Power vs Money: Alternative Approaches to Reducing Child Marriage in Bangladesh, a Randomized Control Trial

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Abstract

A clustered randomized trial in Bangladesh examines alternative strategies to reduce child marriage and teenage childbearing and increase girls' education. Communities were randomized into three treatment and one control group in a 2:1:1:2 ratio. From 2008, girls in treatment communities received either i) a six-month empowerment program, ii) a financial incentive to delay marriage, or iii) empowerment plus incentive. Data from 15,464 girls 4.5 years after program completion show that girls eligible for the incentive for at least two years were 24% (-8.9ppts, $p<0.01$) less likely to be married under 18, 15% (-4.8ppts, $p<0.05$) less likely to have given birth under 20, and 25% (7.0ppts, $p<0.01$) more likely to be in school at age 22. Unlike other incentive programs that are conditional on girls staying in school, an incentive conditional on marriage alone has the potential to benefit out-of-school girls. We find insignificantly different effects for girls in and out of school at baseline. The empowerment program did not decrease child marriage or teenage childbearing. However, girls eligible for the empowerment program were 11% (3.0ppts, $p<0.10$) more likely to be in-school at age 22. We also find significant and large effects of the empowerment program on income-generating activities (IGAs): an increase in an IGA index by 0.5SDs ($p<0.01$).

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Contents

1 Introduction

While most of the world has instituted laws prohibiting marriage under 18, child marriage remains the norm in many countries, with 142 million girls projected to become child brides in developing countries between 2011-2020 (Loaiza Sr and Wong, 2012).

Bangladesh has the second highest child marriage rate in the world: 74% of women aged 20-49 were married before age 18 (UNICEF et al., 2014). Adolescent girls in Bangladesh drop out of school at high rates, experience poor health, face restricted mobility and lack the ability to influence key decisions on their marriage and family planning. Rural areas produce worse education and health outcomes than urban areas. According to the 2014 Bangladesh Demographic and Health Survey (BDHS), only 25% of all Bangladeshi girls between the ages of 15 and 19 had completed their secondary education. Rural completion rates were one third of urban rates for all women. Bangladesh is believed to have one of the highest rates of adolescent and child marriage in the world. Despite the fact that the legal age of marriage is 18, the BDHS shows that 59% of women between ages 20-24 were married before 18. About 31% of adolescents aged 15-19 had begun childbearing, and this number is higher in rural areas (32%) than in urban areas (27%). These adolescent mothers face greater health risks associated with lower age of first birth, higher fertility rates and shorter birth spacing. Adolescent girls' access to reproductive health care and services is also poor. Only 51% of married girls aged 15–19 report using any contraception, compared to the average of 62% for all age groups. The need for family planning, including birth spacing and limiting of births, is not met for 17% of women aged 15-19, compared with 12% for all married women (Mitra et al., 2016).

Early marriage, limited education and limited access to resources for women are highly correlated with each other and with poor health outcomes for young women and their children. A lack of their own income and financial planning skills has the potential to reduce bargaining power for women within the household as well as investment in their children, affecting future generations. However, there are several challenges in determining the most effective ways of empowering adolescent girls and improving their health. First, without exogenous sources of variation in many closely correlated factors, it is difficult to establish the separate causal role of each in determining the poor outcomes observed in adolescents. Second, it is possible that other factors, such as restrictive cultural norms, are instead the main drivers observed in cross-sectional correlations.

This study conducts a clustered randomized trial in rural Bangladesh to evaluate the impact of two very different policy approaches to reducing child marriage and teenage childbearing, and increasing education –an adolescent empowerment training program and a conditional incentive program. In addition, we test in a sub-sample whether either program effects health, empowerment, and income-generating activities. One experimental arm tests the effectiveness of financial incentives conditional on marriage, the first randomized trial of this approach.

Alongside, we also evaluate the impact of a standard empowerment program, and test whether combining the empowerment program and the conditional incentives program is more powerful than either program alone. Our findings indicate that conditional incentive programs are highly effective in increasing age at marriage and schooling attainment, while empowerment programs have no effect on marriage timing, but do encourage unmarried and older married girls to stay in school. We also find that the empowerment program improved health, and income-generating activities among older girls. We find no evidence of complementarities between the incentive and empowerment program for any of the outcomes evaluated.

2 Literature Review

There is substantial literature showing a correlation between early marriage and women's health, and health-seeking behavior. In general, women who marry early begin childbearing at a young age (Jensen and Thornton, 2003), and complications in pregnancy and delivery are a leading cause of death among girls aged 15-19. Maternal mortality in this group is double the rates for women in their twenties. Girls who marry as adolescents face greater health risks associated with lower age of first birth, higher fertility rates and shorter birth spacing related to lower contraceptive use (UNICEF et al., 2001).

Childbearing during adolescence, when physiology is likely to be underdeveloped, is widely believed to result in higher levels of maternal mortality and morbidity, although the degree to which age influences reproductive outcomes is not well established. Girls aged 14 and younger are five times as likely to die from pregnancy complications, and their offspring are also less likely to survive (UNFPA, 2004). Young mothers also have higher maternal morbidity rates, including severe complications such as obstructed labor or obstetric fistula, which occur primarily among young women(EngenderHealth, 2003; Jarrett, 1994)

In addition to the physiological channels, early marriage may also impact health through behavioral channels. First, youth is associated with less active health-seeking behavior and limited health information, which has a negative impact on the health status of married adolescent girls. In Bangladesh, 70% of pregnant girls younger than 20 receive no antenatal care, and 90% deliver their babies at home. Their access to health information is poor: 20% of adolescent mothers have little knowledge of life-threatening conditions during pregnancy, and the majority (married and unmarried) have no information on sexuality, contraception or sexually transmitted infections or HIV and AIDS(Haider et al., 1997; Nahar et al., 1999; Barkat et al., 2000; Bruce and Clark, 2004).

In addition, younger girls tend to marry significantly older men. Research in Sub-Saharan Africa found that the husbands of girls aged 15-19 are on average 10 years older (UNICEF et al., 2001). Mean spouse age difference is decreasing with women's age at first marriage throughout the world. In West Africa, the mean spouse age difference is 12 years for girls aged 14-15 at first

marriage, and 8 years for women married at 24-25 years. The same pattern is found in southern Asia (UNFPA, 2004). The presence of a large age gap between spouses can contribute to poor outcomes in a number of ways. First, older husbands tend to be more sexually experienced, which implies greater risk of sexually transmitted infection (Clark, 2004; Luke and Kurz, 2002). The age gap is also associated with lack of agency in marriage for the adolescent girl, which may contribute to poor health outcomes. Lack of decision-making power may translate into lower reproductive control, or capacity to negotiate sexual relations, contraception and childbearing.

There is qualitative but little rigorous analysis suggesting that isolation, restricted mobility and lack of control over household resources are more common among young married girls (Mensch et al., 1998). Isolation and the increased stress of adult responsibilities may have a direct detrimental impact on psychological health. Lack of mobility is also likely to contribute to low health-care utilization among married adolescent girls. Research in India has documented that married adolescent girls' health-care decisions are mostly controlled by husbands and mothers-in-law (Barua and Kurz, 2001). Taken together with restricted mobility, this may limit the ability of adolescent girls to access health services for themselves and their children. The negative association between early marriage and health extends to the next generation. In Bangladesh, the infant mortality rate is 86 per 1,000 births for infants born to mothers under 20, compared to 60 for mothers aged 20-29. The child mortality rate is 106 per 1,000 for children of mothers under 20, compared to 84 for children born to mothers aged 20-29 (NIPORT and Macro, 2005). How much of this correlation is due to lower utilization of health care (e.g. lower immunization rates) or less knowledge of good health practices by mothers on the part of children is unclear.

There is also substantial evidence of a correlation between education and health-service utilization and health outcomes. Controlling for income, assets, location and community characteristics, women's schooling is positively correlated with lower fertility and lower infant and child mortality (Rosenzweig and Wolpin, 1980; Strauss and Thomas, 1995; Behrman, 1990; Schultz, 1990). Moreover, the correlation is generally stronger for mother's (compared with father's) education. Malhotra et al. (2003) review a number of studies that show a strong association between women's education and health-seeking behavior while controlling for likely confounding factors such as location (rural versus urban) and socioeconomic status. Educated women are more likely to use antenatal care, to use it early and frequently, and to use trained providers and medical institutions. They are more likely to have a safe delivery (most often defined by whether or not a delivery was conducted by a trained attendant), and to use postnatal care. Educated women, especially those with higher education, are more likely to seek care for certain reproductive health problems such as acute pelvic inflammatory disease and anemia(LeVine et al., 1991; Obermeyer and Potter, 1991; Elo, 1992; Bhatia and Cleland, 1995; Govindasamy, 2000; Beegle et al., 2001; Bloom et al., 2001).

Furthermore, in Bangladesh, mothers' education is positively associated with childrens' like-

lihood of being fully vaccinated; 95% of children of mothers who completed secondary or higher education are fully vaccinated, 88% of mothers who have some secondary education, 76% of mothers who have completed primary school, 75% of mothers who have some primary education and 74% of mothers with no education (NIPORT and Macro, 2005). Mothers' level of education is also inversely related to children's risk of dying. Higher levels of educational attainment are generally associated with lower mortality risks, since education exposes mothers to information about better nutrition, use of contraception to limit and space births, and childhood illnesses and their treatment. The 2014 BDHS shows that under-5 mortality declines sharply with increased level of mothers' education; the rate is almost 50% lower for children whose mothers have completed secondary education, compared with those who have no education. Also, a child's chance of dying in neonatal and postneonatal periods is much lower when the mother has completed secondary education (NIPORT and Macro, 2005).

There is also limited causal evidence indicating that households have fewer children when the wife is more educated. In the 1970s, Indonesia completed a large-scale school construction program, generating variation in the differences in schooling between husbands and wives based only on their region and date of birth. Using this variation, Breierova and Duflo(2004) found that conditional on the household's average education, households have fewer children when the wife is more educated. This suggests that relative education matters for women's health, in this case through fertility choices.

While these studies suggest that women who marry young have lower education, less access to resources, worse health outcomes and less healthy children, the many and complex interrelations among these different factors mean that it is difficult to disentangle their separate causal effects.

Traditional customs that sanction adolescent marriage are widely blamed for girls' limited schooling achievement, as they are thought to raise the opportunity cost of educating girls: "The pressure for early marriage remains a powerful force that shapes the alternatives girls have and constrains their access to secondary education" (Mahmud, 2003). Similarly, early marriage is also likely to limit the earning capacity of women by reducing their education, work experience before marriage and ability to work outside the home while married. If women who marry later contribute more to household income, the improvement in income alone should raise the health outcomes of all family members.

The vast majority of the studies mentioned above are cross-sectional correlation studies and thus unable to rigorously examine the separate causal effects of early marriage, education and own resources on women and their children's health and well-being. Nor can they rule out the possibility that other unobserved factors- such as cultural attitudes, or girls' self-esteem- may be driving the observed correlation between early marriage, low educational attainment, limited access to resources, and poor maternal and child health. Insofar as these unobserved factors impact health, the correlations cannot be interpreted as causal. If the relationship is not

causal, then interventions that increase women's marriage age, education or resources without influencing the unobserved factors would not necessarily have the anticipated effect on health.

Few studies have gone beyond simple correlations to examine causal pathways(National Research Council , US). Exceptions are a study on the link between women's education and fertility in Indonesia (Breierova and Duflo, 2004) and another in Taiwan (Chou et al., 2010). However, these studies are only able to look at a few outcomes related to health. Another exception is work by Field and Ambrus (2008) in Bangladesh, which shows how postponing marriage by one year between the ages of 11 and 16 increases schooling by 0.3 years and literacy by 6.5%. However, there are no such studies showing the causal effect of early marriage on health and own income on health.

A number of studies have shown that reducing the cost of education or providing positive incentives for students to stay in school are effective in increasing education and can also reduce teenage pregnancy or cohabiting (Angrist and Lavy, 2009; Baird et al., 2011; Angrist et al., 2006; Schultz, 2004). Bandiera et.al.(2012) also show that girls' clubs in Uganda, which in many ways are similar to the safe spaces evaluated in this study but which focus on older girls and include vocational training, were effective in reducing teenage pregnancy. However, there is little evidence of the effectiveness of alternative approaches to reducing child marriage. There is also no existing experimental evidence on the impact of delaying marriage on schooling outcomes.

3 Methods

3.1 Study design and Participants

Between January 2007 and September 2017 we ran a clustered randomized trial in collaboration with Save the Children (USA) to examine alternative strategies to reduce child marriage and teenage childbearing and increase education. The study was carried out in six sub-districts (Daulatkhan, Babuganj, Muladi, Patuakhali Sadar, Bauphal and Bhola Sadar) in south central Bangladesh, where Save the Children was managing a food security program that provided transfers to pregnant and lactating mothers (a map of the study region can be found in appendix 6.2). The conditional incentive program that we evaluate used the distribution infrastructure of this existing program, which operated in all treatment and control communities in our study. To determine which communities were included in the study, we collected parents' survey data in all 610 communities in the six sub-districts between January and February 2007. Communities were excluded from our study if they were too remote for distribution or had less than 40 or more than 490 adolescent girls, leaving 460 eligible communities in five subdistricts that were randomized into i) a basic empowerment program, ii) a conditional incentive to delay marriage, iii) empowerment plus conditional incentive, or iv) the status quo using a

stratified randomized design in the ratio 2:1:1:2.[1] The objective was to compare the effect of an empowerment program with that of a conditional incentive and to test whether a combined empowerment and incentive program is more powerful than either program alone. Randomization at the community level reduced the risk of inter-household spillovers. We stratified by union, an administrative grouping of roughly ten communities, and within union by community size (supplementary online appendix **??**).

To test for medium-term and long-term effects of the two programs on women's health, empowerment, and income-generating activities, we randomly selected 20 households per community (ten in smaller communities) for detailed interviews with all girls aged 10-17 at program start. The subsample included 11,350 girls at baseline, followed up during surveying in 2010-2011 and 2016-2017.

In communities randomized to receive the empowerment program, called Kishoree Kontha (KK), or "Adolescent Girl's Voice", all girls aged 10-19 were invited to take part in one of four six-month cycles of the program that ran between December 2007 and August 2010. In conditional incentive communities, girls whose reported age at baseline (before the program was announced) meant that they would be age 15-17 at the start of the oil distribution were eligible to receive the conditional incentive until the age of 18 if they remained unmarried. Every four months from April 2008 to August 2010 marital status was verified by interviewing family members, neighbors and community leaders and cooking oil was distributed to eligible girls. We attempted to resurvey all households with girls age 15-17 at distribution start 4.5 years after program completion (between May and September 2015). Parents of each daughter were asked about her history of marriage, childbearing and education. We also followed-up with all girls included in the subsample six years after program completion (between November 2015 and September 2017). Girls were asked directly about their history of marriage, childbearing and education as well as a detailed set of questions aimed at determining their health, empowerment and income-generating activities status.

The sample analyzed in this paper consists of 15,464 girls from 460 communities: 5,119 in the empowerment arm, 2,349 in the conditional incentive arm, 2,659 in the empowerment plus incentive arm and 5,337 in control. We test for medium-term effects of the programs on 1,668 subsample girls from 350 communities: 504 in the empowerment arm, 285 in the conditional incentive arm, 318 in the empowerment plus incentive arm and 561 in in control. Participation in the empowerment and incentive programs was voluntary. Oral consent was collected from subjects for survey participation. Institutional review boards of Innovations for Poverty Action and MIT approved this project.

[1]Experimental assignment was carried out by MIT staff without the involvement of Save the Children using Stata. Save the Children staff were informed of the treatment allocation of study communities.

