage for a woman	24.0 [3.08]	23.9 [3.14]	0.113 (0.218)	0.026
	Suitable age for marriage for a man	27.9 [3.72]	28.0 [3.70]	-0.111 (0.201)	-0.021
K. Childbearing	Preferred number of children	4.21 [1.55]	4.14 [1.43]	0.077 (0.104)	0.036
	Suitable age for women to have the first baby	24.0 [3.15]	23.7 [3.26]	0.236 (0.263)	0.052
L. Children's marriage	Preferred age at which daughter(s) get married	25.0 [2.82]	24.8 [2.78]	0.154 (0.170)	0.039
	Preferred age at which son(s) get married	28.5 [3.23]	28.4 [3.24]	0.129 (0.173)	0.028

Notes: \*\*\* Significance at 1%, \*\* at 5%, and \* at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression using the baseline data only and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge (2009).

The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement “A woman cannot become pregnant at first intercourse or with occasional sexual relations” as true or false.

The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are “A person who has HIV is different from a person who is ill with AIDS”, “During vaginal sex, it is easier for a woman to receive the HIV virus than for a man”, “Pulling out the penis before a man climaxes keeps a 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”.

All variables indicating ages in panels J, K and L were trimmed at 15 years or younger. Indicated ages of 51 years or older are removed from the variable “Anticipated age at marriage”.

Despite this, panel C shows that only 6 per cent of girls report being self-employed in control communities: the type of income-generating activity the ELA programme particularly fosters.<sup>14</sup> Rates of wage employment are even lower (3.6 per cent) at baseline and overall only 9.5 per cent of girls are engaged in any income-generating activities in treated communities at baseline.

Panel D shows that girls are dissatisfied with their earnings (the mean in control communities is 1.4 on a 0–6 scale) and 60 per cent worry they will not find a job as adults. Taken together, the statistics in panels B, C and D illustrate that economic empowerment is extremely low among the sampled girls, a circumstance typical for much of the developing world (Doepke et al. 2012).

Panel F presents evidence on the social empowerment of adolescent girls at baseline. Despite their young age, 11 per cent of girls already have at least one child and around 12 per cent of them are already married or in a cohabiting relationship. Taken together, the statistics in panel F illustrate that low economic empowerment is associated with early childbearing and marriage in Uganda.

Panel G illustrates how high the incidence of girls having sex against their will is in the communities we study. In control communities at baseline, 14 per cent report having had sex unwillingly in the past year. This signals a striking lack of control that adolescent girls have over their bodies in these communities.

In panel H we see that one in four of them incorrectly answer a very basic question related to pregnancy knowledge that asks whether “A woman cannot become pregnant at first intercourse or with occasional sexual relations”. Girls score around 3.8 on a 0–6 scale of HIV knowledge on average, yet there is considerable variation in this metric: at the tails of the knowledge distribution, 4.9 per cent of girls correctly answer all the questions and 2.2 per cent provide no correct answers.<sup>15</sup> In panel I on contraception we see that only 51 per cent of adolescent girls report always using a condom if they are sexually active and only 18 per cent report using some other form of contraceptive. This helps us to understand why teenage pregnancies are common in these communities.

Panels J, K and L reveal that adolescent girls believe that women should get married at around 24 years of age and men at 28, and that women should bear four children (starting at age 24). Clearly, observed behaviour departs significantly from these ideals. Preferred ages of marriage for children at baseline are only slightly older: 25 for daughters and 28.4 for sons.

Table 1 also shows that on most dimensions treatment and control samples are balanced. The null of equal means is rejected for only three out of the 24 outcomes considered: the likelihood to be engaged in wage labour, to have had sex against one’s will, and to be married/cohabiting. Girls in treated communities are more likely to report having had sex unwillingly and less likely to be married/cohabiting. However, in all cases the normalized differences are small relative to the sample variation, and well below the rule of

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<sup>14</sup> The rates of self-employment reported in our baseline sample match closely with those from the nationally representative Uganda National Household Survey 2005/2006 based on over 7,200 households. There we find that among those in the labour force, self-employment rates for 10–12- and 12–20-year-olds are 7 per cent

<sup>15</sup> The HIV knowledge index is based on the number of statements correctly identified as true or false. The statements are: (i) “A person who has HIV is different from a person who is ill with AIDS”; (ii) “During vaginal sex, it is easier for a woman to receive the HIV virus than for a man”; (iii) “Pulling out the penis before a man climaxes keeps a woman from getting HIV during sex”; (iv) “A woman cannot get HIV if she has sex during her period”; (v) “Taking a test for HIV one week after having sex will tell a person if she or he has HIV”; (vi) “A pregnant woman with HIV can give the virus to her unborn baby”.



thumb value of 0.25 (Imbens and Wooldridge 2009). Our empirical specification also controls for outcomes at baseline throughout.

### Club participation

To get a sense of the intensity of treatment arising from the ELA programme, table 2 documents participation in the adolescent development clubs measured at follow-up. Only a sufficiently time-intensive intervention is likely to relax the key underlying constraints limiting economic and social empowerment in the first place.

**Table 2. Descriptive statistics on adolescent girls, by treatment status means (standard errors in parentheses, standard deviations in brackets)**

	(1) Treatment	(2) Control	(3) Difference	(4) Normalized difference
Have heard about club (yes = 1)	0.589 [0.492]	0.398 [0.490]	0.193*** (0.030)	0.275
Have ever participated in club activities, conditional on having heard about club (yes = 1)	0.206 [0.405]	0.047 [0.212]	0.156*** (0.016)	0.348
Continued participation, conditional on ever having participated (yes = 1)	0.630 [0.483]			
Attend(ed) club meetings at least 3 times a week, conditional on ever having participated (yes = 1)	0.273 [0.446]			
Attend(ed) club meetings 1 or 2 times a week, conditional on ever having participated (yes = 1)	0.494 [0.500]			
Received life skills training, conditional on ever having participated (yes = 1)	0.847 [0.360]			
Received livelihood skills training, conditional on ever having participated (yes = 1)	0.527 [0.500]			
Received life and livelihood skills training, conditional on ever having participated (yes = 1)	0.509 [0.500]			

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge (2009).

The indicators for having received life skills and/or livelihood skills are elicited from respondents' declarations to having participated in the corresponding training sessions at least very few times. Examples of training areas mentioned for the life skill training include learning about pregnancy or HIV. Examples of training areas mentioned for the livelihood training include training in hairdressing, computers and poultry-rearing.

The second row highlights that in treated communities the participation rate is 21 per cent.<sup>16</sup> Given that attendance is entirely voluntary, this suggests there is demand for the services provided by ELA and that, at least for some girls, the skills constraints the programme aims to ease are binding. In some urban areas the distance to the nearest club from some pairs of treatment and control communities is similar. As a result we note that 4.7 per cent of those in control communities have ever participated in ELA club activities in

<sup>16</sup> It is perhaps useful to contrast the take-up rate for those in microfinance projects. Karlan *et al.* (2010) provide evidence from two surveys and 13 interventions providing credit, savings or insurance services. They document take-up rates varying from 2 to 84 per cent. In the context of business skills/entrepreneurship interventions, McKenzie and Woodruff (2014) also cite low take-up rates in many studies.

the past. However, the vast majority of girls that initially did attend from control communities do not continue to do so for very long.

Appendix table A2 shows how participants and non-participants in treatment communities differ. On characteristics related to demographics, sex, childbearing and marriage/ cohabitation and income-generating activities related to wage and self-employment, participants do not significantly differ from non-participants. Hence, participants do not appear to be strongly negatively or positively selected on the various measures of economic and social empowerment.

The remaining rows in table 2 report statistics conditional on club participation in treated communities, which relate to the intensity of the treatment. We focus on treatment communities as the number of regular participants from control communities is negligible. The table shows that the majority of adolescents who have ever participated in ELA club activities continued their engagement until follow-up. Nearly half of all participants have attended club meetings, on average, one or two times a week, over the two years of the club's operation. Hence, the intervention amounts to a considerable time investment for participants over two years, and it is plausible that such an intense treatment causes permanent shifts in knowledge and skills, that can drive changes in behaviours that correspond to girls' gaining economic and social empowerment.