3.2 Intervention Procedures

The Bangladesh Development Society (BDS) implemented the empowerment program under the direction of Save the Children. Communities assigned to the empowerment program first underwent a community mobilization phase that informed parents, teachers, and community leaders about the activities and potential benefits of the program, mobilized their support and found locations for "Safe Spaces" – meeting places where girls could meet, socialize, and receive training. Safe Space committees were organized with adult members of the community to help troubleshoot any potential problems, for example if a girl's parents did not want her to attend. The empowerment curriculum included education support and social competency training. The education component aimed to enhance the basic literacy, numeracy, and oral communication of both school-attending and illiterate girls. The social competency component trained girls in life skills and nutritional and reproductive health knowledge via a curriculum designed by Save the Children USA. In randomly selected communities (50%), financial literacy and encouragement to generate own income was added to the curricula. Overall, the empowerment curriculum was similar in content to many empowerment programs being implemented worldwide, including those designed by BRAC and UNICEF.

Each Safe Space had a target of 20 girls, two to four of which were selected to be peer educators. Peer educators were given between 24 and 40 hours of training on the curriculum, which they delivered with the aid of specially designed books that included stories and examples to be read aloud, questions to be discussed, and participatory activities and games to perform. Safe Space groups were designed to meet five or six days a week for two hours each day for six months. Groups could continue to meet once the curriculum was complete but there was no support or new curricula after six months. At the end of the cycle, field staff repeated the mobilization and selection process until the entire community population had been reached. Thus, communities received up to four cycles and 24 safe spaces, depending on the number of girls living there. Monitoring data show Safe Spaces averaged six meetings, or 7.8 hours, per week, and 40,229 girls, or 90%, of girls in target communities were reached (appendix 6.5). This makes KK one of the largest adolescent empowerment programs implemented in the developing world. We find both higher enrollment and session attendance in the empowerment+incentive treatment arm as opposed to the empowerment only arm (88% vs. 93% and 71% vs. 76%, see appendix 6.5). The difference is even more striking when looking at self-reported take-up (appendix 6.6): 71% of girls in the empowerment plus incentive arm report having attended at least one KK session (65% report membership) as opposed to 47% of girls in the empowerment arm (41% report membership). We do not find significant differences between KK members in the empowerment arm and KK members in the empowerment plus incentive arms, however, qualitative interviews showed that unmarried girls were more likely to be allowed to attend the KK sessions. Given that we find an effect of the incentive program on marriage age, it is likely that KK participation was higher in the combined treatment arm because girls remained

unmarried for longer than girls in the empowerment only treatment arms. Similarly, we also observe higher crossovers to the empowerment program in the incentive arm as opposed to the control arm. This does affect our analysis framework, which we discuss in section 3.4.3.

The conditional incentive program was an in-kind transfer of cooking oil to encourage parents to postpone daughters' marriage until the legal age of consent (18). The value of the incentive was approximately $16 per year, an amount chosen to offset the estimated financial cost of higher dowry (Bruce and Sebstad, 2004). Cooking oil was chosen as an incentive because it is purchased regularly by every family in Bangladesh and thus has close to cash equivalent value, yet it is less susceptible to theft and graft than cash because of its bulk. It also has a high value to volume ratio, which minimized transport costs. Girls estimated to be age 15-17 at distribution start and confirmed to be unmarried by Community Health Volunteers (CHVs) were issued ration cards to collect the oil. Only girls (not their parents) were permitted to collect the oil by presenting their ration card, which was checked against a separate beneficiary list at distribution points. A total of 5,734 unmarried adolescent girls received the conditional incentive at least once, or 71% of the girls eligible at baseline (appendix 6.5). Marriage conditionality was checked before each distribution round by CHVs and independent monitors who asked beneficiaries, neighbors and community leaders about marital status. Those found to be married or who had reached 18 (according to their age at baseline) had their names removed from the eligibility list and their cards taken away.

Four and a half years after program completion, we conducted a follow-up study of all girls age 15-17 and unmarried at distribution start. Parents were asked about all daughters' current marital status.[2] Parents of married or previously married girls were also asked "How long ago did she marry?" or "How long ago did she first marry?", respectively. Parents were also asked whether the girl had ever given birth and the age of each child. In addition, parents were asked whether their daughters were still in school and which class they were currently attending and/or last completed. An extract of the parents'survey as well as the components of each parents'survey outcome can be found in supplementary online appendix **??**.

During the parents' survey, enumerators collected tracking information of all girls in the detailed subsample. Immediately after completion of the follow-up survey with parents (five years after program completion), enumerators then used this information to locate girls from the subsample for a more detailed subsample survey. All girls were asked a set of questions related to their physical, mental, reproductive, and child health, as well as their empowerment and work status.

For the subsample women for which we have both parents' and womens' report of outcomes, we use the more conservative report in the subsample analysis.

The trial was registered at the AEA Registry prior to endline data collection, #204

[2]Possible responses were "Married", "Single, never married", "Widowed", "Divorced", "Separated" or "Abandoned".

(https://www.socialscienceregistry.org/trials/204).

3.3 Outcomes

The primary outcomes of the study are child marriage (under 18), teenage childbearing (under 20) and school enrollment, as reported by the parents, as well as mean effects indices for health, empowerment, and income generating activities, as reported by the women (Kling et al., 2007). We use binary outcomes as opposed to continuous measures of marriage and birth age to avoid censored data problems that arise from excluding girls that have never been married or given birth. Secondary outcomes are marriage age, marriage rates under 16, and last class completed, as reported by the parents, as well as denmeher, and indices for gender attitudes, health knowledge, time use, savings and credit, and husband and marriage quality, as reported by the women. Marriage age is calculated by comparing reported marriage duration with girls' age collected at baseline to avoid misreporting of underage marriages. Age at first birth is calculated using baseline age and the reported age of the girl's oldest living or deceased child. The subsample analysis was described in detail in a pre-analysis plan registered at the AEA Registry prior to endline subsample analysis, #204 (https://www.socialscienceregistry.org/trials/204). The analysis plan also lists all questions included in each index.

3.4 Statistical Analysis

3.4.1 Data Monitoring

A team of monitors, data quality control officers, and research associates monitored the data throughout data collection by conducting consistency checks across answers, analyzing variable distributions and monitoring differences between survey responses and responses of parents and young women in a second separate backcheck survey conducted for 7% of parents and 2% of young women. Among parents, marriage status differed in 1.5% of the cases, birth status in 1.3% and ever-schooled in 0.8%. Among young women, marriage status differed in 1.2% of the cases, birth status in 1.1% and ever-schooled in 0.9%. We recollected data through phone interviews from households and women with very high overall backcheck error rates across all variables. Backcheck error rates are balanced across treatment arms. We also intensively verified marriage age using various methods: i) For a subsample of 684 young women for which marriage certificates were collected from the parents' household, we compared the parents' report with the date on the marriage certificate, if available. ii) For those young women in the detailed subsample, we compared the parents' report to the young woman's report. iii) For a subsample of 2,453 young women for which marriage certificates were collected from the young woman's household, we compared the young woman's report with the date on the marriage certificate. Parents' reports and certificates differed by 3.0 months on average, young women's

and parents' reports by 1.1 months on average, and young women's reports and certificates by 2.8 months on average (appendix 6.8). The discrepancy was balanced across treatment arms for all three comparisons.

3.4.2 Parents' Survey

CHVs only issued eligibility cards to girls, who had been identified as eligible in the parents' survey and were still unmarried at program launch. Thus, girls, which could not be found by CHVs and girls who had been married before the program were not issued eligibility cards. We are thus excluding girls from all treatment arms with insufficient baseline tracking information and girls whose reported marriage date is before the first oil distribution (19%, balanced by treatment arm). In addition, we estimate the impact of the incentive using two-stage least squares (2SLS) regressions.

Our first- and second-stage estimations are:

$$\hat{I}_{ti} = \gamma_{0t} + \gamma_{1t} I_i + \gamma_{2t} E_i + \gamma_{3t} I_i \times E_i + \gamma'_{4t} X_{iv} + \mu_{uti} + \varpi_{vti} + \upsilon_{ti} \quad (1)$$

$$Y_i = \alpha + \beta_1 \hat{I}_{1i} + \beta_2 \hat{I}_{2i} + \beta_3 E_i + \beta'_4 X_{iv} + \mu_{ui} + \varpi_{vi} + \epsilon_i \quad (2)$$

where $\hat{I}_{1i}$ is predicted program inclusion (card issuance) of person i to the incentive only program, and $\hat{I}_{2i}$ predicted inclusion of person i to the empowerment plus incentive program. I_i is assignment to either of the incentive treatment arms, and E_i assignment to either of the empowerment treatment arms. Y_i is outcome for person i.

Under plausible assumptions, this method accounts for errors in program inclusion and produces unbiased and consistent estimates of treatment assignment under full compliance. The most important assumption is that of no cross-household spillovers onto adolescent girls in the same cohort. A comparison of girls in households who did not receive an eligibility card relative to controls suggests that this assumption is valid (see appendix 6.9).

Both first and second stage regressions include a vector of individual and community controls measured at baseline for strata, age, household size, an older unmarried sister in the household, school enrollment and level of education, mother's level of education, distance from the community center to the closest neighboring community center and whether the community is accessible via public transport (a proxy for remoteness), number of schools in the community, and the ratio of adult boys to adult girls in the community (a proxy for marriage market conditions), as well as union fixed-effects. Errors are clustered at the unit of randomization (community). First-stage results are reported in appendix 6.10.

We compare impacts on child marriage using an intention-to-treat specification (ITT), using the ITT specification after excluding married girls and girls with insufficient tracking information, and using the 2SLS specification after excluding married girls and girls with insufficient tracking information in appendix 6.11. Results excluding controls, and including washed-out

communities, as well as analysis using ITT specification for all outcomes are reported in appendix 6.11, and yield similar results. We also find no differences when regressing outcomes on dummies for each treatment arm (empowerment, incentive, empowerment plus incentive) as opposed to eligibility for each program. [3]

3.4.3 Subsample Survey

Reweighting During baseline subsample surveying, enumerators were given a list of randomly selected households to interview as well as a list of randomly selected replacement households to substitute into the baseline if an adolescent girl from the original list was unavailable. In some instances, the survey company resorted to sampling from the replacement list after making very few unsuccessful attempts to contact the household on the original list. Due to the excessive use of these replacement lists, the subsample became non-representative of the parents' survey since girls from the replacement list were easier to find. In particular, appendix 6.3.3 shows that girls included in the subsample are on average younger, more educated and come from smaller households than girls not included in the subsample.

To account for sample inclusion bias and transform the unequal probability sample into equal inclusion probability data, we reweigh each observation i in village v by the inverse of it's probability of subsample inclusion $\frac{1}{P_{iv}}$(Rosenbaum, 1987). We predict the probability of subsample inclusion using the statistical learning technique of Bagged CARTs, which is further discussed in appendix 6.12.

2sls We exclude 35.3% of subsample women because of insufficient baseline tracking information, a reported marriage date is before the first oil distribution, or because the household is completely washed-out at follow-up (balanced by treatment arm). We also estimate the impact of the incentive using two-stage least squares (2SLS) regressions.

In addition, midline subsample surveying revealed that a large number of girls in communities that were not randomized to receive the program nevertheless attended some session or were members of the KK program. Appendix 6.6 highlights that 23.3% of girls in incentive communities reported they were KK members, and 8.8% in control villages. Noncompliance was very low in non-oil villages, in which less than 1% of non-eligible girls reported receiving oil. A map of reported KK attendance take-up can be found in appendix 6.7.

[3] The study was powered to detect a 2.4ppts decrease in child marriage among girls receiving the empowerment program and a 2.5ppts decrease among girls receiving the incentive from a control mean of 58.7% with 80% power, 0.05 alpha, 15% attrition, and an intracluster correlation of 0.010. The study also had power to detect a 2.4ppts decrease in teenage childbearing for the empowerment program and a 2.5ppts decrease for the incentive from a control mean of 50.8%, and an intracluster correlation of 0.010. The study could detect an increase of 2.0ppts in school enrollment for the empowerment program and 2.1ppts for the incentive from a control mean of 25.3%, and an intracluster correlation of 0.050. Means were taken from the 2004 Demographic and Health Survey data.

Appendix 6.3.4 displays the means for reported KK members and nonmembers on a number of observable baseline characteristics. KK members were significantly more likely to be in school, and there is a 6 percentage point difference at baseline in school enrollment between members and nonmembers. KK members also have a higher average math and reading score, and greater knowledge on contraception and HIV/AIDS.

KK members also appear to be less marginalized, as they live closer to the Safe Space centers, which were often chosen to be the nicer houses by communities as they had to be large enough to fit around 20 girls on their veranda or porch.

Prior to the start of the program, there was a concern that girls from conservative families would not be allowed to attend. However, there appears to be no large difference in religiosity of the parents of members and nonmembers. There also appears to be no difference in the initial health of members and nonmembers as proxied by BMI (body mass index) and percentage stunted.

To remedy for crossovers, we estimate the impact of the empowerment program using two-stage least squares (2SLS) regressions.

Our first- and second-stage estimations are:

$$\hat{T}_{ti} = \gamma_{0t} + \gamma_{1t} I_i + \gamma_{2t} E_i + \gamma_{3t} I_i \times E_i + \gamma_{4t}' X_{iv} + \mu_{uti} + \varpi_{vti} + \upsilon_{ti} \tag{3}$$

$$Y_i = \alpha + \beta_1 \hat{T}_{1i} + \beta_2 \hat{T}_{2i} + \beta_3 \hat{T}_{3i} + \beta_4' X_{iv} + \mu_{ui} + \varpi_{vi} + \epsilon_i \tag{4}$$

where $\hat{T}_{1i}$ is incentive predicted program inclusion (card issuance) of person i to the incentive only program, $\hat{T}_{2i}$ reported participation in the empowerment program of person i, and $\hat{T}_{3i}$ is the interaction of $\hat{T}_{1i}$ and $\hat{T}_{2i}$. I_i is assignment to either of the incentive treatment arms, and E_i assignment to either of the empowerment treatment arms. Y_i is outcome for person i.

Given the high rate of crossovers, our results change in a intention-to-treat specification in appendix 6.16.7.

Both first and second stage regressions include the vector of census controls, as well as the household's distance to the closest secondary school, and proxies measured at baseline for the girl's aspired level of education (desired education and whether girl believes that she will be permitted to complete her desired education), the girl's beliefs about marriage (desired marriage age, earliest and latest age a girl should get married, ability to discuss marriage timing with parents), and the girl's beliefs about childbearing (desired age at first child, and belief that a woman should get pregnant immediately after marriage). First-stage results are reported in appendix 6.10.

3.4.4 Analysis Sample

There are three sources of missing data from the parents' survey. First, before endline, 1,229 observations (310 in empowerment, 309 in incentive, 315 in empowerment plus incentive,

and 295 in control) were lost due to errors by the data entry firm, which lost hard copy data from 553 households before data entry occurred, and also incorrectly entered IDs such that 645 individuals could not be linked across survey waves. Second, 1,007 girls (486 in empowerment, 156 in incentive, 124 in empowerment plus incentive, and 241 in control) lived in 14 communities that were entirely displaced by cyclone damage. Finally, of the 21,859 girls we attempted to reach at endline, 2,800 could not be tracked (13% attrition, balanced across treatment arms). Finally, 3,595 girls are excluded due to insufficient tracking information or marriage before program start. Our final analysis sample constitutes 15,464 girls: 5,119 girls in empowerment, 2,349 in incentive, 2,659 in empowerment plus incentive, and 5,337 in control.

9% of girls were married at baseline and 60% were in school. Baseline characteristics were balanced across treatment arms (appendix 6.3.1).

There are also three sources of missing data from the young women's survey. First, during the midline survey, rumors spread in one sub-district (Muladi) that enumerators were abducting or converting girls to Christianity, and several enumerators were attacked. As a result, no subsample endline data were collected in the subdistrict (2,061 girls excluded). Second, 44 girls lived in households that were entirely displaced by cyclone damage (girls in washed-out communities were still tracked unless their households were completely washedout). Finally, of the 2,949 girls we attempted to reach at endline, 369 could not be tracked (12% attrition, balanced across treatment arms). Finally, 909 girls are excluded due to insufficient tracking information or marriage before program start. Our final analysis sample constitutes 1,668 girls: 504 girls in empowerment, 285 in incentive, 318 in empowerment plus incentive, and 561 in control.

70.2% of subsample girls were in school at baseline. All baseline subsample characteristics were balanced across treatment arms (appendix 6.3.2).

To assess dose response, we compare effects on the whole sample with effects on girls eligible to receive the incentive for at least two years (aged 15 at distribution start). We also check for differential effects according to whether a girl was in school at baseline to test whether the most vulnerable girls can potentially benefit from one of the policy approaches.

4 Results

4.1 Marriage

As shown in table 4.1, the financial incentive reduced the likelihood of child marriage by 21% overall (-5.8ppts, $p<0.01$) and 24% (-8.9ppts, $p<0.01$) for girls age 15 at distribution start. The likelihood of being married under 16 fell by 28% among girls eligible for the incentive and age 15 at distribution start (-2.6ppts, $p<0.05$).

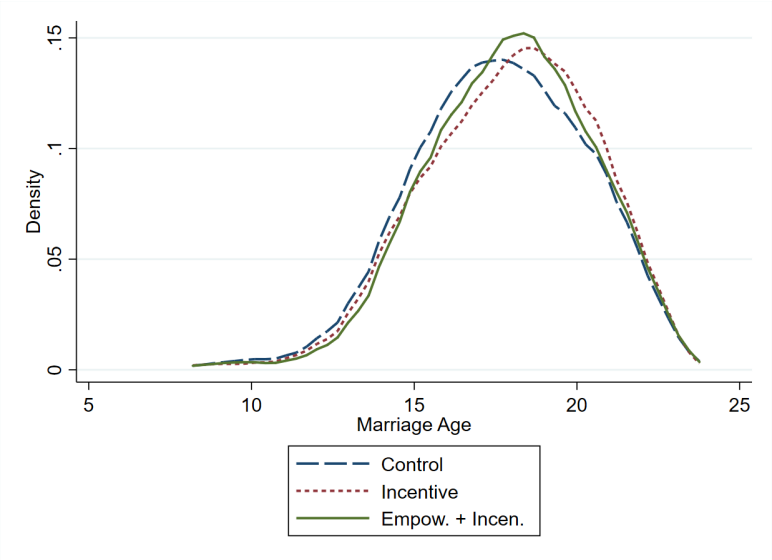
Table 4.1: Marriage outcomes, unmarried girls age 15-17 at program launch

	Ever married		Marriage age		Married<18		Married<16
	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Empow.	0.006	-0.002	-0.021	-0.021	-0.002	-0.002	0.009
	(0.008)	(0.012)	(0.042)	(0.064)	(0.008)	(0.014)	(0.009)
Incentive	-0.015	-0.028	0.245***	0.397***	-0.058***	-0.089***	-0.026**
	(0.013)	(0.018)	(0.064)	(0.088)	(0.012)	(0.022)	(0.012)
Empow.+Incen.	0.002	0.015	-0.065	-0.122	0.026	0.038	-0.002
	(0.017)	(0.025)	(0.089)	(0.133)	(0.017)	(0.029)	(0.018)
Control Mean	0.82971	0.81198	19.07524	18.37120	0.27239	0.36966	0.09426
Observations	15450	5846	12783	4716	15437	5843	5843
FE	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

As 17% of our sample is still unmarried, our marriage age data is censored. Figure 1 shows the probability density function of marriage age by treatment arm, demonstrating a shift in marriages from the two years before 18 to the years just after 18. Marriage rates had fully converged by age 22. We also report non-binary regression coefficients not adjusted for censoring in table 4.1. The incentive increased average age of marriage by 3.0 months (0.25 years, $p<0.01$) overall and 4.8 months (0.40 years, $p<0.01$) among girls age 15 at distribution start. If all control group girls age 15 at distribution start who married under 18 were persuaded to wait until age 18, average marriage age would have increased 6.3 months, a measure of program effect under maximum take-up. Thus, our estimated treatment effect of 4.8 months is the equivalent of almost every family at risk responding to the incentive for the duration of the program.

Figure 1: Distribution of marriage age



Girls age 15 and unmarried at program launch

The magnitude is also consistent with less than full compliance with the program and marriage age increases among some of the responders beyond age 18, despite no incentive being offered to remain unmarried at that age. Indeed, the distribution of marriage ages (figure 1) suggests fewer marriages took place in the incentive arms between ages 15 and 17.5 and more took place between 18 and 22 compared to the control group. That some marriages were delayed well past 18, the cutoff for the incentive, could be explained by marriage market search frictions. Qualitative interviews support this view: marriage proposals come at infrequent intervals and parents will often wait many months for the right match for their daughter. Another possible explanation is that delaying marriage beyond a critical age may endow girls with greater bargaining power in negotiating marriage proposals, which they can then parlay into even further marriage delays once the program is over, simply on account of being older and more experienced.

We do not observe a separate or additional effect of the empowerment program on marriage outcomes.

4.2 Childbearing

We also find strong effects of the incentive on age at first birth (table 4.2). The incentive reduced the likelihood of teenage childbearing by 11% (-2.5ppts, $p<0.05$). We again do not observe a separate or additional effect of the empowerment program.

Table 4.2: Childbearing outcomes, unmarried girls age 15–17 at program launch

	Ever birth	Age 1st birth	Birth<20	#Children	#Children<20	Birth interval
	(1)	(2)	(3)	(4)	(5)	(6)
Empow.	0.013	-0.004	0.005	0.007	0.005	-0.015
	(0.010)	(0.040)	(0.007)	(0.014)	(0.008)	(0.024)
Incentive	-0.020	0.135**	-0.025**	-0.032	-0.024**	-0.148***
	(0.015)	(0.058)	(0.011)	(0.021)	(0.012)	(0.038)
Empow.+Incen.	-0.008	-0.121	0.009	0.002	0.009	0.049
	(0.021)	(0.079)	(0.016)	(0.031)	(0.018)	(0.050)
Control Mean	0.61423	20.61517	0.22900	0.76665	0.23710	2.28909
Observations	15405	9413	15379	15405	15379	9382
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.3 Education

The incentive to delay marriage also has a large positive impact on school enrollment (table 4.3). We restrict our sample to girls in school at program launch because it is extremely rare for girls to return to school once they have unenrolled.[4] Girls aged 15-17 at distribution start and eligible for the incentive were 13% (3.5ppts, p<0.10) more likely to be in school at age 22-25 and had completed 2.5 months (0.21 years, p>0.10) of additional schooling. Girls eligible for the empowerment program were 6% (1.8ppts, p>0.10) more likely to be in school and had completed 2.0 months (0.17 years, p<0.10) of additional schooling. We observe significant dose response both among girls eligible for the incentive and the empowerment program: Girls 15 at distribution start in the incentive group are 25% (7.0ppts, p<0.01) more likely to be in school and have completed 4.6 months (0.38 years, p<0.10) of additional schooling. Girls 15 at distribution start in the empowerment group are 10% (3.0ppts, p<0.10) more likely to be in school and have completed 1.9 months (0.16 years, p>0.10) of additional schooling.

The coefficient on the interaction term between the incentive and empowerment program is insignificantly different from zero in all specifications.

[4]We test this assumption and find no evidence of impact of the incentive on schooling for those girls who were out of school at program start. However, the confidence intervals are large.

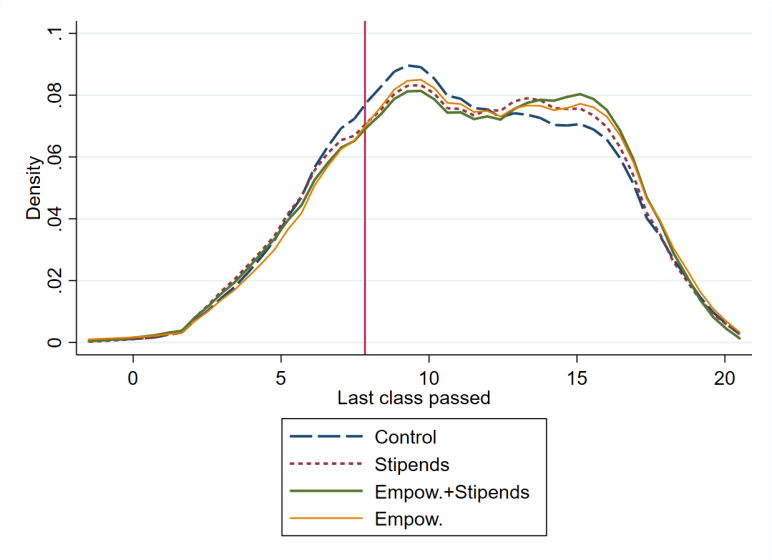
Table 4.3: Education outcomes, unmarried girls age 15–17 and in school at program launch

	In school		Last class passed	
	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)
Empow.	0.018	0.030*	0.172*	0.164
	(0.012)	(0.016)	(0.095)	(0.132)
Incentive	0.035*	0.070***	0.205	0.379*
	(0.018)	(0.023)	(0.147)	(0.219)
Empow.+Incen.	-0.005	-0.036	-0.135	-0.240
	(0.025)	(0.032)	(0.216)	(0.279)
Control Mean	0.28793	0.28373	11.64835	11.11365
Observations	10882	4530	10800	4501
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

As 70% of our sample is still in school, our education data is censored. Figure 2 shows the probability density function of education by treatment arm, demonstrating a shift in education from the median education level at baseline to secondary and even tertiary education.

Figure 2: Distribution of education



Girls age 15 and unmarried at program launch

4.4 Marriage Quality

The incentive to delay marriage decreases a marriage quality index by 0.03SDs ($p<0.05$) (table 4.4). Girls in the incentive arm marry younger ($p>0.10$) and less educated husbands ($p>0.10$). One explanation could be that more qualified husbands are less likely to marry older girls, which might be considered more mature and thus less docile. An alternative explanation is that more qualified husbands had already been married before the girls from the incentive arm entered the marriage market, an effect that would disappear in the general equilibrium. We do not find an effect of the incentive on dowry. This is in line with findings by the authors in another paper (Buchmann et al., 2018) that suggest that a negative effect of age on dowry and a positive effect of education on dowry could cancel out. We do not observe a significant change in marriage quality among girls eligible for the empowerment arm. However, the empowerment arm increases dowry by 5% (USD 41, $p<0.10$). Love marriages, meaning marriages arranged by the couple themselves, are currently 10% of all marriages and not affected by either of the programs.[5]

[5]In a survey of 750 matchmakers, matchmakers reported lower marriage quality in incentive communities and higher marriage quality in empowerment communities (results available upon request).

Table 4.4: Marriage quality outcomes, unmarried girls age 15-17 at program launch and married at endline

	Index	Hus. age	Hus. education	Hus. formal	Dowry	Outside village
	(1)	(2)	(3)	(4)	(5)	(6)
Empow.	-0.001	0.107	0.011	-0.005	41.497*	0.009
	(0.009)	(0.099)	(0.103)	(0.010)	(21.963)	(0.007)
Incentive	-0.033**	-0.054	-0.181	-0.020	-0.879	-0.008
	(0.015)	(0.162)	(0.146)	(0.015)	(34.288)	(0.011)
Empow.+Incen.	0.028	0.110	0.156	0.012	19.349	0.006
	(0.020)	(0.222)	(0.213)	(0.021)	(47.752)	(0.015)
Control Mean	0.03382	24.60896	9.91993	0.74694	770.08125	0.90309
Observations	12796	12017	11506	12527	12086	12731
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.
Dowry in USD.

4.5 Subsample First-Stage

In the subsample data, the incentive decreases child marriage (marriage under 18) by 40% (-13.2ppts, p< 0.10) overall and 49% (-21.3ppts, p< 0.05) among girls eligible for the incentive for at least two years. The incentive decreases the likelihood of marriage under 16 by 79% (-8.9ppts, p> 0.10). We also find strong effects of the incentive on age of first birth in the subsample. The incentive reduced the likelihood of teenage childbearing by 28% (5.2ppts, p> 0.10) overall and 86% (21.9ppts, p< 0.05) among girls age 15 at program start. We do not observe significant effects of the incentive on schooling in the subsample.

We do not find separate or additional effects of the empowerment arm on child marriage or teenage childbearing. However, we find large and significant effects of the empowerment arm on last class passed. The empowerment increases education by 7.1 months (p> 0.10 overall) and 10.4 years (p< 0.10) among younger girls.

The larger coefficients for both marriage and education outcomes are due to the more accurate measurement of empowerment participation by using reported attendance by women. Results regressing outcomes on binary empowerment arm assignment instead can be found in

appendix section 6.16.5. Coefficients are very similar to those reported by the parents. The small control means are explained by our choice of the more conservative reports between parents' and womens' reports. We do not find any significant effects in the overall sample in table 4.6.

Table 4.5: First-stage, unmarried girls age 15-17 at program launch

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17	Age 15	Age 15	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.108	0.158	0.098	0.033	0.112	0.594	0.870*	0.081	0.085
	(0.069)	(0.108)	(0.063)	(0.080)	(0.079)	(0.464)	(0.470)	(0.058)	(0.093)
Incentive	-0.132*	-0.213**	-0.089	-0.040	0.091	0.217	0.474	-0.052	-0.219**
	(0.073)	(0.108)	(0.055)	(0.072)	(0.073)	(0.400)	(0.460)	(0.052)	(0.086)
Incen.*Empow.	0.103	0.127	0.025	0.087	-0.150	-0.285	-0.797	0.008	0.185
	(0.126)	(0.185)	(0.097)	(0.138)	(0.134)	(0.770)	(0.816)	(0.093)	(0.146)
Control Mean	0.32806	0.43788	0.11230	0.27675	0.25322	11.05989	10.50223	0.18436	0.25487
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.6: First-stage, unmarried girls age 10-17 at program launch

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 10-17	Age 10-14	Age 10-14	Age 10-17	Age 10-14	Age 10-17	Age 10-14	Age 10-17	Age 10-14
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	-0.003	-0.048	-0.095	0.031	0.025	0.239	0.200	-0.032	-0.051
	(0.052)	(0.068)	(0.069)	(0.046)	(0.058)	(0.274)	(0.320)	(0.042)	(0.056)
Incentive	-0.039	-0.035	-0.035	-0.008	0.004	0.186	0.209	-0.012	0.003
	(0.025)	(0.033)	(0.042)	(0.032)	(0.034)	(0.174)	(0.181)	(0.025)	(0.032)
Incen.*Empow.	0.084	0.117	0.117	-0.012	-0.054	-0.337	-0.490	0.076	0.106
	(0.070)	(0.090)	(0.097)	(0.071)	(0.086)	(0.404)	(0.449)	(0.059)	(0.079)
Control Mean	0.54119	0.67965	0.37755	0.35622	0.38323	9.86994	9.34429	0.31558	0.37894
Observations	4332	2753	2753	4382	3102	4383	3102	5010	3390
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.6 Primary Indices

Our analysis of health, empowerment, and income-generating activities (IGA) outcomes for unmarried girls are measured by indices of censored variables for unmarried girls ages 15–17 (eligible for both incentive and empowerment treatment) and also ages 10–17 (eligible for

empowerment treatment only) at program start. Overall, the incentive to delay marriage does not appear to have a significant effect on health, empowerment, or IGA indices in either age range. We do find a significant and large effect of the empowerment arm on income-generating activities (IGAs) for older girls, increasing the IGA index by 0.4SDs ($p<0.01$) for girls ages 15–17 at program start and 0.5SDs ($p<0.01$) for girls age 15 at program start. When considering a wider range of girls age 10–17 at program start, the empowerment arm only increases the IGA index by 0.06SDs ($p>0.10$). Additionally, the effect of the empowerment arm on the health and empowerment indices are relatively small and only marginally significant for the empowerment index for girls age 10–17 at program start (0.05SDs, $p<0.10$).

The coefficients on the incentive plus empowerment arm are all insignificantly different from zero.

We do not find significant differences between the censored and uncensored indices (tables 4.7 and 4.8).

We will discuss the effects of the different treatment arms on our primary outcomes below.