By follow-up, a substantial proportion of club participants have taken part in the training on life skills (84.7 per cent) and vocational skills (52.7 per cent). The majority of girls (50.9 per cent) report having received both forms of training; we can therefore infer that 33 per cent take up only life skills training, and 1 per cent take up only vocational skills training. As participation in either or both trainings is voluntary, revealed preference suggests the two programme components are complementary for the majority of participants.<sup>17</sup>

To conclude, it is useful to overview the key innovative differences between this intervention and the set of business training and entrepreneurship evaluations covered in the review by McKenzie and Woodruff (2014): (i) it targets adolescent girls, the majority of whom do not already engage in self-employment activities at baseline; (ii) it has an intense training period lasting far longer than a few weeks; (iii) the training covers general business skills as well as technical knowledge and sector specific content; (iv) it bundles together vocational skills with life skills that aim to simultaneously raise girls' social empowerment. Taken together, this opens up the possibility that such a twin-pronged programme can have greater impacts on the lives of adolescent girls than has been documented from many earlier single-pronged programmes that have focused on economic or reproductive health constraints in isolation.

### 3.3 Estimation

We first estimate the ITT impact of the ELA programme. Given random assignment of communities to treatment and control status, estimating the ITT impact of the ELA programme with ordinary least squares (OLS) is straightforward. We estimate ELA's

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<sup>17</sup> We have explored the possibility that these take-up rates are driven by supply-side constraints rather than demand-side heterogeneity (and so under plausible assumptions might be used to separately identify the impact of each component of the ELA programme). This, however, is not the case: in nearly all treated communities we observe that (i) some eligible girls choose to take up a component and other girls do not; (ii) the vast majority of eligible girls report life and livelihood skills training as being available even if they don't themselves take up the course(s). In addition, we do not find school enrolment at baseline to be a significant determinant of enrolment in the vocational training component, which might otherwise have been indicative of implicit supply-side constraints preventing some girls from participating.

impact on outcome  $y_{ijt}$  measured for adolescent  $i$  living in community  $j$  at follow-up ( $t = 1$ ) using the following specification:

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

$X_{ij0}$  controls for the adolescent's age at baseline ( $t = 0$ ), and we also include a series of indicator variables for branch areas as we stratify the sample of communities by branch before randomly assigning them to treatment or control status (Bruhn and McKenzie 2009).  $treat_j$  equals one if community  $j$  is assigned to be treated and zero otherwise. To improve the efficiency of the estimated treatment effect, we control for the baseline level of each outcome variable  $y_{ij0}$  (McKenzie 2012).  $\varepsilon_{ijt}$  is a disturbance term that we allow to be clustered by community  $j$  because there are likely to be common unobserved factors within communities that determine outcomes.  $\gamma$  is the coefficient of interest, measuring the ELA programme's ITT impact.

Three further points are of note. First, while the OLS specification in (1) is our base configuration, some outcomes related to dichotomous or censored outcomes. In such cases we also report ITT estimates based on non-linear probit and tobit specifications analogous to (1). Second, (1) is estimated only from those adolescents that are in the panel sample. As discussed above and in table A1, there is little evidence of differential attrition on observables across treatment and control communities.

Third, given that participation into the club is far from universal, the ITT estimates underestimate the impact of the programme on actual club participants. We therefore also present estimates of the TOT effect of the programme following a standard approach of instrumenting individual club participation with  $treat_j$ , the community treatment dummy. The impacts are computed using a standard two-stage least squares procedure and, therefore, all coefficients are computed using a linear probability model in the first stage (Angrist 2001). In the first stage, we regress a dummy variable for participation on the treatment dummy, branch fixed effects and individual baseline characteristics  $X_{ij0}$ . The coefficient on the treatment dummy is 0.157 and is significant at the 1 per cent level. The  $F$ -statistic from the first stage is 97.4. Under the assumption that treatment assignment has no spillover impacts on non-participants, the IV estimate then produces the local average treatment effect on those that are induced to participate in the presence of a club in their community.<sup>18</sup>

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<sup>18</sup> We also experimented with a first-stage specification using additional instruments based on distance from the girls' household to the club to estimate impacts of average treatment effect (ATE). The instrument validity, however, may be potentially undermined if the distance measure correlates with the outcome variable because, for example, the distance proxies for school and market opportunities, infrastructure or parental background. To counter this concern, we also additionally included a control variable for the distance between the adolescent's household and the nearest BRAC branch office. These offices tend to be located at a central point such as the main street in urban settings or the main trade centre or town in more rural areas. The inclusion of this variable is thus intended to control for at least one potential dimension of geographical remoteness. The first-stage regressions then confirmed that treatment assignment and distance to the club were significantly correlated to participation (distance to the nearest BRAC branch office had no significant impact on the likelihood of participation). Moreover, in the second stage, the estimated ATE impacts were similar for the majority of life and livelihood skills out-comes documented. However, the distance measures are computed from GPS coordinates and this spatial data is only available for a subset of respondents. Hence we focus on the TOT (local ATE) estimates that use only treatment assignment as an instrument.

## 4. Results

In this section we present estimates of the programme impacts on economic empowerment (table 3), as reflected in business skills and income-generating activities, and control over the body (table 4), as reflected in, childbearing, marriage and sex and on aspirations on childbearing and marriage (table 5). Each results table follows the same format: to benchmark the magnitude of the difference in outcome between treatment and control communities, in column 1 we show the baseline value of each outcome in control communities.<sup>19</sup> Column 2 shows the number of adolescents in the panel sample used to estimate each outcome. Column 3 reports the ITT estimate from column 1, and column 4 reports ITT probit estimates for all dichotomous outcomes: all of the documented impacts are qualitatively robust to this change in specification. The final column reports TOT impacts from actual participation on each outcome, where club participation is instrumented by the offer of treatment. To ease exposition across many outcomes, the results tables present only the coefficient of interest,  $\hat{\gamma}$ .

### 4.1 Economic empowerment: Business skills and income generation

The first row of table 3 reports the estimated treatment effects on the gender empowerment index. The ITT estimates indicate that by endline this is 2.86 points higher for adolescent girls in treated communities than for those in control communities, corresponding to an increase of 9 per cent of the sample mean (in control communities) at baseline. For treated girls, the TOT estimate in column 5 shows the index is 18.3 points higher, 58 per cent of the sample mean. These are large effects. Figure 2A presents a spider graph showing the ITT impacts (and their associated 95 per cent confidence interval) for each component of the gender empowerment index. The red line shows the ITT impact along each component, and the black line shows the boundary for a zero impact. On key dimensions such as earning money, obtaining higher levels of education, feeding and bathing children and fetching water, we see that adolescent girls in treatment communities (relative to those in control communities) feel that both sexes should take part in these activities. The pattern we observe in figure 2A is consistent with girls gaining a more equal footing in the workplace and in the home relative to their male counterparts. This represents a significant shift as regards the role of the sexes in income generation, education and the performance of household tasks and in a direction that is towards that observed in developed countries.

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<sup>19</sup> Where values would naturally rise as girls get older, as is the case for labour force participation, childbearing, marriage and sex, we also later refer to endline values in control communities to help benchmark impact magnitudes.

**Table 3. The impact of the ELA programme on the economic empowerment of adolescent girls coefficients (standard errors in parentheses, standard deviations in brackets)**

	Outcome	(1) Baseline levels, control	(2) Sample size	(3) ITT , OLS	(4) ITT, probit marginal effects	(5) TOT
A. Indices	1. Gender empowerment index (0–100 score)	31.6 [24.5]	4,831	2.86*** (0.932)		18.3*** (6.27)
	2. Entrepreneurial ability (0–100 score)	71.6 [25.0]	4,765	5.63*** (0.982)		35.6*** (7.75)
B. Income	3. Engaged in any IGA (yes = 1)	0.095 [0.293]	4,831	.068*** (0.016)	.071*** (0.015)	.434*** (0.097)
	4. Self–employment (yes = 1)	0.060 [0.237]	4,831	0.059*** (0.012)	0.060*** (0.011)	0.375*** (0.074)
	5. Wage employment (yes = 1)	0.036 [0.186]	4,831	0.009 (0.007)	0.007 (0.006)	0.056 (0.046)
C. Welfare	6. Satisfaction with earnings/income (0–6 score)	1.380 [1.87]	1,191	.216 (0.143)		1.61 (1.01)
	7. Never worry about getting a good job in adulthood (yes = 1)	0.400 [0.490]	4,637	0.072*** (0.018)		0.453*** (0.124)
	8. Expenditure on goods in the last month (UGX)	11.45 [18.487]	4,752	4.676*** (950)	0.075*** (0.019)	29.944*** (5.991)
D. Education	9. Currently enrolled in school (yes = 1)	0.712 [0.453]	4,831	-0.018 (0.017)	-0.021 (0.020)	-0.118 (0.108)
	10. If enrolled, hours spent on going to and attending school, homework	61.5 [20.0]	2,423	1.59* (0.892)		11.2* (6.67)
	11. If dropped out, plan to start/go back to school (yes = 1)	0.539 [0.499]	739	0.076** (0.037)	0.080** (0.039)	0.485* (0.269)