Table 4.7: Main outcomes (censored), unmarried girls age 15-17 at program launch

	Health			Empowerment			IGA		
	Age 10-17 (1)	Age 15-17 (2)	Age 15 (3)	Age 10-17 (4)	Age 15-17 (5)	Age 15 (6)	Age 10-17 (7)	Age 15-17 (8)	Age 15 (9)
Empow.	0.037	0.081	0.133	0.053*	0.091	0.101	0.059	0.382***	0.459***
	(0.039)	(0.066)	(0.087)	(0.031)	(0.069)	(0.107)	(0.068)	(0.133)	(0.159)
Incentive	-0.044	-0.003	-0.133	-0.019	0.011	-0.046	-0.043	0.155	-0.040
	(0.028)	(0.061)	(0.092)	(0.020)	(0.046)	(0.073)	(0.047)	(0.128)	(0.173)
Incen.*Empow.	0.037	-0.060	0.094	-0.028	-0.090	-0.054	0.015	-0.358	-0.040
	(0.058)	(0.112)	(0.151)	(0.045)	(0.094)	(0.134)	(0.101)	(0.235)	(0.297)
Control Mean	-0.00706	-0.01291	0.00343	0.00906	0.00569	0.01132	0.04395	0.04135	-0.00225
Observations	5002	1558	683	5013	1561	685	5007	1560	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.8: Main outcomes (uncensored), unmarried girls age 15-17 at program launch

	Health			Empowerment			IGA		
	Age 10-17	Age 15-17	Age 15	Age 10-17	Age 15-17	Age 15	Age 10-17	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.025	0.008	0.092	0.061*	0.070	0.002	0.059	0.382***	0.459***
	(0.048)	(0.079)	(0.110)	(0.036)	(0.074)	(0.106)	(0.068)	(0.133)	(0.159)
Incentive	-0.054	-0.032	-0.134	-0.012	-0.054	-0.095	-0.043	0.155	-0.040
	(0.036)	(0.085)	(0.122)	(0.021)	(0.043)	(0.067)	(0.047)	(0.128)	(0.173)
Incen.*Empow.	0.056	0.063	0.168	-0.038	0.036	0.067	0.015	-0.358	-0.040
	(0.073)	(0.147)	(0.198)	(0.052)	(0.094)	(0.132)	(0.101)	(0.235)	(0.297)
Control Mean	0.00024	0.00162	0.01418	-0.00728	-0.00104	0.01179	0.04395	0.04135	-0.00225
Observations	5002	1558	683	5013	1561	685	5007	1560	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.6.1 Health

The health index is compromised of two sub-indices: 1) girl's health (uncensored, questions posed to all girls), and 2) reproductive and child health (censored, posed to married and/or women with children only). Tables 4.9 and 4.10 show that the incentive does not affect health outcomes while the empowerment seems to slightly but insignificantly increase health outcomes.

Table 4.9: Health outcomes, unmarried girls age 15–17 at program launch

		Uncensored variables only			All variables			
	HEALTH	**Girl's Health**	Physical	Mental	**Reprod. & Child**	Contraception	Reprod. Health	Child Mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.081	0.008	-0.054	0.090	0.114	0.152	0.040	0.261
	(0.066)	(0.079)	(0.083)	(0.131)	(0.098)	(0.113)	(0.108)	(0.176)
Incentive	-0.003	-0.032	0.017	-0.108	0.125	-0.190	0.079	0.216*
	(0.061)	(0.085)	(0.083)	(0.128)	(0.089)	(0.145)	(0.101)	(0.119)
Incen.*Empow.	-0.060	0.063	0.084	0.034	-0.135	-0.027	-0.094	-0.217
	(0.112)	(0.147)	(0.146)	(0.237)	(0.149)	(0.216)	(0.175)	(0.210)
Control Mean	-0.01291	0.00162	0.00438	0.00000	-0.00000	0.02709	-0.00000	0.00000
Observations	1558	1558	1558	1556	898	1219	898	898
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.10: Health outcomes, unmarried girls Age 10–17 at program launch

		Uncensored variables only			All variables			
	HEALTH	**Girl's Health**	Physical	Mental	**Reprod. & Child**	Contraception	Reprod. Health	Child Mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.037	0.025	-0.017	0.085	0.074	-0.036	0.035	0.152
	(0.039)	(0.048)	(0.051)	(0.071)	(0.052)	(0.063)	(0.060)	(0.104)
Incentive	-0.044	-0.054	-0.062*	-0.043	0.025	-0.063	-0.002	0.081
	(0.028)	(0.036)	(0.038)	(0.050)	(0.038)	(0.048)	(0.049)	(0.070)
Incen.*Empow.	0.037	0.056	0.101	-0.014	-0.031	0.065	0.048	-0.189
	(0.058)	(0.073)	(0.078)	(0.105)	(0.079)	(0.099)	(0.101)	(0.145)
Control Mean	-0.00706	0.00024	0.00159	0.00000	-0.00000	0.02116	-0.00000	-0.00000
Observations	5002	5002	5002	4993	2491	3633	2491	2491
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.6.2 Empowerment

The empowerment index is comprised of three sub-indices: 1) gender attitudes (uncensored and censored sections), 2) mobility (uncensored and censored sections), 3) contraception (censored, posed to married women only), 4) decision-making (censored, posed to married women only). The empowerment program increases the overall empowerment index by 0.09 SDs ($p>0.10$) among girls age 15–17 at program launch (table 4.11). After including younger girls, we find that the empowerment treatment increases the censored empowerment index by 0.05 SDs ($p<0.10$) and the uncensored empowerment index by 0.06 SDs ($p<0.10$) with a large and significant increase in gender attitudes (0.09 SDs, $p<0.05$) (table 4.12). As married girls are self-selected, it is reasonable that we find stronger effects among the uncensored variables.

Table 4.11: Empowerment outcomes, unmarried girls age 15–17 at program launch

		Uncensored variables only			All variables								
	EMPOWERMENT	**Empowerment**	**Gender Att.**	**Mobility**	**Gender Att.**	**Mobility**	**Contraception**	**Decision-making**	Girl Health Dec.	Marriage Dec.	Dress Dec.	Economic Dec.	Reprod. Health Dec.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Empow.	0.091	0.070	0.112	-0.098	0.029	-0.125	0.029	0.129	0.197	0.074	0.015	0.127	-0.253
	(0.069)	(0.074)	(0.082)	(0.102)	(0.087)	(0.092)	(0.089)	(0.082)	(0.131)	(0.108)	(0.099)	(0.093)	(0.194)
Incentive	0.011	-0.054	-0.048	-0.055	-0.048	-0.024	0.107	0.127	0.081	0.102	0.020	0.005	0.342**
	(0.046)	(0.043)	(0.055)	(0.093)	(0.058)	(0.093)	(0.090)	(0.079)	(0.136)	(0.098)	(0.097)	(0.104)	(0.164)
Incen.*Empow.	-0.090	0.036	-0.009	0.198	0.010	0.164	-0.275*	-0.260*	-0.250	-0.162	0.146	-0.119	-0.268
	(0.094)	(0.094)	(0.114)	(0.170)	(0.119)	(0.163)	(0.161)	(0.137)	(0.225)	(0.183)	(0.168)	(0.175)	(0.293)
Control Mean	0.00569	-0.00104	0.00099	-0.08929	0.00564	-0.05140	0.51960	-0.01583	0.00247	0.00751	-0.00071	0.00112	-0.00000
Observations	1561	1561	1561	1555	1561	1555	1111	1261	1196	1222	1207	1207	979
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.12: Empowerment outcomes, unmarried girls age 10–17 at program launch

		Uncensored variables only			All variables								
	EMPOWERMENT	**Empowerment**	**Gender Att.**	**Mobility**	**Gender Att.**	**Mobility**	**Contraception**	**Decision-making**	Girl Health Dec.	Marriage Dec.	Dress Dec.	Economic Dec.	Reprod. Health Dec.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Empow.	0.053*	0.061*	0.093**	-0.063	0.056	-0.058	0.001	0.059	0.066	0.051	0.051	0.047	0.150
	(0.031)	(0.036)	(0.041)	(0.052)	(0.044)	(0.052)	(0.046)	(0.041)	(0.079)	(0.058)	(0.065)	(0.056)	(0.114)
Incentive	-0.019	-0.012	0.008	-0.087**	-0.017	-0.068*	-0.000	0.007	-0.075	0.051	-0.010	-0.041	0.210**
	(0.020)	(0.021)	(0.028)	(0.035)	(0.029)	(0.035)	(0.034)	(0.026)	(0.051)	(0.043)	(0.045)	(0.041)	(0.093)
Incen.*Empow.	-0.028	-0.038	-0.085	0.151**	-0.054	0.133*	-0.048	-0.052	0.087	-0.125	0.100	-0.003	-0.371**
	(0.045)	(0.052)	(0.063)	(0.075)	(0.067)	(0.074)	(0.075)	(0.057)	(0.110)	(0.089)	(0.102)	(0.081)	(0.184)
Control Mean	0.00906	-0.00728	-0.00469	-0.09052	0.00547	-0.05744	0.48862	-0.00211	-0.00697	0.00354	-0.00008	-0.00029	-0.00000
Observations	5013	5013	5013	4989	5013	4989	3327	3674	3523	3658	3556	3556	2539
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.6.3 IGA

We observe large and significant effects of the empowerment arm on the IGA index among girls ages 15–17 at program start. The empowerment arm increases the IGA index by 0.4 SDs ($p<0.01$) (table 4.13). The empowerment increases the likelihood that a girl has ever-worked by 52% (0.26ppts, $p<0.01$), and that she is currently working by 79% (0.21ppts, $p<0.01$). The empowerment treatment also increases the number of months she worked in the previous year by 1.6 months ($p<0.01$), the number of hours she worked in the previous day by 0.4 hours ($p>0.10$), the number of days she worked in the previous week by 2.2 days ($p>0.10$), her wage in the previous month by USD 4.3 ($p>0.10$), her total earnings in the previous month by USD 9.3 ($p<0.10$) and her past income by USD 1.1 ($p<0.10$). We find much weaker effects in the overall sample because we have negative effects on IGA among younger girls (which are more likely to still be in school due to the empowerment treatment and thus less likely to be working). We also do not find significant effects of the incentive treatment on IGA outcomes. Figure 3 shows the percentage of girls with positive income and income distribution conditional on earning income. We do not find significant differences in the likelihood of earning positive income between control and incentive (25.7% vs 31.4%) but a much larger share of girls earning income among the two empowerment arms (38.0% in empowerment vs 39.1% in empowerment plus incentive).

Table 4.13: IGA outcomes, unmarried girls age 15–17 at program launch

	IGA	Ever worked	Works	Months/year	Hours/day	Days/week	Wage	Total income	Past income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.382***	0.261***	0.212***	1.637**	0.421	2.161	4.318	9.333*	1.143*
	(0.133)	(0.073)	(0.069)	(0.674)	(0.459)	(2.799)	(3.507)	(5.001)	(0.599)
Incentive	0.155	0.075	0.044	0.710	0.178	0.480	4.445	8.994*	0.056
	(0.128)	(0.073)	(0.066)	(0.700)	(0.430)	(2.599)	(3.381)	(4.748)	(0.554)
Incen.*Empow.	-0.358	-0.216*	-0.138	-1.639	-0.563	-2.497	-9.293	-15.151*	0.256
	(0.235)	(0.126)	(0.122)	(1.238)	(0.786)	(4.710)	(6.337)	(9.133)	(1.042)
Control Mean	0.04135	0.50413	0.26857	2.18279	1.00072	5.96760	8.54942	11.93587	1.68630
Observations	1560	1556	1556	1553	1412	1412	1553	1560	1193
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

Income in USD.

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

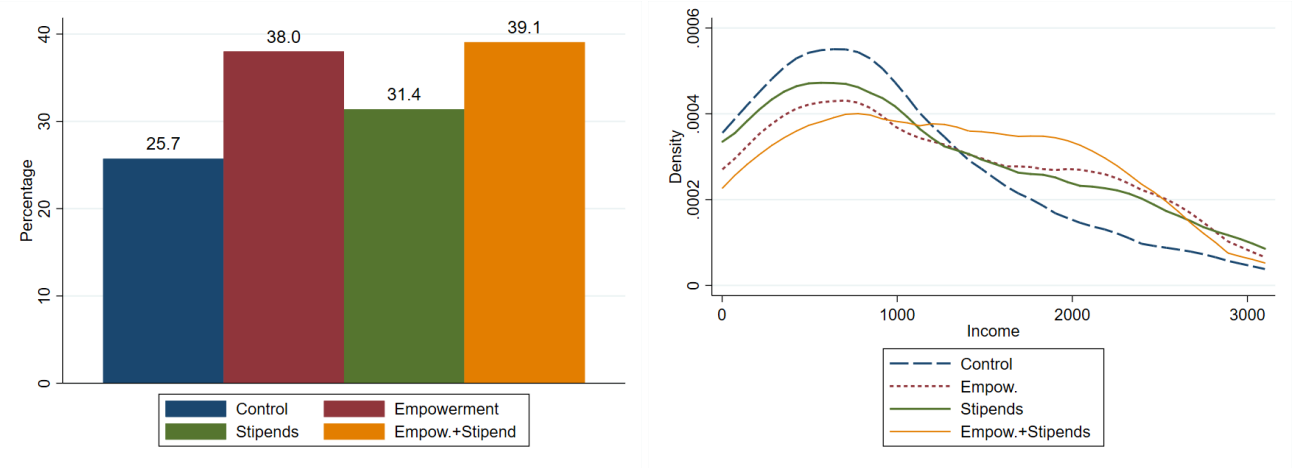
Table 4.14: IGA outcomes, unmarried girls age 10–17 at program launch

	IGA	Ever worked	Works	Months/year	hours/day	hours/week	Wage	Total income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.059	0.085**	0.047	0.044*	0.273	-0.175	-1.092	-1.579	0.070
	(0.068)	(0.040)	(0.038)	(0.026)	(0.363)	(0.212)	(1.276)	(1.624)	(2.285)
Incentive	-0.043	-0.017	-0.005	0.015	-0.236	-0.239	-1.519	-1.457	-0.907
	(0.047)	(0.030)	(0.026)	(0.016)	(0.266)	(0.157)	(0.930)	(1.039)	(1.340)
Incen.*Empow.	0.015	-0.003	-0.014	-0.038	0.174	0.094	0.471	1.483	-0.895
	(0.101)	(0.062)	(0.057)	(0.035)	(0.551)	(0.309)	(1.821)	(2.263)	(3.056)
Control Mean	0.04395	0.50390	0.29725	0.09571	2.32390	1.06733	6.37550	8.39486	11.44643
Observations	5007	4992	4992	4983	4982	4553	4553	4982	5007
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

Income in USD.

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Figure 3: Percentage of girls with positive income and income distribution conditional on earning income



4.7 Secondary Outcomes

We consider secondary outcomes in tables 4.15 and 4.16. The empowerment increased a savings and credit index by 0.10SDs (p>0.10) (0.10SDs, p<0.10 in the entire sample) and increased the share of girls who ever saved by 17% (p<0.05) (13%, p<0.10) in the entire sample). The empowerment arm also increased denmeher by USD 572 (p<0.05) and the incentive by USD 381 (p<0.10) (USD 234, p>0.10 and USD 255, p<0.05 in the entire sample), which is in line with the findings of the authors that education increases denmeher (see Buchmann et al. (2018)). The empowerment increases girls' health knowledge by 0.17 SDs (p<0.05) (0.06 SDs, p>0.10 in the entire sample). Finally, the empowerment decreases free time by 0.8 hours (p>0.10) per week (0.6 hours, p<0.05 in the overall sample) and the incentive by 0.1 hours (p>0.10) per week (0.4 hours, p<0.20 in the overall sample). This is in line with the findings that girls in the empowerment and incentive arms are more likely to be in school or working.