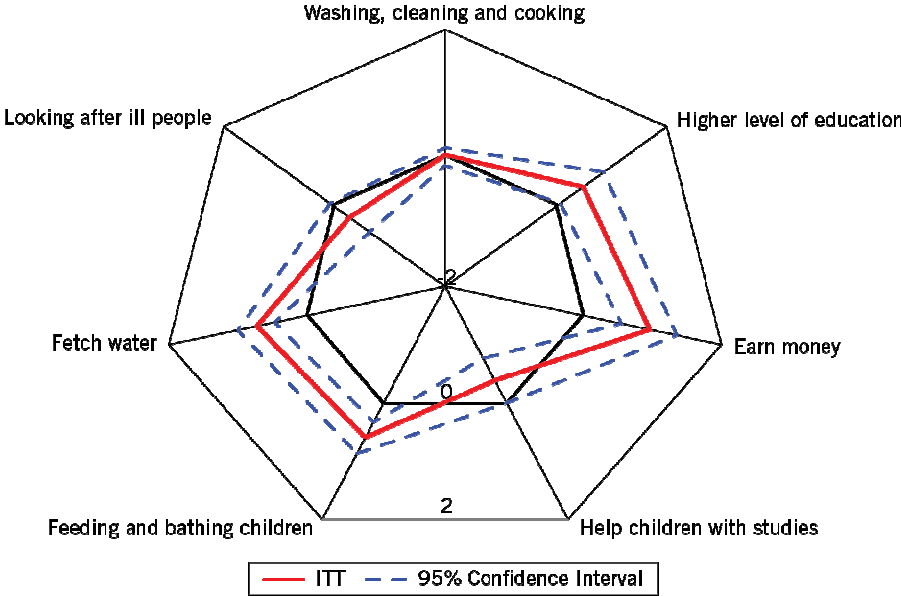
Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors are clustered by community. The control variables include the adolescent age and a series of indicator variables for branch areas.

The gender empowerment index is a variable that cumulates the number of times a respondent answers “Both/Same” to the following questions: “Who should earn money for the family?”, “Who should have a higher level of education in the family?”, “Who should be responsible for washing, cleaning and cooking?”, “If there is no water pump or tap, who should fetch water?”, “Who should be responsible for feeding and bathing children?”, “Who should help the children in their studies at home?” and “Who should be responsible for looking after the ill persons?” The other possible answers given to the respondent were “Male” and “Female”. The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities.

The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): “Run your own business”, “Identify business opportunities to start up new business”, “Obtain credit to start up new business or expand existing business”, “Save in order to invest in future business opportunities”, “Make sure that your employees get the work done properly”, “Manage financial accounts”, “Bargain to obtain cheap prices when you are buying anything for business 2 assessment on a 7 point score (where originally “1” is completely happy and “7” is not at all happy). For the expenditure variable, the goods categories are jewelry/ornaments, cosmetics/makeup, clothes, hairdressers, shoes/footwear, going to restaurants/bars/teashop/cafe, talk time for your mobile phone and presents/gifts. The top 1% outliers of the expenditure variable have been removed. All monetary variables are deflated and expressed in terms of the price level in January 2008 using the monthly consumer price index published by the Uganda Bureau of Statistics.

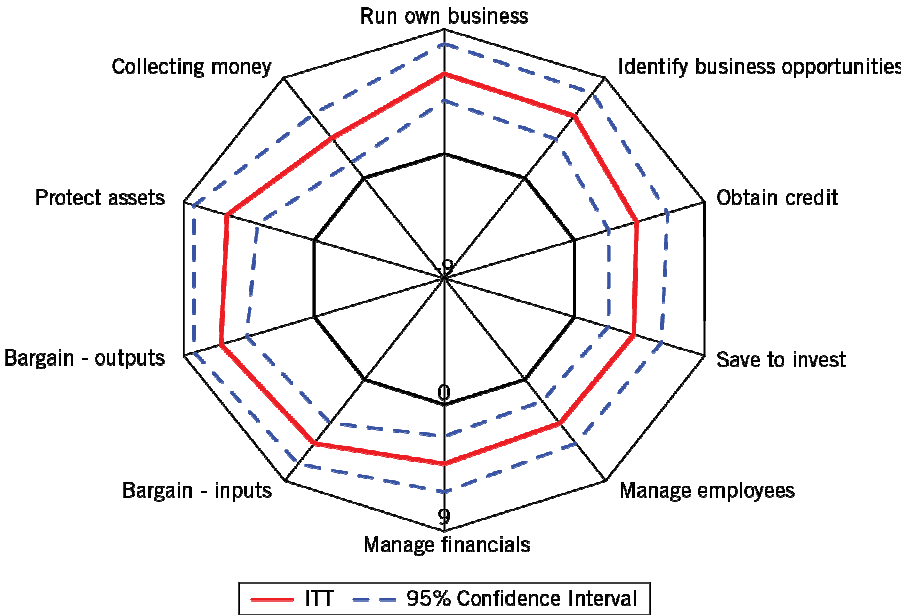
In column 5, the TOT estimates are based on club participation being instrumented by the offer of treatment.

**Figure 2A. The ITT impact of the ELA programme on gender empowerment measures**



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

**Figure 2B. The ITT impact of the ELA programme on entrepreneurship measures**



Notes: The control variables include the adolescent age and a series of indicator variables for branch areas. The adolescents were asked to rank their ability on how well they can do the following activities on a scale of 1–10, 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".

Row 2 in table 3 estimates the programme impact on girls' self-reported entrepreneurial skills. This index is significantly higher for adolescent girls in treated communities: the ITT estimates show an increase of 8 per cent relative to its baseline value, and for girls that participate in the programme, the TOT estimate suggests an increase of 50 per cent over the baseline level. Figure 2B presents a spider graph showing the ITT impacts (and their associated 95 per cent confidence interval) for each of the components of the entrepreneurial skills score. Strikingly, the programme increases entrepreneurial skills on all ten dimensions: girls in treatment communities perceive themselves as having better entrepreneurial skill than girls in control communities on dimensions as diverse as running a business, spotting business opportunities, obtaining and managing capital, managing employees, bargaining over input and output prices, protecting assets and collecting debts. Hence relative to girls in control communities, this is a major shift upward in the perceived ability of treated girls to run small businesses.

In panel B of table 3 we analyse actual labour market activities of adolescent girls. Row 3 shows that eligible girls are 6.8 pp more likely to be engaged in income-generating activities, a 72 per cent increase over the baseline mean. Improvements in gender empowerment and entrepreneurial ability seen in figures 2A and 2B are thus reflected in greater labour force participation. Dividing income-generating activities into those arising from self-and wage-employment, the next two rows show that the increase is entirely driven by the adolescent girls becoming increasingly engaged in self-employment activities. The incidence of self-employment increases from 6 per cent to 9 per cent in control communities as girls get older and work more. What the programme does is accelerate transition into self-employment for girls in treatment communities. At endline they are 98 per cent more likely to be self-employed relative to the control baseline (i.e. twice as likely to be self-employed). This is in line with expectations given the emphasis placed on developing entrepreneurship skills in the vocational training component of the ELA. Indeed, among girls on the margin of participating in the programme, the TOT shows that engagement in such entrepreneurial activities increases six-fold relative to the baseline mean. Labour force participation is a major driver of women's empowerment across the world. The fact that the programme is able to increase participation in an environment where employment opportunities are limited (and particularly for women) is an important result.

Panel C examines how these changes affect welfare. To do so we use measures of satisfaction, (lack of) anxiety, and monthly expenditures. The latter is used as a proxy for earnings, because earnings are difficult to measure accurately for self-employment activities in low-income settings. While row 6 shows a positive but insignificant impact on satisfaction with earnings, row 7 shows that the programme significantly reduces girls' anxiety about finding a good job in adulthood: the share of those who do not worry about this aspect of their lives is 7.2 pp higher in treatment communities from a baseline mean of 40 per cent, an increase of 18 per cent. Finally, row 8 evaluates the impacts on monthly consumption expenditures aggregated across eight items<sup>20</sup> The ITT estimate in column 3 shows that expenditures are UGX4,676 higher in treatment communities, corresponding to a 41 per cent increase from their baseline value. Among participating girls the TOT estimate is almost UGX30,000, more than double its baseline value.