Table 4.15: Secondary outcomes, unmarried girls age 15–17 at program launch

	Savings & Credit	Savings	Ever Saved	Credit	**Denmeher**	**Attitudes**	**Health knowledge**	**Free Time**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.098	0.109	0.127**	0.061	572.255**	-0.035	0.173**	-0.802
	(0.100)	(0.118)	(0.064)	(0.154)	(230.748)	(0.100)	(0.072)	(0.532)
Incentive	-0.073	-0.142	0.009	0.131	380.994*	-0.114	0.013	-0.077
	(0.079)	(0.093)	(0.053)	(0.133)	(226.620)	(0.094)	(0.072)	(0.439)
Incen.*Empow.	0.132	0.217	-0.077	-0.116	-871.608**	0.241	-0.076	0.692
	(0.160)	(0.186)	(0.102)	(0.256)	(437.644)	(0.175)	(0.130)	(0.886)
Control Mean	0.00004	0.00037	0.76169	-0.00000	1950.27137	0.00703	-0.01440	18.29063
Observations	1556	1556	1556	1555	999	1550	1557	1557
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.16: Secondary outcomes, unmarried girls age 10–17 at program launch

	Savings & Credit	Savings	Ever Saved	Credit	**Denmeher**	**Attitudes**	**Health knowledge**	**Free Time**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.098*	0.121*	0.063	0.022	233.680	-0.051	0.060	-0.607**
	(0.054)	(0.062)	(0.039)	(0.082)	(145.591)	(0.056)	(0.056)	(0.307)
Incentive	0.021	0.002	0.010	0.072	255.449**	-0.047	-0.061	-0.366*
	(0.038)	(0.044)	(0.028)	(0.058)	(117.832)	(0.044)	(0.037)	(0.213)
Incen.*Empow.	-0.014	-0.005	-0.018	-0.033	-327.863	0.087	0.092	0.607
	(0.083)	(0.096)	(0.059)	(0.120)	(239.496)	(0.085)	(0.082)	(0.451)
Control Mean	0.00030	0.00145	0.73214	0.00000	1940.78714	0.00759	-0.01463	18.94553
Observations	4996	4996	4996	4990	3451	4977	4998	4999
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.8 Validity Checks

To check for the mechanisms driving our results (i.e. are we seeing changes in outcomes due to increases in education, changes in marriage age, or changes in marriage quality), we test whether the treatments impact husband and marriage quality in table 4.17 and table 4.18. We do not find any effects, suggesting that changes in outcomes are mainly driven by the changes in marriage age and education.

Table 4.17: Validity Checks, unmarried girls age 15–17 at program launch

	Hus & Mar. Quality	Husband Quality	Dom. Violence	Marriage Quality
	(1)	(2)	(3)	(4)
Empow.	0.010	-0.049	0.012	-0.150
	(0.060)	(0.103)	(0.068)	(0.188)
Incentive	0.066	0.016	0.084	-0.123
	(0.058)	(0.109)	(0.071)	(0.205)
Incen.*Empow.	-0.086	-0.011	-0.118	0.194
	(0.099)	(0.176)	(0.117)	(0.338)
Control Mean	-0.00063	0.00041	0.00193	-0.00000
Observations	1238	1236	1221	1136
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.18: Validity Checks, unmarried girls age 10–17 at program launch

	Hus & Mar. Quality	Husband Quality	Dom. Violence	Marriage Quality
	(1)	(2)	(3)	(4)
Empow.	0.007	0.014	-0.003	-0.047
	(0.043)	(0.062)	(0.047)	(0.108)
Incentive	-0.010	0.022	-0.020	-0.062
	(0.029)	(0.045)	(0.032)	(0.074)
Incen.*Empow.	0.019	-0.104	0.046	0.192
	(0.061)	(0.094)	(0.065)	(0.155)
Control Mean	0.00298	-0.00001	0.00152	0.00000
Observations	3721	3719	3655	3413
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

4.9 Heterogeneity

Unlike other incentive programs that are conditional on girls staying in school, an incentive conditional on marriage alone has the potential to benefit out-of-school girls. On the other hand, the incentive may only be sufficient to discourage child marriage if a girl has the option of staying in school while she waits. We compare the effects of the incentive conditional on staying unmarried on child marriage and teenage childbearing outcomes for girls in school and out of school at baseline (tables 4.19 and 4.20). We find insignificantly different effects of the incentive for girls in and out of school at baseline: The conditional incentive decreased the likelihood of child marriage by 10% (-2.8ppts) among girls out of school at baseline and by 25% (-6.9ppts) among girls in school at baseline. As the empowerment program only affected schooling but not marriage age, it is not surprising that we find the empowerment program to only increase schooling among women in school at program launch: -7% ($p>0.10$) among women out of school at program launch and +9% ($p<0.05$) among women in school at program launch. We again do not observe a separate or additional effect of the empowerment program on marriage and childbearing outcomes in either of the subsamples.

These results imply that marriage age influences childbearing and other outcomes not only through its impact on education. Even when there is no possibility of attaining more schooling, women are made better off by postponing marriage.

We do not find heterogeneity of the programs on the main indices by schooling.

Table 4.19: Marriage outcomes, unmarried girls age 15–17 at program launch, parents' report

	Married< 18	Married< 16	In school	Education
	(1)	(2)	(3)	(4)
Empow.	0.004	0.018	-0.015	-0.006
	(0.016)	(0.026)	(0.011)	(0.124)
Incentive	-0.028	-0.006	0.010	0.153
	(0.027)	(0.035)	(0.017)	(0.250)
Empow.+Incen.	0.022	-0.029	0.006	0.031
	(0.038)	(0.053)	(0.023)	(0.315)
In school	-0.089***	-0.047**	0.167***	4.200***
	(0.014)	(0.018)	(0.012)	(0.187)
Incentive*In school	-0.041	-0.023	0.016	-0.026
	(0.032)	(0.038)	(0.025)	(0.308)
Empow.+Incen.*In school	0.009	0.032	-0.012	-0.146
	(0.043)	(0.056)	(0.035)	(0.390)
Empow.*In school	-0.010	-0.011	0.034**	0.193
	(0.019)	(0.029)	(0.016)	(0.165)
Control Mean	0.27239	0.09426	0.21782	9.95614
Observations	15437	5843	15447	15334
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 4.20: Indices, unmarried girls age 15-17 at program launch, girls' report

	Health	Empowerment	IGA
Empow.	0.040	0.056	0.411
	(0.173)	(0.125)	(0.370)
Incentive	0.040	-0.079	0.331
	(0.191)	(0.113)	(0.339)
Incen.*Empow.	-0.164	0.104	-0.741
	(0.323)	(0.227)	(0.673)
In school	-0.049	-0.029	-0.136
	(0.083)	(0.055)	(0.140)
Empow.*In school	0.052	0.042	-0.034
	(0.194)	(0.145)	(0.383)
Incentive*In school	-0.048	0.109	-0.208
	(0.214)	(0.133)	(0.358)
Incen.*Empow.*In school	0.120	-0.232	0.454
	(0.362)	(0.252)	(0.689)
Control Mean	-0.01291	0.00569	0.04135
Observations	1558	1561	1560
FE	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

5 Discussion

These results provide novel evidence that a relatively inexpensive conditional incentive targeted to families of adolescent girls in a setting with high rates of underage marriage is effective in substantially reducing child marriage and teenage childbearing. It also increased the percentage of girls still in school at age 22 to 25 and increased years of schooling completed. A well-crafted and quite intensive adolescent girls' empowerment program did not decrease child marriage or teenage childbearing but was effective in increasing schooling.

We show that a financial incentive conditional on marriage and not education can also delay marriage and childbearing for out-of-school girls. This is important because the most popular incentive programs focus on keeping girls in school and thus are unavailable to out-of-school girls. This focus may stem from the assumption that once out of school a girl will inevitably marry and there is little that policy can do to change this. Our results suggest this vulnerable population can still benefit from incentives.

One possible concern with the validity of our estimates is the loss of observations from data entry errors and cyclone damage. However, the problem was not driven by treatment status, minimizing risk of bias. Attrition among households that enumerators attempted to find was just 13%, which is low given the 9-year study duration (appendix 6.4).

Another possible concern is parents lying about marriage timing because of the incentive. We consider this unlikely as the program had finished 4.5 years before endline surveying, girls were far too old to qualify, and marriage rates are similar in a verification survey where marriage was carefully verified (appendix 6.8). Finally, childbearing and school enrollment results provide strong evidence that the marriage effects are real, as there was no incentive to lie about childbearing or schooling 4.5 years after the program ended.

Our results complement the growing literature suggesting that incentives can help change long-held behaviors often believed to be culturally entrenched and immutable. Incentives conditional on education have been criticized for failing to help the most marginal girls who cannot continue in school. Our results suggest a way to promote education and reach the most vulnerable.

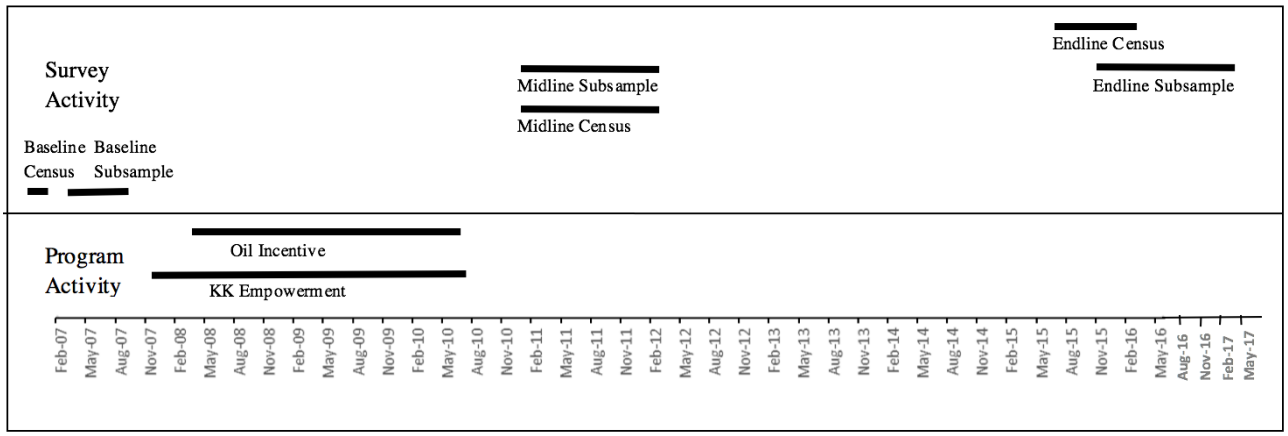
We find an impact of a well-crafted and -implemented empowerment program on education and income-generating activities. Women who participated in the empowerment program are more likely to work at age 22–25 and work more months a year, thus earning a larger income. We also find evidence that women in the empowerment program have improved gender attitudes and health knowledge and are more likely to save. It is also possible that the empowerment program will translate into further gains in reproductive health outcomes or marital bargaining power later in a woman's life. The empowerment program could have further impacts on child marriage and teenage childbearing in regions in which women are more in control of their marriage and fertility decisions.

Our results also imply that both the conditional incentive and the empowerment program are highly cost-effective. The conditional incentive translates into 6.3 years of delayed marriage, 1.4 averted child marriages, and 4.3 years of schooling for every $1,000 invested by the implementer, generating $1,078 in Net Present Value for every $1,000 spent (costs to implementer and beneficiary) – the highest impacts among rigorously evaluated interventions in a comprehensive cost-efficacy analysis (appendix 6.18). The empowerment program translates into 4.3 years of schooling for every $1,000 invested by the implementer, generating $954 in Net Present Value for every $1,000 spent (costs to implementer and beneficiary) – the second highest impact NPV among the evaluated interventions.

6 Appendix

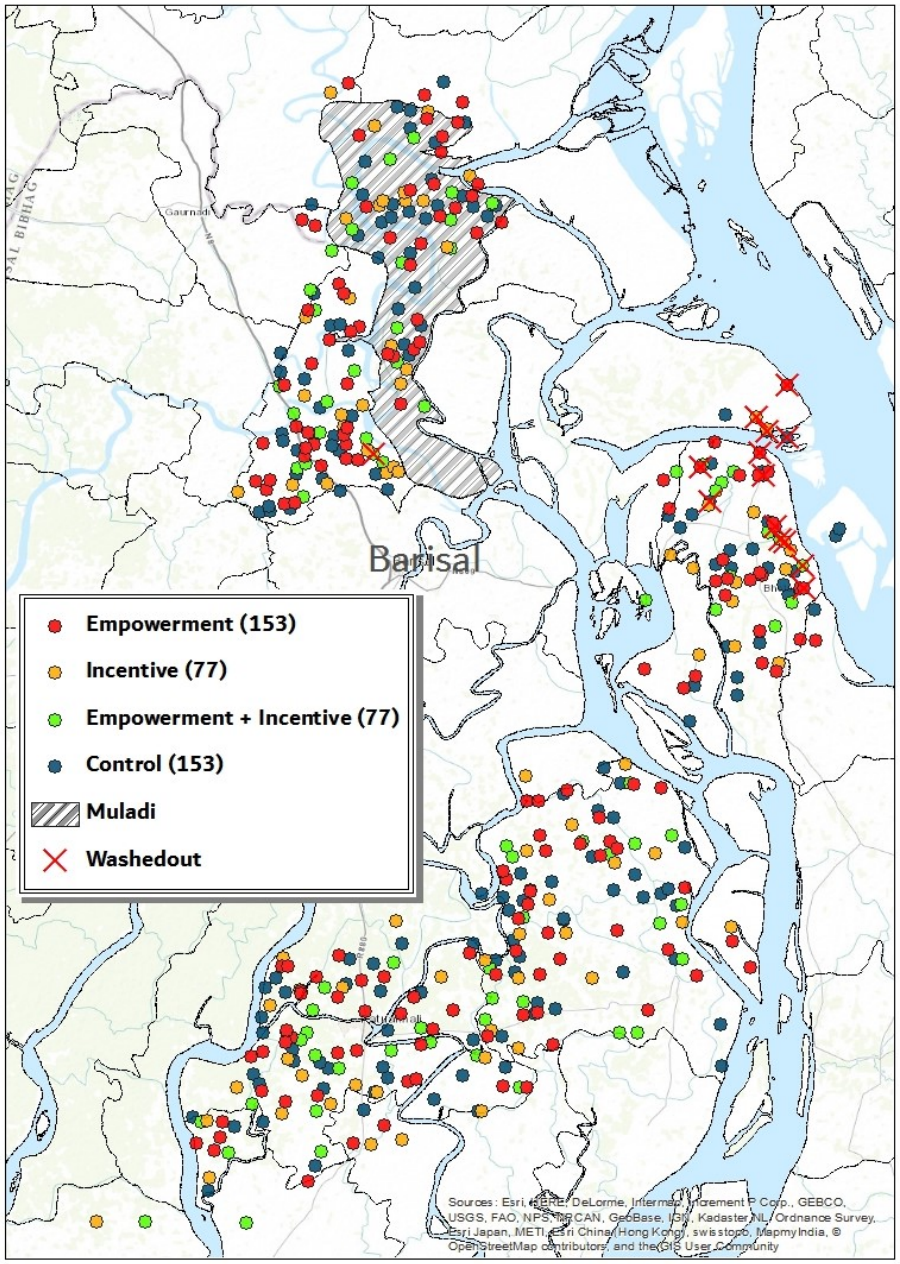
6.1 Program Timeline

Figure 4: Program timeline



6.2 Treatment Region

Figure 5: Communities by Treatment Status



6.3 Baseline Balance

6.3.1 Parents' Survey

Table 6.1: Baseline characteristics in the parents' survey, girls age 15-17 at program launch

	Empowerment			Incentive			Empow.+Incen.			Control		Total	
Married & Unmarried at Baseline													
N		8,739			4,176			4,503			8,990		26,408
	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Mean	S.D.
Ever Married (%)	8.5	28.0	-0.1	9.4	29.1	0.7	8.8	28.4	0.2	8.7	28.1	8.8	28.3
Still in-school (%)	60.2	48.9	-0.9	59.2	49.2	-2.0	60.2	48.9	-0.9	61.2	48.7	60.4	48.9
Highest Class Passed	6.2	2.6	0.0	6.1	2.7	-0.1	6.3	2.7	0.1	6.2	2.7	6.2	2.6
Unmarried at Baseline													
N		7,992			3,785			4,106			8,212		24,095
	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Mean	S.D.
Still in-school (%)	64.6	47.8	-1.2	64.1	48.0	-1.7	65.1	47.7	-0.8	65.8	47.4	65.0	47.7
Highest Class Passed	6.4	2.6	0.0	6.3	2.6	-0.1	6.4	2.6	0.1	6.4	2.6	6.4	2.6
Age	14.9	0.8	-0.0	14.9	0.8	0.0	14.9	0.8	-0.0	14.9	0.8	14.9	0.8
Father Education (0-17)	4.1	4.4	0.2	3.8	4.1	-0.1	4.0	4.2	0.0	3.9	4.2	4.0	4.2
Mother Education (0-17)	3.2	3.3	0.1	3.0	3.3	-0.1	3.0	3.1	-0.0	3.1	3.3	3.1	3.3
HH Size (members)	6.0	1.9	0.0	6.1	2.0	0.1	6.0	2.0	0.0	6.0	2.0	6.0	2.0
Unmarried older sister in HH (%)	18.9	39.1	0.3	18.0	38.5	-0.5	18.0	38.4	-0.5	18.5	38.9	18.5	38.8
Community Boys/Girls Ratio	1.1	0.3	-0.0	1.0	0.3	-0.0	1.1	0.3	0.0	1.1	0.3	1.1	0.3
Community size (girls age 10 to 19)	265.9	121.3	-9.2	251.2	119.4	-23.9	261.3	118.6	-13.7	275.1	126.2	265.9	122.5

Differences from OLS regressions with modified Huber-White SEs clustered at the community level. Significance levels are * p<0.10 , ** p<0.05 and *** p<0.01.