Finally, we have also explored the impacts on reported earnings from wage-and self-employment (results not shown). As expected we find that earnings from self-employment significantly increase, while there is no impact on earnings from wage employment. Estimating ITT impacts on annual earnings from self-employment from a tobit

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<sup>20</sup> The goods categories are jewellery/ornaments, cosmetics/makeup, clothes, hairdressers, shoes/footwear, going to restaurants/bars/teashop/cafe, talk time for your mobile phone and presents/gifts.

specification we find that: (i) on the extensive margin, adolescent girls are 62 per cent more likely to have some earnings from self-employment; (ii) on the intensive margin, self-employment earnings increase by three times their baseline level. Going one step further to examine the impacts on labour supply, we find the programme significantly increases hours devoted to self-employment (but not to wage employment). On the intensive margin we find the proportionate impact on earnings from self-employment to be larger than on hours worked in self-employment, indicating the marginal product of labour for adolescent girls in self-employment rises as a consequence of the programme.

These results on economic empowerment are encouraging relative to the impact evaluations of other programmes delivering standalone financial and entrepreneurship training. These evaluations, based on randomized control trials, have generally found weak impacts – see for example Field *et al.* (2010), Drexler *et al.* (2010), Karlan and Valdivia (2010), Fairlie *et al.* (2012) and Bruhn *et al.* (2012), or the review of evidence in McKenzie and Woodruff (2014).<sup>21</sup>

This is despite the fact that other programmes are often specifically targeted towards those who have self-selected to be small-scale entrepreneurs. Our evidence suggests that twin-pronged programmes that simultaneously tackle economic and social constraints adolescent girls face can lead to significant improvements in business skills and engagement in income-generating activities, even among girls who, *ex ante*, might not consider themselves as being on the verge of setting up a small-scale enterprise. It is intervening at that critical point in adolescence when employment choices are still fluid that seems critical to the success of the programme.

The second natural point of comparison is with the literature evaluating standalone vocational training. Such interventions are often found to have limited impacts in developed (Blundell *et al.* 2004; Card *et al.* 2010) and developing-country contexts (Card *et al.* 2011; Groh *et al.* 2012). Among studies finding impacts, Attanasio *et al.* (2011) document that for women, the likelihood to be employed increases by 6.1 pp, and earnings increase by 22 per cent relative to a randomized control group. These impacts are comparable to those we find for the two-pronged ELA intervention.

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<sup>21</sup> Field *et al.* (2010) report results from a randomized control trial that provides basic financial literacy training to a randomly selected group of female entrepreneurs in India. Only a socially restricted sub-group were found to benefit from the intervention in terms of business income and borrowings. Drexler *et al.* (2010) find that teaching accounting principles to a group of micro-borrowers in the Dominican Republic has no impact either on the way they run their business or on business outcomes. However, simple rule-of-thumb-style training does affect the way in which financial records are kept. Karlan and Valdivia (2010) investigate the impact of a relatively intense training intervention of up to two years that delivered comprehensive training on business practices to clients of a Peruvian microfinance institution. Despite improving business knowl-edge, the intervention failed to impact any major business outcomes. Fairlie *et al.* (2012) find that providing entrepreneurs training has no measurable impact on business operations in the long run. Two more recent papers have, however, found more substantial evidence of the effectiveness of such interventions: Bruhn *et al.* (2012) suggests granting small and medium enterprises in Mexico access to consulting services – which are orders of magnitude more costly than the other forms of business intervention described above – does have large positive impacts on firm profits, although not their employment. Calderon *et al.* (2013) report large impacts on profits from self-employment among female entrepreneurs in rural Mexico from a business skills intervention. A key channel for the impact is changes in product mix offered by entrepreneurs.



Finally, we address an important concern behind the introduction of vocational skills training: the potential adverse effect on schooling investments made by beneficiaries of the ELA programme. More precisely, the potential trade-off is that as the programme targets girls of school-going age, they might be encouraged to drop out of school. Panel D of table 3 then explores whether there are adverse impacts in this dimension. The estimated ITT impact of ELA on an indicator that equals one if the respondent is currently enrolled in a school, and zero otherwise, is not different from zero. The programme does cause differential school drop-outs between treatment and control communities two years after its introduction. This finding is confirmed by the fact that the programme does not adversely impact the number of hours spent on studying/school per week for those currently enrolled. In fact, there are hints that the programme increases the value attached to education in treated villages, consistent with formally provided education being complementary to the vocational and life skills provided in the ELA programme. Moreover, as the final row shows, among those that have dropped out at baseline, the ITT estimate implies the programme motivates a significantly higher proportion of dropped out girls to consider going back to school, again in line with the type of skills provision being complementary to formal education.<sup>22</sup>

## 4.2 Control over the body: Childbearing, marriage and sex

Table 4 shows the programme impacts on control over the body for adolescent girls, as measured through outcomes such as childbearing, marriage and sex. As before, the table reports baseline means to benchmark impacts, linear and non-linear ITT estimates and TOT estimates that instrument participation in the clubs with the randomly assigned offer of treatment.

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

Delaying the onset of marriage is an important mechanism through which adolescent girls can devote more attention to accumulating human capital and improve their long-term earnings potential (Field and Ambrus 2008; Baird et al. 2011). Along this margin the programme also has noteworthy impacts: the ITT estimate shows girls in treated communities to be 6.9 pp less likely to be in marriage or cohabitation at follow-up, corresponding to 58 per cent of the baseline mean. Again, in control communities marriage rates for adolescent girls rise naturally from 12 per cent to 18 per cent between baseline and endline, and the evidence suggests this is almost entirely prevented from happening by the programme in treatment communities.

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<sup>22</sup> Baird *et al.* (2013) also report beneficial impacts on the economic and social empowerment of adolescent girls in Malawi that have dropped out of formal schooling from a cash transfer pro-gramme that is conditioned on school attendance.

**Table 4. The impact of the ELA programme on control over the body coefficients (standard errors in parentheses, standard deviations in brackets)**

Outcome		(1) Baseline levels, control	(2) Sample size	(3) ITT , OLS	(4) ITT, probit marginal effects	(5) TOT
A. Childbearing and marriage	1. Has child(ren) (yes = 1)	0.105 [0.306]	4,670	-0.027*** (0.010)	-0.022*** (0.008)	-0.169** (0.066)
	2. Married or cohabiting (yes = 1)	0.120 [0.325]	4,633	-0.069*** (0.013)	-0.075*** (0.014)	-0.432*** (0.093)
B. Sexual violence	3. Had sex unwillingly in the past year (yes = 1)	0.142 [0.350]	922	-0.061** (0.028)	-0.056** (0.026)	-0.246** (0.120)
C. Knowledge	4. Pregnancy knowledge (0–1 score)	0.746 [0.436]	4,550	0.048** (0.021)	0.050** (0.021)	0.299** (0.128)
	5. HIV knowledge (0–6 score)	3.78 [1.24]	4,831	0.471*** (0.047)		3.02*** (0.418)
D. Contraception	6. If sexually active, always uses condom (yes = 1)	0.514 [0.500]	816	0.130*** (0.038)	0.138*** (0.040)	0.675*** (0.219)
	7. If sexually active, uses other contraceptives (yes = 1)	0.235 [0.425]	816	0.028 (0.031)	0.031 (0.033)	0.148 (0.163)

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors are clustered by community. The control variables include the adolescent age and a series of indicator variables for branch areas.

The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement “A woman cannot become pregnant at first intercourse or with occasional sexual relations” as true or false.

The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are “A person who has HIV is different from a person who is ill with AIDS”, “During vaginal sex, it is easier for a woman to receive the HIV virus than for a man”, “Pulling out the penis before a man climaxes keeps a 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”.

In column 5 the TOT estimates are based on club participation being instrumented by the offer of treatment.

In panel B of table 4 we see that the rate of adolescents who report having had sex unwillingly during the past year is 6.1 pp lower in treated communities. Starting from a baseline of 14 per cent in control communities, this corresponds to a near 44 per cent reduction in the incidence of such events. The incidence of unwilling sex in these communities is strikingly high and indicative of adolescent girls having limited control over their bodies. But what is equally striking is the power of the programme in terms of helping girls to regain control over their bodies. Among participants, the TOT is 24.6 pp (column 5), implying the near elimination of such experiences for adolescent girls.

This provides a dramatic illustration of the programme enabling girls to become empowered in their relations with men. This impact is likely a direct result of three specific programme features: (i) the life skills sessions on negotiation, rape and legal rights, through which girls are sensitized and discuss prevention measures; (ii) the fact that the adolescent clubs provide a safe location for girls, especially in the after-school period in the afternoon when their parents might not be back from work; (iii) as documented earlier, the other prong of the intervention raises girls' engagement in and earnings from self-employment, and such economic empowerment likely reinforces girls' control over their bodies, all else equal (Baird et al. 2011).

In panel C we see that on a very basic question related to pregnancy, girls' knowledge is 4.8 pp higher in treatment communities relative to a baseline mean of 74.6 per cent. Panel C also shows that the index of HIV-related knowledge is 0.471 pp higher in treated communities, relative to a baseline mean of 3.78. In panel D we see that condom use increases among those who are sexually active: the percentage of eligible girls who *always* use a condom when having intercourse is 13 pp higher in the linear OLS specification (column 3), and 13.8 pp higher in the non-linear probit specification (column 4).<sup>23</sup> Row 7 shows that among the sexually active there is little evidence of the use of other forms of contraception having increased. This is reassuring because although girls are encouraged to use various forms of contraception in the programme, there is actually limited availability of such alternatives. Hence the results do not seem to reflect girls merely repeating what they have been taught in life skills courses, or what they believe enumerators wish to hear. These indicators of improved knowledge (panel C) and enhanced contraceptive use (panel D) help us to understand the dramatic reductions in early childbearing and marriage that we observe in panel A.

Comparing our findings to the literature, we note first that meta-analyses of previous single-pronged interventions report generally weak impacts of standalone HIV-education programmes, irrespective of whether they are delivered via classroom-based courses (Gallant and Maticka-Tyndale 2004; McCoy et al. 2010; Duflo et al. 2012) or peer-provided courses (Cornish and Campbell 2009). There are two recent studies that find impacts of *standalone* education programmes that are worth comparison. First, Arcand and Wouabe (2010) use a regression discontinuity design to estimate the impacts of a school-based HIV prevention course in Cameroon. Their estimated impacts on childbearing and condom usage lie between the ITT and TOT estimates we find. Second, Dupas (2011) uses a randomized control design to evaluate the effectiveness of the Kenyan national HIV curriculum to an intervention providing information on the *relative risk* of HIV infection by the partner's age. She finds that exposure to this curriculum causes a 28 per cent reduction in teenage pregnancies over a one-year period.

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<sup>23</sup> As argued in Dupas (2011), childbearing is not a perfect proxy for the incidence of risky sex because: (i) adolescent girls in long-term relationships are more likely to get pregnant than girls in several short-term relationships; (ii) teenage girls might be more likely to abort if the father is a teenage boy who cannot provide economic support; (iii) adolescent girls might be more likely to engage in anal sex with partners as a way to avoid pregnancy, and this is especially risky in terms of HIV transmission. The concern that such changes in behaviour might be driving fertility drops is partly ameliorated by the increased self-reported condom usage.

In the Appendix we present additional robustness checks on the baseline results from tables 3 and 4. In short, we find our core findings to be robust to adjusting p-values for multiple inference and sample attrition, and the treatment effects along both dimensions of economic and social empowerment are found to be largely *homogeneous* across rural and urban areas, rich and poor households, and young and old girls. Finally, we find little evidence that any of the core impacts are driven by the anticipation of microfinance.

### 4.3 Aspirations on marriage and childbearing

The previously documented impacts on adolescent girls' entrepreneurial skills, engagement in self-employment activities, knowledge and practices related to sex, childbearing and marriage, all highlight the substantial programme impacts on girls' economic and social empowerment within the two-year evaluation window. We complete our analysis by considering the programme's impact on girls' aspirations and opinions about marriage and childbearing: this serves as a marker for the programme potentially impacting deep-rooted social norms about girls' role in society and lifetime opportunities, which might be the hardest traits to shift, all else equal.

Panel A of table 5 relates to girls' views on ideal ages at marriage for men and women in society as a whole. Adolescent girls in treated communities report significant higher ages for women and men by 0.77 and 0.69 years respectively, while the TOT impacts are 4.9 and 4.5 years respectively. As not all ages of marriage are logically feasible, a more appropriate way to benchmark these impacts is relative to the standard deviation of baseline responses (rather than their mean value). The ITT impacts then correspond to a shift in expectations on age at marriage for women of around one-quarter of a standard deviation, and the TOT impacts are larger than one standard deviation.

**Table 5. The impact of the ELA programme on aspirations related to marriage and childbearing coefficients (standard errors in parentheses, standard deviations in brackets)**

		(1) Baseline levels, control	(2) Sample size	(3) ITT , OLS	(4) TOT
A. Marriage	1. Suitable age for marriage for a woman	23.9 [3.14]	4,730	0.770*** (0.116)	4.92*** (0.907)
	2. Suitable age for marriage for a man	28.0 [3.70]	4,705	0.693*** (0.125)	4.49*** (0.954)
B. Childbearing	3. Preferred number of children	4.14 [1.43]	4,700	-0.279*** (0.052)	-1.77*** (0.352)
	4. Suitable age for women to have the first baby	23.7 [3.26]	4,701	0.619*** (0.110)	3.93*** (0.819)
C. Children's marriage	5. Preferred age at which daughter(s) get married	24.8 [2.78]	4,603	0.718*** (0.118)	4.58*** (0.878)
	6. Preferred age at which son(s) get married	28.4 [3.24]	4,504	0.120 (0.113)	0.763 (0.719)

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors are clustered by community. The control variables include the adolescent age and a series of indicator variables for branch areas. All variables indicating ages were trimmed at 15 years or younger. Indicated ages of 51 years or older are removed from the variable "Anticipated age at marriage". In column 4 the TOT estimates are based on club participation being instrumented by the offer of treatment.

If unmarried at follow-up, we also asked girls about their expected age at the time of their own marriage: the ITT impact is almost one year (not shown).<sup>24</sup>

Panel B focuses on aspirations related to childbearing. We find that the programme causes a significant reduction in the preferred number of children: this is 0.279 lower for girls in treated communities, corresponding to 7 per cent of the baseline number of desired children (or 0.2 of a standard deviation). Among participants, the reduction in demand for children is dramatic: the TOT is  $-1.77$ , which corresponds to 43 per cent of the baseline level (or more than one standard deviation). If implemented, this change in aspirations would close much of the gap in fertility rates among adolescent girls between developed countries and the average adolescent girl in Uganda, as highlighted in figure 1C. Across the developing regions of the world, fertility has been dropping towards two, although parts of Africa have been a laggard in this respect. What the ELA programme does is bring desired fertility down much closer to levels in higher-income countries.

On aspirations for childbearing, row 4 shows there is a significant increase in what girls report as being the most suitable age for women to have their first child: the ITT estimate is 0.619, and the TOT is more economically significant at 3.93 years (corresponding to more than a one standard deviation change from the baseline).

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

#### 4.4 Cost–benefit analysis

In this section we document the cost of the programme to benchmark how large the per-girl benefits would have to be for the intervention to be effective for a social planner. Table 6 categorizes the fixed and variable costs of the programme, where variable costs depend on the number of participating girls. Depending on whether the costs are incurred once only or recur each month, we list the amounts in column 1 or 2 respectively. Columns 3 and 4 then split each cost into its first- and second-year component respectively. All costs are in 2008 US dollars.

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<sup>24</sup> Adolescent girls were also asked who they thought would be involved in deciding their marriage partners (not shown). We find that among treated girls there is a significant reduction in the likelihood they report the choice will be made by them alone, and a corresponding increase of similar magnitude in the likelihood they report decisions over marriage partners will be made in conjunction with their parents. This might be taken as tentative evidence that higher-quality marriage partners being sought, as well as changes in the timing of marriage.

**Table 6. Cost-benefit analysis (in 2008 US dollars)**

			(1)	(2)	(3)	(4)
			Non-recurring	Recurring monthly	Year 1	Year 2
A. Fixed costs	1. Office space & equipment	10 branch offices	4,000		4,000	
	2. Programme assistant training	10 assistants	2,250		2,250	
	3. Training & operational material development	2 manuals	4,000		4,000	
	4. Programme management compensation	2 coordinators		780	9,360	9,360
	5. Programme assistant compensation	10 assistants		1,690	20,280	20,280
	6. Adolescent leader compensation	100 adolescent leaders		1,200	14,400	14,400
	7. Adolescent leader training	100 adolescent leaders	22,500		22,500	
	8. Adolescent leader training (for replacements)	20 adolescent leaders	4,500			4,500
	9. Adolescent leader refreshers	100 adolescent leaders		400	4,800	4,800
	10. Club rent	100 clubs		1,000	12,000	12,000
	11. Club materials	100 clubs	42,000		42,000	
	12. Club materials (replenishment)	100 clubs	16,800			16,800
	13. Branch office overhead	10 branch offices		800	9,600	9,600
	14. Country office overhead	1 country office		4,000	48,000	48,000
B. Variable costs	15. Financial literacy courses	2,500 members	12,500		12,500	12,500
	16. Livelihood training (year 1)	2,000 members	100,000		100,000	
	17. Livelihood training inputs (year 1)	2,000 members	60,000		60,000	
	18. Livelihood training (year 2)	1,000 members	50,000			50,000
	19. livelihood training inputs (year 2)	1,000 members	30,000		30,000	
C. Total costs	<b>20. ELA programme costs for the 100 studied communities</b>				<b>365,690</b>	<b>232,240</b>
D. Yearly per unit average costs	21. Assuming 130 potential girl attendees per club	Fixed costs			14.9	10.7
	22.	Variable costs			13.3	7.12
	23.	Total costs			28.1	17.9
E. Yearly benefits	24. ITT impact of ELA on individual yearly total expenditures					32.8

Notes: The exchange rate used to convert monetary values is based on January 2008 at which point 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 programme stated in row 20 is the summation of all individual cost items applicable to the respective year. The yearly benefits shown in row 24 are based on the ITT impact estimates on expenditures (not shown in the tables).