6.3.2 Subsample

Table 6.2: Baseline characteristics in the subsample, unmarried girls age 15–17 at program launch

	Empowerment			Incentive			Empow.+Incen.			Control		Total	
	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Mean	S.D.
Age	14.9	0.8	-0.0	14.9	0.8	-0.0	14.9	0.8	-0.0	14.9	0.8	14.9	0.8
Last class passed													
Girl in school (%)	68.4	46.5	-3.5	70.8	45.5	0.9	71.2	45.3	0.5	71.0	45.4	70.2	45.8
Math score (1-4)	2.6	1.0	0.0	2.6	0.9	0.1	2.7	1.0	0.1	2.6	1.0	2.6	1.0
Reading score (1-5)	4.5	1.1	0.0	4.5	1.1	0.1	4.5	1.1	0.1	4.4	1.2	4.5	1.1
Income													
Total household income ($)	19.7	18.1	-0.2	19.6	15.4	0.1	19.1	15.3	-0.9	20.3	22.0	19.8	18.7
Knowledge													
Contraception (%)	59.4	49.1	0.9	58.6	49.3	0.6	63.4	48.2	7.3*	59.4	49.1	60.0	49.0
Aids (%)	70.3	45.7	0.6	69.0	46.3	-0.6	70.4	45.7	2.7	70.6	45.6	70.2	45.7
Gender Attitudes													
Better to be a man (%)	45.6	49.8	-4.7	46.0	49.9	-3.7	50.8	50.0	0.2	49.2	50.0	47.9	50.0
Boys more education (%)	34.5	47.6	-2.7	36.9	48.3	2.1	34.4	47.6	-2.2	35.2	47.8	35.2	47.8
Girl Health													
BMI	18.3	2.1	-0.0	18.4	2.1	0.0	18.5	2.2	0.1	18.4	2.1	18.4	2.1
Stunted (%)	33.1	47.1	6.3**	32.0	46.7	2.6	33.1	47.1	6.4**	29.6	45.7	31.7	46.6
Religiosity													
Girl religiosity (1-3)	2.2	0.6	0.0	2.2	0.6	0.0	2.2	0.7	0.1	2.2	0.6	2.2	0.6
Father religiosity (1-3)	2.4	0.7	-0.0	2.4	0.7	-0.0	2.5	0.7	-0.0	2.4	0.7	2.4	0.7
Mother religiosity (1-3)	2.5	0.6	-0.0	2.5	0.6	-0.0	2.5	0.6	-0.0	2.6	0.6	2.5	0.6

6.3.3 Comparison of Subsample and Non-Subsample Girls

Table 6.3: Subsample comparison, difference in baseline characteristics. Girls age 15-17 and unmarried at distribution start

	Non-subsample	**Subsample**	**Mean Difference**	**p-value**	**t-stat**
Age	14.92	14.89	0.03**	0.016	2.411
Older unmarried sister	0.06	0.05	0.00	0.338	0.958
Still in school	0.65	0.69	-0.05***	0.000	-5.156
Last class passed	6.50	6.62	-0.12*	0.050	-1.963
Mother schooled	0.57	0.58	-0.01	0.490	-0.691
HH Members	6.01	5.81	0.21***	0.000	4.773

P-values and t-stats from OLS regressions with union fixed effects and standard errors clustered at the community level. Differences due to rounding error. Significance levels are * p<0.10 , ** p<0.05 and *** p<0.01.

6.3.4 KK Member Comparison

Table 6.4: Baseline characteristics by reported KK-membership, unmarried girls age 15–17 at program launch

	Non-members	KK members	Mean Difference	p-value	t-stat
Age	14.9	14.9	0.0	0.783	0.276
Last class passed					
Girl in school (%)	68.8	75.1	-6.2***	0.003	-2.980
Math score (1-4)	2.6	2.7	-0.1**	0.015	-2.448
Reading score (1-5)	4.4	4.6	-0.2***	0.004	-2.860
Income					
Total household income ($)	20.5	20.4	0.2	0.878	0.153
Knowledge					
Contraception (%)	58.1	64.9	-6.8**	0.011	-2.570
Aids (%)	68.3	72.9	-4.6*	0.094	-1.680
Gender Attitudes					
Better to be a man (%)	49.2	48.2	0.9	0.723	0.355
Boys more education (%)	35.4	35.9	-0.5	0.844	-0.197
Girl Health					
BMI	18.4	18.2	0.2	0.118	1.568
Stunted (%)	30.7	31.4	-0.7	0.792	-0.264
Religiosity					
Girl religiosity (1-3)	2.2	2.2	0.0	0.879	0.152
Father religiosity (1-3)	2.5	2.4	0.1***	0.007	2.709
Mother religiosity (1-3)	2.5	2.5	0.0	0.284	1.073
Proximity to Safe Space					
SS distance (km)	0.8	0.4	0.4***	0.000	6.744

6.4 Attrition

Table 6.5: Outcome: Attritted, family-wise error rate Sidak sequentially adjusted p-values (excluding prefill errors and washed-out households)

	Census				Subsample			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	-0.016	-0.015	-0.016	-0.015	0.016	0.015	0.016	0.015
	[-0.039,0.007]	[-0.038,0.008]	[-0.039,0.007]	[-0.038,0.008]	[-0.022,0.053]	[-0.023,0.052]	[-0.022,0.053]	[-0.023,0.052]
Incentive	-0.014	-0.014	-0.014	-0.014	-0.027	-0.027	-0.027	-0.027
	[-0.041,0.012]	[-0.040,0.012]	[-0.041,0.012]	[-0.040,0.012]	[-0.064,0.010]	[-0.064,0.009]	[-0.064,0.010]	[-0.064,0.009]
Incen.+Empow.	-0.023	-0.023	-0.023	-0.023	-0.009	-0.010	-0.009	-0.010
	[-0.051,0.005]	[-0.051,0.005]	[-0.051,0.005]	[-0.051,0.005]	[-0.047,0.029]	[-0.048,0.028]	[-0.047,0.029]	[-0.048,0.028]
In school (BL)		-0.022***		-0.022***		-0.047***		-0.047**
		[-0.034,-0.011]		[-0.034,-0.011]		[-0.078,-0.017]		[-0.078,-0.017]
Mother schooled (BL)		0.000		0.000		-0.005		-0.005
		[-0.014,0.014]		[-0.014,0.014]		[-0.033,0.023]		[-0.033,0.023]
Unmarried older sister		-0.009		-0.009		0.066**		0.066
		[-0.021,0.003]		[-0.021,0.003]		[0.005,0.128]		[0.005,0.128]
HH very poor		0.009		0.009		-0.002		-0.002
		[-0.010,0.027]		[-0.010,0.027]		[-0.035,0.031]		[-0.035,0.031]
Age (BL)		-0.002		-0.002		0.001		0.001
		[-0.008,0.003]		[-0.008,0.003]		[-0.013,0.016]		[-0.013,0.016]
Control Mean	0.13940	0.13940	0.13940	0.13940	0.12669	0.12669	0.12669	0.12669
Observations	21859	21859	21859	21859	2946	2946	2946	2946

OLS regressions with modified Huber-White SEs clustered at the community level.

6.5 Take-Up

Table 6.6: Take-Up, calculated from monitoring data. KK: Girls age 10-19 in empowerment villages, Incentive: Unmarried girls age 15-17 in incentive villages at distribution start

Treatment Group	**KK Enrollment** (%)		**KK Attendance, Unconditional** (%)		**Oil Take-up** (%)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Empowerment	88.3	10.7	70.9	10.9	.	.
Incentive	.	.	.	.	67.5	17.2
Empowerment+Incentive	93.3	8.0	76.0	9.4	74.3	15.3
Any Empowerment	90.0	10.1	72.6	10.7	.	.
Any Incentive	.	.	.	.	70.9	16.6

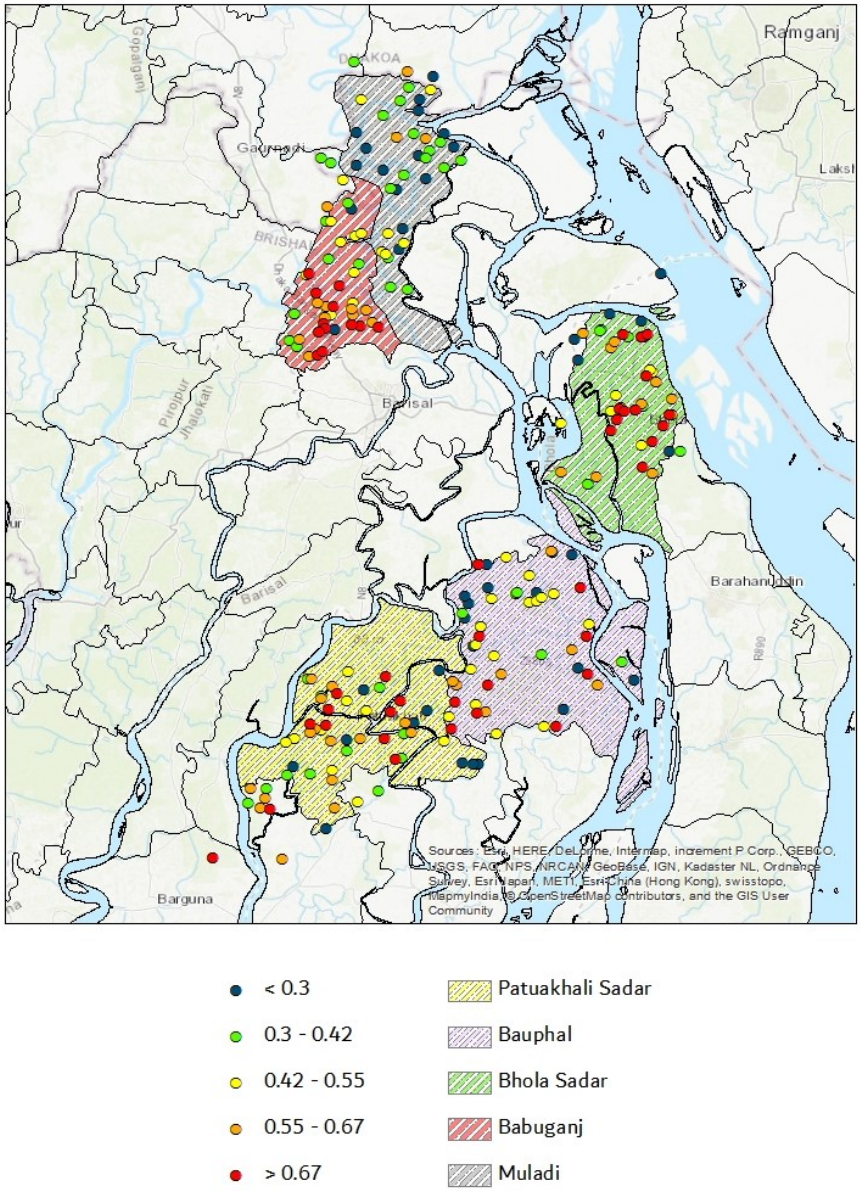
6.6 Compliance

Table 6.7: Compliance, self-reported take-up in the midline verification survey. Any empowerment includes girls in empowerment and empowerment plus incentive treatment groups. Any incentive includes girls in the incentive and empowerment plus incentive treatment groups. Girls age 15-17 and unmarried at distribution start

Treatment Group	**Attended at least 1 KK session** (%)		**Member of KK** (%)		**Oil Take-up** (%)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Empowerment	47.0	49.9	40.5	49.9	0.6	49.9
Incentive	29.7	45.7	23.3	45.7	62.8	45.7
Empowerment+Incentive	71.3	45.3	64.8	45.3	69.4	45.3
Control	12.3	32.8	8.8	32.8	1.0	32.8
Any Empowerment	56.1	56.1	49.6	50.0	.	.
Any Incentive	.	.	.	.	66.2	47.3

6.7 Self-Reported Empowerment Take-Up

Figure 6: Self-reported KK Attendance



6.8 Verification of Marriage Age

Table 6.8: Marriage age checks, comparison of marriage age using verified reports and marriage certificates. Girls age 15-17 and unmarried at distribution start

	Empowerment (%)			**Incentive** (%)			**Empow.+Incen.** (%)			**Control** (%)		**Total** (%)	
	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Diff.	Mean	S.D.	Mean	S.D.
Certificate - parents' report	4.1	15.5	1.9	2.6	11.3	0.4	3.1	14.1	0.9	2.2	9.9	3.0	12.8
Girls' report - parents' report	2.0	23.5	1.1	0.1	22.9	-1.6	0.6	21.0	-0.8	1.0	21.6	1.1	22.3
Certificate - girls' report	2.1	19.6	-5.3	1.7	18.6	-7.7	-0.2	14.2	-7.1	5.5	18.7	2.8	18.3

For each treatment arm, the differences between surveys are compared to the difference between surveys in the control arm.
Significance levels are * p<0.10 , ** p<0.05 and *** p<0.01.

6.9 Inter-Household Spillovers

Table 6.9: Married<18, by age at distribution start

	Age 11-12 (1)	Age 13-14 (2)	Age 18 (3)	Whole sample (4)
Empow.	-0.015	0.004	0.009*	-0.009
	[-0.036,0.006]	[-0.019,0.026]	[-0.001,0.019]	[-0.026,0.008]
Incentive	-0.016	0.020	-0.004	0.003
	[-0.042,0.011]	[-0.007,0.048]	[-0.011,0.003]	[-0.018,0.025]
Empow.*Incen.	0.034*	-0.029	-0.010	0.007
	[-0.005,0.072]	[-0.068,0.010]	[-0.021,0.002]	[-0.024,0.038]
Control Mean	0.55349	0.49582	0.00454	0.48777
Observations	12506	12210	1943	26659
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.10 First-Stage Effects

Table 6.10: First stage effects, girls age 15-17 and unmarried at distribution start

	Census		Subsample		
	Distribution list	Distribution list * Empow.	Distribution list	KK Member	Distribution list * KK Member
	(1)	(2)	(3)	(4)	(5)
Empowerment assignment	0.002	0.001	-0.001	0.440***	0.006
	[-0.007,0.010]	[-0.004,0.006]	[-0.018,0.015]	[0.382,0.498]	[-0.016,0.029]
Incentive assignment	0.841***	0.002	0.838***	0.191***	0.252***
	[0.813,0.868]	[-0.005,0.009]	[0.778,0.899]	[0.114,0.268]	[0.186,0.318]
Incentive * empowerment assignment	0.026	0.869***	0.075**	0.061	0.465***
	[-0.011,0.063]	[0.842,0.896]	[0.010,0.140]	[-0.041,0.164]	[0.376,0.554]
Constant	0.006	-0.000	0.052	0.260*	0.113
	[-0.008,0.019]	[-0.010,0.009]	[-0.050,0.154]	[-0.023,0.544]	[-0.063,0.289]
F-statistic	1859.25	1005.17	275.03	30.21	47.36
Observations	15464	15464	1668	1571	1571
FE	Union	Union	Union	Union	Union

OLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification.

6.11 Comparison of Analysis Methods

Table 6.11: Child marriage, unmarried girls age 15-17 at program launch

	ITT	ITT, drop	2SLS, drop
	(1)	(2)	(3)
Empow.	-0.008	-0.002	-0.002
	(0.008)	(0.008)	(0.008)
Incentive	-0.064***	-0.049***	-0.058***
	(0.011)	(0.010)	(0.012)
Incen.*Empow.	0.009	0.021	0.026
	(0.016)	(0.014)	(0.017)
Control Mean	0.40237	0.27239	0.27239
Observations	19032	15437	15437
FE	Union	Union	Union

Modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.12 Subsample Weights

Enumerators were asked to return several times to 40 communities to survey all girls who had been skipped. For these 40 communities, we are thus able to use all baseline characteristics in order to estimate the probability of subsample inclusion (which is not being skipped in the original surveying). Table 6.12 shows that these 40 communities resurveyed do not differ significantly from the remaining 420 communities in baseline characteristics.

Table 6.12: Community comparison, difference in baseline characteristics. Girls age 15-17 and unmarried at distribution start in 40 communities with follow-up data and other communities

	420 communities without follow-up data	**40 communities with follow-up data**	**Mean Difference**	**p-value**	**t-stat**
Age	14.93	10.83	0.04	0.436	0.781
Older unmarried sister	0.03	0.01	-0.00	0.479	-0.709
Still in school	0.65	0.80	-0.01	0.584	-0.547
Last class passed	6.40	3.48	0.06	0.578	0.557
Mother schooled	0.57	0.55	0.01	0.550	0.599
HH Members	5.48	5.91	0.02	0.688	0.401

P-values and t-stats from OLS regressions with union fixed effects and standard errors clustered at the community level. Differences due to rounding error. Significance levels are * p<0.10 , ** p<0.05 and *** p<0.01.

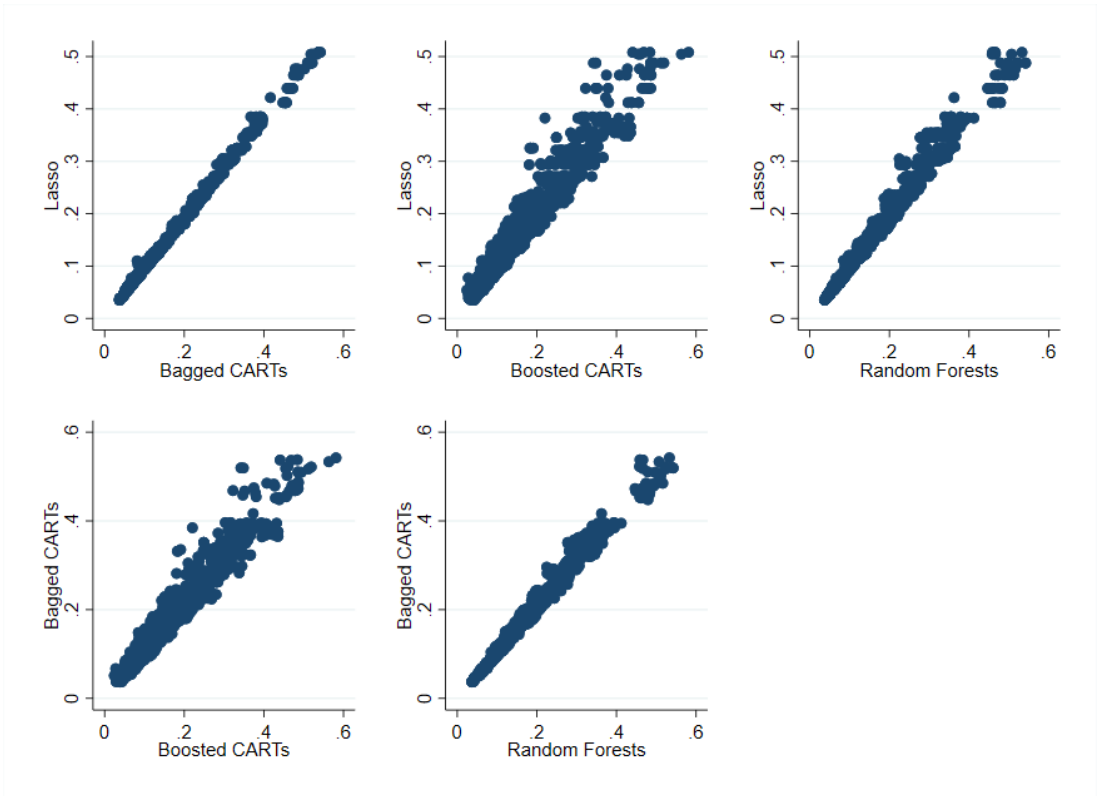
We estimate P_{iv} as $P_{i(S|X)} \times \frac{a_v + b_v}{N_v}$, where $P_i(S|X)$ is the probability of subsample inclusion by individual i given a vector of baseline characteristics X and $\frac{a_v + b_v}{N_v}$ is the design weight. We account for the design weight to account for the clustered design of the experiment. However, our results are robust to weighting each observation by the inverse of $P_i(S|X)$ only. $\frac{a_v}{N_v}$ is the probability of being selected to the initial subsample, whereby N_v is the number of girls in village v and a_v the number of girls selected for a subsample interview ($a_v = 10$ in small villages and $a_v = 20$ in large villages). $\frac{b_v}{N_v}$ is the probability of being selected for a replacement interview, whereby N_v is the number of girls in village v and b_v the number of girls that were replaced by replacement girls in a subsample of 40 communities for which we monitored the replacement process in more detail at baseline. On average, 17% of girls were substituted from replacement lists.

We predict the probability of subsample inclusion using four different statistical learning techniques: 1) L1-regularization, or lasso regression, 2) Bagged classification and regression trees (CARTs), 3) Boosted CARTs, and 4) Random forests. This allows us to predict the probability of subsample inclusion from a high-dimensional dataset including baseline characteristics from the parents' survey, gps data, and surveys conducted with village leaders, matchmakers, and school principals. Table 6.13 and figure 7 show that the propensity scores calculated using the four different methods are highly correlated.

Table 6.13: Cross-correlations between Propensity Scores

	Lasso	Bagged CARTs	Boosted CARTs	Random Forests
Lasso	1.0000			
Bagged CARTs	0.9988	1.0000		
	(0.0000)			
Boosted CARTs	0.9725	0.9743	1.0000	
	(0.0000)	(0.0000)		
Random Forests	0.9904	0.9931	0.9718	1.0000
	(0.0000)	(0.0000)	(0.0000)	

Figure 7: Scatter Plots between Different Methods



As Lasso estimations give high weight to observations with high values in absolute values, we normalize all datasets prior to analysis. In addition, as Lasso-estimated coeffcients are biased, we obtain an unbiased estimate of the probability of subsample inclusion through first running a regularized regression to select variables within the 40 communities for which data exists both for girls surveyed and initially skipped, followed by running an unregularized regression with the variables selected in the whole subsample dataset.

We use 10-fold cross-validation to select the penalty coefficient in the lasso regression, as well as the number of learning trees and the maximum number of decision splits per tree in the bagged and boosted CARTs, and the learning rate in the boosted CARTs that minimize the out-of-sample mean squared error rates. This means that we divide the data into 10 different folds. We "train" the data on all but the kth fold, and then validate on the kth fold, iterating over $k = 1, ..., 10$. For each hyperparameter, we calculate the MSE between the predicted values and the actual values and select the hyperparameter with the lowest MSE. As bagged CARTs have the overall lowest MSE-rate (Table 6.14), we use the inverse probability weights obtained using bagged CARTs in our main specifications. However, our main results are robust to using any of the other methodologies (see appendix section 6.16.4).

Table 6.14: Out-of-Sample MSEs

Lasso	Bagged CARTs	Boosted CARTs	Random Forests
0.1523	0.0996	0.1232	0.1687

6.13 Uncensored Subsample Outcomes

Table 6.15: Main outcomes (uncensored), unmarried girls age 15-17 at program launch

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	-0.537	-0.273**	0.317	0.103	1.630***	1.048***
	(0.386)	(0.137)	(0.199)	(0.096)	(0.465)	(0.256)
Incentive	-0.504*	-0.017	0.226	-0.052	0.922***	0.491*
	(0.287)	(0.133)	(0.175)	(0.071)	(0.344)	(0.292)
Incen.*Empow.	1.182**	0.340	-0.647*	0.035	-2.406***	-1.395**
	(0.594)	(0.218)	(0.342)	(0.123)	(0.697)	(0.548)
Control Mean	0.17643	0.04423	-0.02344	0.01613	-0.26156	-0.31320
Observations	1440	655	1440	655	1439	655
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.
Indices exclude variables collected from women with children. IGA index unchanged.

Table 6.16: Main outcomes (uncensored), unmarried girls Age 10-17 at program launch

	Health		Empowerment		IGA	
	Age 10-17 (1)	Age 10-14 (2)	Age 10-17 (3)	Age 10-14 (4)	Age 10-17 (5)	Age 10-14 (6)
Empow.	0.086	0.099	0.114*	0.016	-0.051	0.715***
	(0.086)	(0.119)	(0.061)	(0.095)	(0.128)	(0.200)
Incentive	-0.071	-0.185	-0.007	-0.037	-0.047	0.006
	(0.046)	(0.116)	(0.035)	(0.056)	(0.080)	(0.149)
Incen.*Empow.	0.123	0.213	-0.078	-0.032	0.008	-0.456
	(0.113)	(0.204)	(0.083)	(0.141)	(0.187)	(0.337)
Control Mean	0.01921	0.03054	-0.00000	0.02350	-0.00000	-0.10470
Observations	5344	711	5344	711	5340	711
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics. Indices exclude variables collected from women with children. IGA index unchanged.

6.14 Parents' Survey Outcomes for Girls Age 15 at Program Launch

Table 6.17: Childbearing outcomes, unmarried girls age 15 at program launch

	Ever birth	Age 1st birth	Birth<20	#Children	#Children<20	Birth interval
	(1)	(2)	(3)	(4)	(5)	(6)
Empow.	0.020	-0.004	0.003	-0.009	0.004	-0.023
	(0.015)	(0.067)	(0.012)	(0.021)	(0.014)	(0.041)
Incentive	-0.040*	0.095	-0.048***	-0.046	-0.047**	-0.296***
	(0.021)	(0.090)	(0.018)	(0.029)	(0.020)	(0.068)
Empow.+Incen.	-0.002	-0.093	0.021	0.021	0.025	0.100
	(0.030)	(0.127)	(0.026)	(0.043)	(0.029)	(0.085)
Control Mean	0.58149	19.86624	0.31493	0.72083	0.32923	2.31553
Observations	5831	3382	5827	5831	5827	3372
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.15 Subsample Outcomes for Girls age 15 at Program Launch

Table 6.18: Health outcomes, unmarried girls age 15 at program launch

	Uncensored variables only				All variables			
	HEALTH	**Girl's Health**	Physical	Mental	**Reprod. & Child**	Contraception	Reprod. Health	Child Mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.133	0.092	0.122	0.031	-0.046	0.449***	-0.186	0.232
	(0.087)	(0.110)	(0.126)	(0.155)	(0.112)	(0.155)	(0.140)	(0.219)
Incentive	-0.133	-0.134	-0.110	-0.177	-0.079	-0.270	-0.110	-0.019
	(0.092)	(0.122)	(0.130)	(0.169)	(0.118)	(0.204)	(0.147)	(0.156)
Incen.*Empow.	0.094	0.168	0.119	0.242	0.233	-0.218	0.320	0.059
	(0.151)	(0.198)	(0.226)	(0.281)	(0.183)	(0.294)	(0.223)	(0.303)
Control Mean	0.00343	0.01418	-0.00432	0.04726	0.00232	-0.00643	-0.01955	0.04608
Observations	683	683	683	681	391	543	391	391
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.19: Empowerment outcomes, unmarried girls age 15 at program launch

	Uncensored variables only				All variables								
	EMPOWERMENT	**Empowerment**	Gender Att.	Mobility	**Decision-making**	Gender Att.	Mobility	Girl Health Dec.	Contraception	Marriage Dec.	Dress Dec.	Economic Dec.	Reprod. Health Dec.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Empow.	0.101	0.002	0.037	-0.158	-0.030	-0.255**	0.109	0.132	0.128	0.038	0.153	0.167	-0.367
	(0.107)	(0.106)	(0.118)	(0.119)	(0.120)	(0.122)	(0.129)	(0.100)	(0.184)	(0.154)	(0.142)	(0.140)	(0.233)
Incentive	-0.046	-0.095	-0.108	-0.018	-0.076	-0.053	0.189	0.009	-0.054	-0.066	-0.034	-0.092	0.179
	(0.073)	(0.067)	(0.081)	(0.122)	(0.089)	(0.115)	(0.149)	(0.093)	(0.174)	(0.148)	(0.130)	(0.158)	(0.192)
Incen.*Empow.	-0.054	0.067	0.039	0.190	0.049	0.239	-0.265	-0.108	-0.045	0.059	0.091	-0.020	-0.139
	(0.134)	(0.132)	(0.156)	(0.225)	(0.164)	(0.213)	(0.224)	(0.159)	(0.282)	(0.255)	(0.216)	(0.255)	(0.333)
Control Mean	0.01132	0.01179	0.02015	-0.10429	0.02200	-0.05350	0.48474	-0.01810	0.01986	0.00717	-0.08523	-0.03516	0.04428
Observations	685	685	685	680	685	680	493	548	532	543	536	536	413
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.20: IGA outcomes, unmarried girls age 15 at program launch

	IGA	Ever worked	Works	Months/year	Hours/day	Days/week	Wage	Total income	Past income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.459***	0.398***	0.313***	1.771**	0.462	2.890	3.863	5.041	1.412*
	(0.159)	(0.098)	(0.081)	(0.750)	(0.582)	(3.518)	(4.213)	(5.536)	(0.835)
Incentive	-0.040	0.022	0.001	-0.138	-0.788	-4.098	-0.092	-0.700	-1.265
	(0.173)	(0.106)	(0.090)	(0.789)	(0.534)	(3.128)	(4.209)	(6.077)	(0.854)
Incen.*Empow.	-0.040	-0.129	-0.110	-0.495	0.499	2.040	-2.902	4.157	2.716*
	(0.297)	(0.179)	(0.155)	(1.395)	(0.928)	(5.439)	(7.368)	(10.681)	(1.599)
Control Mean	-0.00225	0.45621	0.24665	2.11914	0.91948	5.44579	7.56853	10.73912	1.52701
Observations	684	681	681	680	606	606	680	684	512
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

Income in USD.