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

We conducted a pre-baseline census listing of all households in the communities in the evaluation sample. This revealed that around 130 eligible adolescent girls resided in the average community. Given that the benefits we document relate to ITT estimates of residing in a community that is offered the ELA programme, we use this number of eligible girls to calculate the per-girl cost of the programme. Hence in panel D of table 6, 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 two years after the baseline, we focus on the second-year per-girl incurred cost of \$17.9.

To put the cost estimate in context, we note that \$17.9 corresponds to only 0.54 per cent of household incomes at baseline. Alternatively, this cost corresponds to 21.0 per cent of the annual expenditures of adolescent girls on the subset of consumption goods described in table 3. If the per-girl benefits to an adolescent girl, of residing in a community that is offered the ELA programme, are larger than this, it would suggest the programme is sustainable from the social planner’s perspective.

Our findings indicate that the programme increases labour force participation while reducing childbearing, marriage and unprotected sex. The labour market impacts of the programme are easily monetized, using the ITT estimate on expenditures. The final row of table 6 shows that this increase of \$32.8 is significantly different from zero and more than offsets the per-girl programme cost.<sup>25</sup>

The impact of the programme on reducing early childbearing, early marriage, having sex against one’s will or unprotected sex (table 4), or in changing social norms regarding early childbearing, early marriage and desired fertility (table 5) are much more difficult to monetize but are likely to add significantly to these estimated benefits. It is precisely events such as getting married or having children during adolescence which interrupt human capital accumulation and thus permanently and significantly adversely affect the lifetime earnings potential of women across the developing world. There is also literature which suggests that having sex against one’s will seriously depresses 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.

Even if the benefits of the programme outweigh its costs, the question of whether the same resources could be spent more effectively remains open. The combined ELA intervention appears to improve outcomes at least as well as single-pronged interventions that have focused on classroom-based education courses designed to reduce risky

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<sup>25</sup> The figure of US\$32.8 is taken from the corresponding monthly estimate in Ugandan shillings (UGX) shown in column 3 of table 3, where we use the exchange rate of UGX1,700 to one US dollar.

behaviours, or exclusively on vocational training designed to improve labour market outcomes among youth. As a body of randomized control trials suggest, these single-pronged programmes have met with, at best, rather mixed success (Gallant and Maticka-Tyndale 2004; Cornish and Campbell 2009; McCoy et al. 2010; Card et al. 2011).

One class of vocational training programmes that has met with some success are the Jovenes programmes implemented throughout Latin America. For example, Attanasio et al. (2011) find that for the Jovenes programme in Colombia, among women, the likelihood to be employed increases by 6.1 pp, and earnings increase by 22 per cent relative to a randomly assigned control group. These impacts are comparable to those we find for the two-pronged ELA intervention. However, the costs per trainee of the Jovenes programmes vary from \$600 to \$2,000 per participant served (World Bank 2009). These costs are still an order of magnitude larger than the \$17.9 per eligible girl of the ELA programme, or given a 21 per cent take-up rate, a cost of \$85 per participating adolescent girl.

Moreover, even apart from differences in programme costs, there remains doubt as to whether private sector firms in sub-Saharan Africa would be able to currently take part in Jovenes-style training programmes for workers.

A final approach to understanding whether the ELA programme is socially beneficial is to consider the impacts of providing unconditional cash transfers in a similar setting. This is precisely what is considered in Blattman et al. (2014), who present evidence from the Youth Opportunities Programme (YOP) using a randomized control trial in which youth were given unconditional and unsupervised cash transfers.<sup>26</sup> They find that almost 80 per cent of youth chose to spend these transfers on acquiring vocational skills and tools, and that the resultant increases in earnings imply an annual return on capital of 35 per cent on average. There are of course many differences between the treated individuals in the ELA programme and the YOP: the YOP targets both genders and those aged 16–35; individuals form groups to apply for the unconditional transfers; the per-person transfer is \$374. Although the ELA programme can be thought of as a constrained version of such unconditional cash transfers, even if the rates of return through labour market outcomes alone are half as much, this still compares favourably with regards to other formal sector financial investment opportunities available in Uganda in mid-2008 when the ELA programme was initiated.<sup>27</sup>

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<sup>26</sup> Similarly, Baird *et al.* (2012) report that the provision of unconditional cash transfers via lotter-ies, to girls aged 13–22 and enrolled in school at baseline in Malawi, significantly reduced the prevalence of HIV and herpes simplex virus 2 (HSV-2) after 18 months. These effects were also supported by self-reported sexual behaviours. 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.

<sup>27</sup> For example, the International Financial Statistics of the IMF state that the deposit rate in the formal sector in Uganda (i.e. the rate paid by commercial banks for savings deposits) was 10.7 per cent in 2008, 9.75 per cent in 2009 and 7.69 per cent 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 per cent according to the Bank of Uganda ([http://www.bou.or.ug/bou/collateral/tbond\\_forms/2008/May/tbond\\_28May2008.html](http://www.bou.or.ug/bou/collateral/tbond_forms/2008/May/tbond_28May2008.html)).



## 5. Conclusions

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

Empowering women in Africa represents a particular challenge as labour force participation remains stubbornly low and fertility stubbornly high. In this paper we evaluate an attempt to jump-start female economic and social empowerment in Uganda, the world's second youngest country. We examine the impacts of a programme that provides adolescent girls an opportunity to accumulate 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 programme operates outside of schools and so can also encompass girls that have dropped out of formal education and who are often not reached by schools-based interventions. Beyond the twin-pronged approach to training on vocational and life skills, the training offered also differs from some other earlier evaluated interventions in providing for training over a period far longer than a few weeks, and covering general business skills as well as technical knowledge and sector specific content.

The ideas that underpin the programme were developed in Bangladesh, where the programme 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.

Tracing the impacts over two years using a panel of 4,800 adolescent girls, we document quantitatively large and beneficial impacts along both margins of economic and social empowerment. On the first margin, girls are significantly more likely to be engaged in self-employment activities, report improved business skills and have higher monthly expenditures. On the second margin, adolescent girls are significantly less likely to become pregnant and more likely to delay marriage.

These 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. The fact that we also see a dramatic reduction in the incidence of women being forced to have sex against their will and a significant uptick in women using condoms points to the programme helping adolescent girls to take control of their reproductive lives.

Looking forward, engaging in economic activities and delaying childbearing and marriage is likely to have a major impact on the life trajectories of adolescent girls. What the programme achieves is to change the girls' own perceptions of what they are economically capable of and of what rights they have over their own bodies. The intervention is fundamentally about changing norms on these two dimensions within societies where women have been traditionally disempowered. The documented results on aspirations show that girls aspire to marry later, to have their daughters marry later, to have

children later and to have fewer children. These are all additional powerful signals that norms are changing, and the intervention might start to open opportunities by shifting norms for the next generation.

Africa has been a laggard relative to other developing regions in terms of how quickly it is converging to the norms of low fertility, late marriage and high career participation that characterize women's lives in developed nations. There is thus a case to be made for cost-effective programmes like this to help women in Africa to accelerate convergence towards these norms. Breaking out of an equilibrium characterized by low career participation and early childbearing and marriage is challenging, particularly given societal norms in African countries and limited meaningful labour market opportunities. But what our results suggest is that such escape is possible. The impacts found over a two-year period suggest that the poor life circumstances that adolescent girls find themselves in at baseline will not necessarily be maintained by binding social norms. Targeting girls when they are adolescents and targeting both the human capital and reproductive choices that will determine future life trajectories seems critical to the success of the programme.

The external validity of these results is currently being researched as ELA-style programmes have been rolled out and are being evaluated in a range of sub-Saharan countries. The programme offers some promise to policy-makers, as being a low-cost and scalable intervention that enables adolescent girls to improve their life outcomes. As this research agenda expands, an important direction for future work to take is to study in more detail the impacts such programmes have on interactions between men and adolescent girls. Doing so would help crystallize whether the gains occur because adolescent girls are able to match with better-quality men when their human capital improves (Dupas 2011), whether it improves their bargaining power within existing relationships, say because of a direct impact of earned income of women and their autonomy in relationships (Anderson and Eswaran 2009), or whether men change attitudes towards women as the programme raises returns to women's human capital.<sup>28</sup> This last channel is an important mechanism that drove the provision of women's rights across countries over time (Doepke and Tertilt 2009), 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; Duflo 2012).

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<sup>28</sup> Dupas (2011) documents how the provision of information on relative risk of HIV infection by partner's relative age to adolescents in Kenya led to substitution away from higher-risk older partners. Anderson and Eswaran (2009) present 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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## Appendix

**Table A1. Correlates of two-year attrition dependent variable (in panel sample (yes = 1) OLS estimates in columns 1–4, probit estimate in column 5)**

	(1)	(2)	(3)	(4)	(5)
Treatment	0.025 (0.029)	0.026 (0.027)	0.026 (0.027)	-0.019 (0.100)	-0.041 (0.093)
Age			-0.0004 (0.002)	-0.0009 (0.004)	-0.002 (0.004)
Currently enrolled in school (yes = 1]			0.017 (0.015)	-0.015 (0.030)	-0.028 (0.030)
Married or cohabiting (yes = 1)			0.012 (0.018)	0.024 (0.033)	0.038 (0.031)
Has child(ren) (yes = 1)			0.021 (0.020)	0.004 (0.033)	-0.010 (0.036)
Treatment x age				0.0007 (0.005)	0.002 (0.005)
Treatment x currently enrolled in school (yes = 1)				0.046 (0.039)	0.050 (0.038)
Treatment x married or cohabiting (yes = 1)				-0.022 (0.040)	-0.017 (0.038)
Treatment x has child(ren) (yes = 1)				0.024 (0.043)	0.019 (0.044)
Branch dummies	No	Yes	Yes	Yes	No
Observations	5,661	5,661	5,661	5,661	5,661

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

**Table A2. Descriptive statistics on adolescent girls, by participation status means (standard errors in parentheses, standard deviations in brackets)**

		(1) Participants	(2) Non- participants	(3) Difference	(4) Normalized difference
A. Demographics	Age	16.2 [2.82]	16.4 [2.80]	-0.150 (0.133)	-0.038
	Currently enrolled in school (yes = 1)	0.716 [0.451]	0.712 [0.453]	0.004 (0.025)	0.006
B. Economic empowerment:	Gender empowerment index (0100 score)	28.0 [23.5]	28.6 [24.3]	-0.629 (1.42)	-0.019
Income- generating Activities	Entrepreneurial ability (0–100 score)	68.5 [23.9]	69.9 [24.7]	-1.42 (1.26)	-0.041
	Self-employment (yes = 1)	0.068 [0.252]	0.070 [0.256]	-0.002 (0.011)	-0.006



		(1) Participants	(2) Non- participants	(3) Difference	(4) Normalized difference
	Wage-employment (yes = 1)	0.055 [0.228]	0.058 [0.234]	-0.003 (0.009)	-0.010
	Satisfaction with earnings/ income (0–6 score)	1.12 [1.67]	1.19 [1.71]	-0.068 (0.099)	-0.029
	Never worry about getting a good job in adulthood (yes = 1)	0.438 [0.497]	0.412 [0.492]	0.026 (0.022)	0.037
C. Social empowerment: Control over the body	Has child(ren) (yes = 1)	0.093 [0.290]	0.108 [0.311]	-0.015 (0.014)	-0.036
	Married or cohabiting (yes = 1)	0.087 [0.283]	0.097 [0.296]	-0.009 (0.013)	-0.022
	Had sex unwillingly in the past year (yes = 1)	0.177 [0.382]	0.212 [0.409]	-0.036 (0.030)	-0.063
	Pregnancy knowledge (0–1 score)	0.754 [0.431]	0.735 [0.441]	0.019 (0.021)	0.031
	HIV knowledge (0–6 score)	3.84 [1.31]	3.82 [1.22]	0.022 (0.065)	0.012
	If sexually active, always uses condom (yes = 1)	0.562 [0.497]	0.502 [0.500]	0.060* (0.035)	0.085

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge (2009).

The gender empowerment index is a variable that cumulates the number of times a respondent answers “Both/Same” to the following questions: “Who should earn money for the family?”, “Who should have a higher level of education in the family?”, “Who should be responsible for washing, cleaning and cooking?”, “If there is no water pump or tap, who should fetch water?”, “Who should be responsible for feeding and bathing children?”, “Who should help the children in their studies at home?” and “Who should be responsible for looking after the ill persons?” The other possible answers given to the respondent were “Male” and “Female”. The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities.

The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): “Run your own business”, “Identify business opportunities to start up new business”, “Obtain credit to start up new business or expand existing business”, “Save in order to invest in future business opportunities”, “Make sure that your employees get the work done properly”, “Manage financial accounts”, “Bargain to obtain cheap prices when you are buying anything for business (inputs)”, “Bargain to obtain high prices when you are selling anything for business (outputs)”, “Protect your business assets from harm by others”, “Collecting the money someone owes you”.

The index for satisfaction with earnings/income is the reversed and rescaled respondent’s self-assessment on a 7 point score (where originally “1” is completely happy and “7” is not at all happy).

The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement “A woman cannot become pregnant at first intercourse or with occasional sexual relations” as true or false.

The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are “A person who has HIV is different from a person who is ill with AIDS”, “During vaginal sex, it is easier for a woman to receive the HIV virus than for a man”, “Pulling out the penis before a man climaxes keeps a 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”.

**Table A3. Robustness checks marginal effects (standard errors in parentheses, p-values)**

		p-value correction for multiple inference			Sample attrition	Anticipation of microfinance	
		(1) Baseline ITT estimates	(2) Original	(3) Step-down	(4) Summary index	(5) Weighted ITT estimates adjusting for attrition	(6) ITT Estimate on future assignment to microfinance
A. Income-generating activities (IGA)	Entrepreneurial ability (0–100 score)	5.63*** (0.982)	0.000	0.000		5.69*** (1.01)	-1.82* (1.07)
	Self-employment (yes = 1)	0.060*** (0.011)	0.000	0.000		0.066*** (0.012)	-0.005 (0.014)
	Wage employment (yes = 1)	0.007 (0.006)	0.242	0.272		0.009 (0.006)	0.001 (0.006)
	Summary Index (IGA)	0.172*** (0.029)			0.000	0.186*** (0.030)	-0.031 (0.031)
B. Control over the body	Has child(ren) (yes = 1)	-0.022*** (0.008)	0.007	0.037		-0.022** (0.009)	0.015* (0.009)
	Married or cohabiting (yes = 1)	-0.075*** (0.014)	0.000	0.000		-0.074*** (0.014)	0.003 (0.009)
	Had sex unwillingly in the past year (yes = 1)	-0.056** (0.026)	0.028	0.045		-0.073*** (0.028)	0.018 (0.029)
	Pregnancy knowledge (0–1 score)	0.050** (0.021)	0.016	0.050		0.052** (0.021)	0.010 (0.022)
	HIV knowledge (0–6 score)	0.471*** (0.047)	0.000	0.000		0.490*** (0.050)	-0.0007 (0.061)
	If sexually active, always uses condom (yes = 1)	0.138*** (0.040)	0.001	0.008		0.107** (0.042)	0.028 (0.048)
	Summary index (control over the body)	0.240*** (0.019)			0.000	0.240*** (0.019)	-0.003 (0.015)

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors are clustered by community. The control variables include the adolescent age and a series of indicator variables for branch areas.

The entrepreneurial ability index consists of cumulative ranks (scale 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", "Collecting the money someone owes you". The top 1% outliers of the income variables have been removed.

The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement "A woman cannot become pregnant at first intercourse or with occasional sexual relations" as true or false.

The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a 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 summary index (life skills) is based on all outcome variables summarized in the "Control over the body" category and listed in panel B above.

The summary index (IGA) is based on the entrepreneurship ability and the indicators for self-employment and wage employment. The indices are constructed following the procedure outlined in Kling et al. [2007].

**Table A4. Impact heterogeneity marginal effects (standard errors in parentheses, p-values)**

		(1) Baseline ITT estimates	(2) Rural	(3) Urban	(4) Above median hh asset value	(5) Below median hh asset value	(6) Younger than 16 yrs	(7) Older than 16 yrs
A. Income-generating activities (IGA)	Summary index (IGA)	0.172*** (0.029)	0.131*** (0.034)	0.216*** (0.045)	0.186*** (0.038)	0.156*** (0.036)	0.166*** (0.031)	0.181*** (0.038)
B. Control over the Body	Summary index (control over the body)	0.240*** (0.019)	0.237*** (0.026)	0.237*** (0.027)	0.230*** (0.023)	0.241*** (0.023)	0.246*** (0.020)	0.228*** (0.026)
C. Education	Currently enrolled in school (yes = 1)	-0.021 (0.020)	-0.036 (0.027)	-0.011 (0.028)	-0.028 (0.023)	-0.011 (0.028)	-0.023 (0.017)	-0.021 (0.027)
	If enrolled, hours spent on going to and attending school, homework and study per week	1.59* (0.892)	2.16 (1.44)	0.969 (1.02)	1.89 (1.30)	1.18 (0.950)	1.39 (0.957)	1.78 (1.57)
	If dropped out, plan to start/go back to school (yes = 1)	0.080** (0.039)	0.038 (0.053)	0.142*** (0.053)	0.036 (0.072)	0.108** (0.042)	0.898 (0.166)	0.065* (0.039)

Notes: \*\*\* Significance at 1%, \*\* at 5% and \* at 10%. The standard errors are clustered by community. The control variables include the adolescent age and a series of indicator variables for branch areas.

The summary index (life skills) is based on indicators for reported motherhood, being married or cohabiting, having had sex unwillingly in the past one year and always using a condom (if sexually active) as well as a pregnancy and HIV-related knowledge scores.

The summary index (IGA) is based on the entrepreneurship ability and the indicators for self-employment and wage employment. The indices are constructed following the procedure outlined in Kling *et al.* (2007).

The rural sample comprises respondents from BRAC's Njeru, Iganga, Busia, Bugembe and Buwenge areas.

Protein intake is derived from the indicated household consumption of eggs, fish and meat.

## A.1 Multiple inference

The large set of outcomes analysed related to economic and social empowerment raises concerns about multiple inference, namely that the probability of erroneously rejecting at least one null hypothesis of zero impact naturally increases with the number of outcomes considered. We deal with this using two approaches. First, we adjust the  $p$ -values on the ITT estimates using the free step-down procedure, detailed in Westfall and Young (1993) and Anderson (2008), to control for the probability of rejecting at least one true hypothesis tested.<sup>29</sup>

The second approach combines several outcome variables into a single index and, thus, decreases the number of hypothesis to be tested. This method is discussed in Kling et al. (2007) and Anderson (2008). We follow Kling et al. (2007) by rescaling outcome variables such that higher values indicate better outcomes, demeaning the outcomes, and dividing them by the standard deviation measured using the control group at baseline only, and imputing missing values using the mean of the variable in the appropriate survey wave for the adolescent's treatment status group. We then construct the index as the mean of equally weighted individual outcome variables. One such summary index is created for each of the two broad outcome domains (income-generating activities and life skills), where we focus on the outcomes that are likely to be most highly correlated along each dimension. The summary index (income-generating activities, IGA) is based on the entrepreneurship ability and the indicators for self-employment and wage employment as shown in panel A of table A3. The summary index (life skills) is based on all outcome variables in the lower panel of table A3. The constructed summary index is then regressed on the usual set of control variables using OLS.

The results are reported in table A3. Column 1 restates the previously estimated ITT impacts on all major outcomes with their corresponding original and standard  $p$ -values shown in column 2. The adjusted  $p$ -values using the free step-down resampling method are shown in column 3. For all outcomes considered, the conservative free step-down  $p$ -values leave the key findings and interpretations intact. Finally, column 4 of table A3 reports the  $p$ -values for the two summary indices. The  $p$ -values show positive and significant ITT impacts of the programme on the two indices related to income-generating activities and life skills.

## A.2 Impact heterogeneity

We next check for whether particular subsamples of the data are driving the main impacts on economic and social empowerment. To do so, we present ITT estimates on the two summary indices, derived for the multiple inference checks above. We also check for heterogeneous impacts among outcomes related to current investments in schooling. We explore impact heterogeneity along the following dimensions: (i) rural versus urban households; (ii) rich versus poor households, as defined by whether the household's asset values at baseline are above or below the median for all households; (iii) girls aged above 16 at baseline versus older girls at baseline.

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<sup>29</sup> Following this procedure, original  $p$ -values are compared with a subset of  $p$ -values obtained for the entire family of outcome variables in each resampling iteration. This feature makes the corrected  $p$ -values more conservative than originally but less conservative than, for example, the Bonferroni or Šidák  $p$ -values, which are based on an implicit comparison with the entire set of  $p$ -values contained in one family. Given that all simulated  $p$ -values within one family are based on the same treatment assignment, the dependency structure between the outcomes stays intact which substantially increases the power if outcomes are correlated as detailed in Anderson (2008). The adjusted  $p$ -values are based on 100,000 replications under the null hypothesis of no programme impact.

Table A4 shows the results. For the index related to income-generating activities, the impacts found are largely homogeneous across rural and urban areas, rich and poor households, and young and old girls. For the summary index for social empowerment shown in panel B, there is also little evidence of impact heterogeneity across these margins. This demonstrates, for example, that behavioural change can be induced with regards to sex, childbearing and marriage among adolescent girls of all ages from 12 to 20. This might not have been the case for older girls if such behaviour were habitual, for example. Similarly, this might not have been the case for younger girls if they particularly lacked bargaining power or negotiation skills in their relationships with men.<sup>30</sup>

Panel C of table A4 shows how for education-related outcomes, the previously documented ITT impacts are also similar across the relevant dimensions of heterogeneity. In particular, it remains the case that the programme does not encourage girls to drop out from schooling, and this applies equally to rural and urban areas, rich and poor households, and young and old girls. This is again encouraging: if, for example, girls were especially myopic, the incentives to drop out of school in the presence of the programme might be higher in rural areas where the returns to education are limited due to a lack of labour market opportunities outside of the agricultural section.

### A.3 Attrition

To check the robustness of the results to panel attrition, we re-estimate each ITT impact using weights, where these weights are constructed from the inverse of the estimated probability of panel inclusion (Wooldridge 2002). The rationale behind using inverse probability weighting is straightforward: individuals who are very likely to have been re-interviewed receive less influence through weighting them by the inverse of the estimated probability of panel inclusion. On the other hand, adolescents likely to be under-represented in the panel receive higher weights in order to strengthen their contribution to the estimated impacts.

The key step in this procedure is a probit regression of the dummy variable capturing panel inclusion on the usual set of control variables included in the main outcome regression as well as baseline variables with decisive influence on the panel status. The latter set of variables contains in our case dummy variables for each surveyor, the number of named friends, a measure for the distance between the village and the BRAC branch office, the household size, an indicator of whether there is at least one household member who migrated away in the last year as well as a dummy variable indicating membership in an NGO of at least one household member. From this regression predicted probabilities are obtained, which are then inverted and used as weights in the actual outcome regressions. The results obtained are presented in column 5 of table A3. These are very similar to the baseline ITT estimates shown in column 1 so that, as suggested in table A1, selective attrition over time does not appear to be driving the main results. This is the case both for the individual outcomes shown in table A3 as well as the summary indices for all risky behaviours, and for all outcomes related to income-generating activities.

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<sup>30</sup> The results for younger girls are especially encouraging, given the conventional wisdom that girls aged 10-14, particularly those out of school, face the greatest economic challenges and health challenges arising from unsafe sexual behaviour in this context (UNICEF 2003).

#### A.4 Anticipation of microfinance

This evaluation is based on changes in behaviour in the two years after the initiation of the ELA programme. In the year that followed, the programme expanded to comprise a microfinance component, that offers participating adolescents the opportunity to take on desired credit in order to capitalize on their entrepreneurial potential and newly acquired skills during the vocational training. Microfinance was randomly assigned to half the treated communities after the two-year period. At the time of the current evaluation, adolescent club participants were unaware of the potential future offer of microfinance. BRAC staff were unaware of which clubs would be assigned to receive microfinance in addition. However, one concern is that the results presented here may be picking up the effects of participants' anticipating they will receive credit.

To check for this we focus solely on the sample of 100 treated communities and then estimate whether within this sample, the future random assignment to microfinance predicts outcomes in the first two years of the programme. We therefore estimate a specification analogous to (1) where  $\text{treat}_j$  refers to whether the community will in future receive microfinance or not: something that is observed to the researchers but not the adolescent girls nor to BRAC workers in the first two years of the programme. The coefficients on this treatment dummy variable are shown in column 6 of table A3 for each outcome of interest. Reassuringly, we see that for nearly all outcomes listed, there are no significant ITT anticipation impacts of future assignment to microfinance.

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