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.21: Secondary outcomes, unmarried girls age 15 at program launch

	Savings & Credit	Savings	Credit	Denmeher	Attitudes	Health knowledge	Free Time	Ever Saved
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empow.	0.044	0.004	0.089	0.158	68.753	-0.036	0.252**	-1.228
	(0.119)	(0.145)	(0.085)	(0.180)	(286.650)	(0.135)	(0.104)	(0.748)
Incentive	-0.237*	-0.399***	-0.226***	0.247	114.087	-0.133	-0.035	-0.002
	(0.124)	(0.148)	(0.086)	(0.159)	(298.951)	(0.138)	(0.093)	(0.704)
Incen.*Empow.	0.291	0.501**	0.195	-0.339	-480.206	0.340	-0.120	0.599
	(0.217)	(0.250)	(0.142)	(0.313)	(517.610)	(0.232)	(0.172)	(1.246)
Control Mean	0.03851	0.04012	0.82507	0.03551	1904.49885	0.01163	-0.06366	18.15237
Observations	681	681	681	680	434	679	682	682
FE	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.22: Validity Checks, unmarried girls age 15 at program launch

	Hus & Mar. Quality	Husband Quality	Dom. Violence	Marriage Quality
	(1)	(2)	(3)	(4)
Empow.	-0.110	-0.143	-0.142	-0.467*
	(0.101)	(0.141)	(0.113)	(0.248)
Incentive	-0.022	-0.065	-0.040	-0.244
	(0.098)	(0.151)	(0.120)	(0.255)
Incen.*Empow.	0.057	0.219	0.038	0.537
	(0.155)	(0.237)	(0.184)	(0.379)
Control Mean	0.01486	-0.00632	0.02123	0.07703
Observations	551	550	543	507
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16 Robustness Checks

6.16.1 Parents' Survey: Excluding Controls

Table 6.23: Marriage outcomes, unmarried girls age 15-17 at program launch

	Ever married	Marriage age	Married<18	Married<16
	(1)	(2)	(3)	(4)
Empow.	0.005	-0.007	-0.004	0.010
	(0.008)	(0.044)	(0.008)	(0.009)
Incentive	-0.009	0.261***	-0.056***	-0.025**
	(0.013)	(0.074)	(0.013)	(0.013)
Incen.*Empow.	-0.002	-0.090	0.028	-0.007
	(0.017)	(0.102)	(0.019)	(0.018)
Control Mean	0.82958	19.07347	0.27221	0.09386
Observations	15446	12782	15433	5842
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.24: Education outcomes, unmarried girls age 15-17 and in school at program launch

	In school		Last class passed	
	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)
Empow.	0.027*	0.039**	0.296*	0.288
	(0.016)	(0.019)	(0.160)	(0.189)
Incentive	0.014	0.041	0.011	0.108
	(0.026)	(0.031)	(0.259)	(0.312)
Empow.+Incen.	-0.009	-0.032	-0.150	-0.195
	(0.035)	(0.042)	(0.359)	(0.419)
Control Mean	0.28793	0.28373	11.64835	11.11365
Observations	10882	4530	10800	4501
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.2 Parents' Survey: Including washedout villages

Table 6.25: Marriage outcomes, unmarried girls age 15-17 at program launch

	Ever married	Marriage age	Married<18	Married<16
	(1)	(2)	(3)	(4)
Empow.	0.006	-0.009	-0.001	0.007
	(0.008)	(0.043)	(0.008)	(0.009)
Incentive	-0.015	0.277***	-0.059***	-0.025**
	(0.013)	(0.070)	(0.012)	(0.013)
Incen.*Empow.	0.002	-0.093	0.025	-0.003
	(0.016)	(0.096)	(0.017)	(0.017)
Control Mean	0.82974	19.07064	0.27230	0.09605
Observations	15721	13018	15707	5949
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.26: Education outcomes, unmarried girls age 15-17 and in school at program launch

	In school		Last class passed	
	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)
Empow.	0.018	0.028*	0.163*	0.137
	(0.012)	(0.016)	(0.094)	(0.130)
Incentive	0.033*	0.069***	0.183	0.340
	(0.018)	(0.023)	(0.147)	(0.219)
Empow.+Incen.	-0.003	-0.039	-0.120	-0.229
	(0.024)	(0.032)	(0.214)	(0.279)
Control Mean	0.28680	0.28366	11.64867	11.12043
Observations	11052	4603	10969	4574
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.3 Parents' Survey: Intention-to-Treat Analysis

Table 6.27: Marriage outcomes, unmarried girls age 15-17 at program launch

	Ever married		Marriage age		Married<18		Married<16
	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Empow.	0.006	-0.002	-0.020	-0.019	-0.002	-0.002	0.009
	(0.008)	(0.012)	(0.042)	(0.065)	(0.008)	(0.014)	(0.009)
Incentive	-0.013	-0.024	0.206***	0.344***	-0.049***	-0.076***	-0.022**
	(0.011)	(0.016)	(0.053)	(0.076)	(0.010)	(0.019)	(0.011)
Incen.*Empow.	0.001	0.013	-0.052	-0.103	0.021	0.031	-0.003
	(0.014)	(0.022)	(0.076)	(0.116)	(0.014)	(0.026)	(0.015)
Control Mean	0.82971	0.81198	19.07524	18.37120	0.27239	0.36966	0.09426
Observations	15450	5846	12783	4716	15437	5843	5843
FE	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.28: Education outcomes, unmarried girls age 15-17 and in school at program launch

	In school		Last class passed	
	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)
Empow.	0.018	0.030*	0.172*	0.165
	(0.012)	(0.016)	(0.095)	(0.133)
Incentive	0.030*	0.061***	0.174	0.329*
	(0.015)	(0.021)	(0.126)	(0.195)
Incen.*Empow.	-0.003	-0.030	-0.112	-0.203
	(0.022)	(0.029)	(0.190)	(0.250)
Control Mean	0.28793	0.28373	11.64835	11.11365
Observations	10882	4530	10800	4501
FE	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.4 Subsample: Results using Different Weights

Table 6.29: First-stage, unmarried girls age 15-17 at program launch, no weights

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17 (1)	Age 15 (2)	Age 15 (3)	Age 15-17 (4)	Age 15 (5)	Age 15-17 (6)	Age 15 (7)	Age 15-17 (8)	Age 15 (9)
Empow.	0.097	0.139	0.109*	-0.015	0.085	0.346	0.622	0.078	0.055
	(0.070)	(0.104)	(0.060)	(0.075)	(0.079)	(0.447)	(0.459)	(0.056)	(0.087)
Incentive	-0.125*	-0.219**	-0.083*	-0.079	0.074	-0.084	0.240	-0.042	-0.187***
	(0.065)	(0.091)	(0.044)	(0.072)	(0.067)	(0.377)	(0.395)	(0.049)	(0.071)
Incen.*Empow.	0.103	0.144	0.032	0.189	-0.066	0.284	-0.256	0.003	0.185
	(0.122)	(0.170)	(0.089)	(0.135)	(0.129)	(0.731)	(0.727)	(0.094)	(0.136)
Control Mean	0.31627	0.44068	0.08898	0.30660	0.26263	11.14319	10.62814	0.17029	0.25105
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.30: Main outcomes, unmarried girls age 15-17 at program launch, no weights

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	0.078	0.095	0.091	0.129	0.291**	0.251
	(0.061)	(0.088)	(0.081)	(0.137)	(0.130)	(0.154)
Incentive	0.034	-0.081	-0.024	-0.043	0.196*	0.039
	(0.057)	(0.072)	(0.052)	(0.074)	(0.117)	(0.149)
Incen.*Empow.	-0.146	0.044	-0.049	-0.060	-0.333	0.003
	(0.105)	(0.137)	(0.113)	(0.165)	(0.224)	(0.272)
Control Mean	-0.00780	0.00305	0.02715	0.03993	0.06228	0.05297
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.31: First-stage, unmarried girls age 15-17 at program launch, Lasso

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17 (1)	Age 15 (2)	Age 15 (3)	Age 15-17 (4)	Age 15 (5)	Age 15-17 (6)	Age 15 (7)	Age 15-17 (8)	Age 15 (9)
Empow.	0.106	0.156	0.099	0.036	0.111	0.601	0.864*	0.080	0.083
	(0.069)	(0.108)	(0.062)	(0.079)	(0.079)	(0.460)	(0.470)	(0.058)	(0.093)
Incentive	-0.132*	-0.216**	-0.090	-0.036	0.094	0.233	0.481	-0.055	-0.222***
	(0.073)	(0.108)	(0.055)	(0.072)	(0.074)	(0.396)	(0.460)	(0.052)	(0.086)
Incen.*Empow.	0.103	0.132	0.027	0.080	-0.152	-0.312	-0.806	0.012	0.190
	(0.126)	(0.186)	(0.097)	(0.137)	(0.135)	(0.765)	(0.815)	(0.093)	(0.146)
Control Mean	0.32832	0.43954	0.11332	0.27533	0.25073	11.05105	10.48730	0.18425	0.25606
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.32: Main outcomes, unmarried girls age 15-17 at program launch, Lasso

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	0.079	0.133	0.088	0.095	0.379***	0.452***
	(0.065)	(0.087)	(0.069)	(0.105)	(0.132)	(0.158)
Incentive	-0.002	-0.134	0.012	-0.048	0.155	-0.044
	(0.061)	(0.093)	(0.046)	(0.073)	(0.128)	(0.173)
Incen.*Empow.	-0.061	0.094	-0.090	-0.049	-0.355	-0.027
	(0.112)	(0.152)	(0.094)	(0.133)	(0.234)	(0.298)
Control Mean	-0.01300	0.00260	0.00583	0.01153	0.04239	-0.00213
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.33: First-stage, unmarried girls age 15-17 at program launch, Boosted CARTs

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17	Age 15	Age 15	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.114	0.175	0.097	0.027	0.117	0.552	0.732	0.079	0.091
	(0.069)	(0.109)	(0.063)	(0.080)	(0.079)	(0.463)	(0.477)	(0.057)	(0.092)
Incentive	-0.126*	-0.190*	-0.084	-0.057	0.078	0.182	0.403	-0.051	-0.199**
	(0.073)	(0.107)	(0.054)	(0.071)	(0.070)	(0.390)	(0.470)	(0.050)	(0.084)
Incen.*Empow.	0.088	0.084	0.022	0.109	-0.130	-0.254	-0.703	0.005	0.158
	(0.126)	(0.186)	(0.097)	(0.135)	(0.131)	(0.756)	(0.828)	(0.092)	(0.144)
Control Mean	0.32196	0.42717	0.10961	0.27964	0.25514	11.11216	10.60676	0.18332	0.24956
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.34: Main outcomes, unmarried girls age 15-17 at program launch, Boosted CARTs

	Health		Empowerment		IGA	
	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)
Empow.	0.078	0.134	0.084	0.091	0.377***	0.450***
	(0.066)	(0.087)	(0.071)	(0.111)	(0.135)	(0.162)
Incentive	0.005	-0.103	0.010	-0.030	0.142	-0.046
	(0.059)	(0.088)	(0.046)	(0.073)	(0.125)	(0.168)
Incen.*Empow.	-0.081	0.044	-0.088	-0.078	-0.350	-0.037
	(0.110)	(0.147)	(0.096)	(0.137)	(0.230)	(0.294)
Control Mean	-0.01095	0.00581	0.00796	0.01487	0.03964	0.00376
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.35: First-stage, unmarried girls age 15-17 at program launch, Random Forests

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17 (1)	Age 15 (2)	Age 15 (3)	Age 15-17 (4)	Age 15 (5)	Age 15-17 (6)	Age 15 (7)	Age 15-17 (8)	Age 15 (9)
Empow.	0.107	0.153	0.099	0.026	0.110	0.577	0.850*	0.078	0.080
	(0.069)	(0.108)	(0.063)	(0.080)	(0.079)	(0.462)	(0.467)	(0.058)	(0.093)
Incentive	-0.130*	-0.212**	-0.090	-0.049	0.086	0.209	0.463	-0.056	-0.223***
	(0.073)	(0.107)	(0.055)	(0.072)	(0.073)	(0.396)	(0.455)	(0.052)	(0.085)
Incen.*Empow.	0.103	0.134	0.028	0.106	-0.139	-0.264	-0.767	0.015	0.195
	(0.126)	(0.185)	(0.098)	(0.138)	(0.133)	(0.765)	(0.805)	(0.094)	(0.145)
Control Mean	0.32749	0.43693	0.11154	0.27987	0.25540	11.06337	10.51352	0.18412	0.25410
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.36: Main outcomes, unmarried girls age 15-17 at program launch, Random Forests

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	0.078	0.133	0.088	0.097	0.382***	0.448***
	(0.065)	(0.087)	(0.070)	(0.109)	(0.132)	(0.158)
Incentive	-0.002	-0.125	0.006	-0.047	0.153	-0.042
	(0.060)	(0.090)	(0.046)	(0.073)	(0.128)	(0.172)
Incen.*Empow.	-0.062	0.084	-0.085	-0.053	-0.359	-0.030
	(0.111)	(0.149)	(0.095)	(0.135)	(0.235)	(0.297)
Control Mean	-0.01262	0.00284	0.00637	0.01328	0.04063	-0.00119
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.5 Subsample: Binary empowerment assignment

Table 6.37: First-stage, unmarried girls age 15-17 at program launch

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17 (1)	Age 15 (2)	Age 15 (3)	Age 15-17 (4)	Age 15 (5)	Age 15-17 (6)	Age 15 (7)	Age 15-17 (8)	Age 15 (9)
Empowerment assignment	0.044	0.082*	0.033	0.018	0.060	0.271	0.361	0.039	0.049
	(0.028)	(0.049)	(0.031)	(0.035)	(0.038)	(0.205)	(0.235)	(0.024)	(0.044)
Incentive	-0.058	-0.130*	-0.050	-0.026	0.069	0.202	0.415	-0.021	-0.140**
	(0.045)	(0.073)	(0.040)	(0.050)	(0.055)	(0.272)	(0.357)	(0.035)	(0.061)
Incen.*Empow.	0.049	0.054	0.014	0.044	-0.088	-0.118	-0.357	-0.005	0.080
	(0.057)	(0.093)	(0.049)	(0.069)	(0.074)	(0.373)	(0.463)	(0.044)	(0.075)
Control Mean	0.31627	0.44068	0.08898	0.30660	0.26263	11.14319	10.62814	0.17029	0.25105
Observations	1633	705	705	1295	597	1297	598	1652	713
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.38: Main outcomes (censored), unmarried girls age 15-17 at program launch

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	0.080	0.135	0.090	0.100	0.376***	0.458***
	(0.064)	(0.084)	(0.068)	(0.104)	(0.130)	(0.154)
Incentive	-0.021	-0.109*	-0.015	-0.061	0.051	-0.051
	(0.037)	(0.060)	(0.028)	(0.049)	(0.074)	(0.112)
Incen.*Empow.	-0.029	0.050	-0.044	-0.029	-0.175	-0.021
	(0.055)	(0.078)	(0.046)	(0.071)	(0.113)	(0.157)
Control Mean	-0.01291	0.00343	0.00569	0.01132	0.04135	-0.00225
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.6 Subsample: Excluding Controls

Table 6.39: First-stage, unmarried girls age 15-17 at program launch

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17 (1)	Age 15 (2)	Age 15 (3)	Age 15-17 (4)	Age 15 (5)	Age 15-17 (6)	Age 15 (7)	Age 15-17 (8)	Age 15 (9)
Empow.	0.097	0.139	0.109*	-0.015	0.085	0.346	0.622	0.078	0.055
	(0.070)	(0.104)	(0.060)	(0.075)	(0.079)	(0.447)	(0.459)	(0.056)	(0.087)
Incentive	-0.125*	-0.219**	-0.083*	-0.079	0.074	-0.084	0.240	-0.042	-0.187***
	(0.065)	(0.091)	(0.044)	(0.072)	(0.067)	(0.377)	(0.395)	(0.049)	(0.071)
Incen.*Empow.	0.103	0.144	0.032	0.189	-0.066	0.284	-0.256	0.003	0.185
	(0.122)	(0.170)	(0.089)	(0.135)	(0.129)	(0.731)	(0.727)	(0.094)	(0.136)
Control Mean	0.31627	0.44068	0.08898	0.30660	0.26263	11.14319	10.62814	0.17029	0.25105
Observations	1540	676	676	1230	573	1231	573	1559	684
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.40: Main outcomes, unmarried girls age 15-17 at program launch

	Health		Empowerment		IGA	
	Age 15-17 (1)	Age 15 (2)	Age 15-17 (3)	Age 15 (4)	Age 15-17 (5)	Age 15 (6)
Empow.	0.115	0.060	0.089	0.099	0.370**	0.506***
	(0.075)	(0.117)	(0.077)	(0.114)	(0.159)	(0.194)
Incentive	0.005	-0.118	0.031	-0.066	0.205	-0.042
	(0.074)	(0.115)	(0.066)	(0.074)	(0.142)	(0.178)
Incen.*Empow.	-0.106	0.122	-0.127	-0.025	-0.450*	-0.108
	(0.130)	(0.189)	(0.129)	(0.153)	(0.258)	(0.321)
Control Mean	-0.01291	0.00343	0.00569	0.01132	0.04135	-0.00225
Observations	1558	683	1561	685	1560	684
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.16.7 Subsample: Intention-to-Treat Analysis

Table 6.41: First-stage, unmarried girls age 15-17 at program launch

	Married<18		Married<16	In school		Last class passed		Birth<20	
	Age 15-17	Age 15	Age 15	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Empow.	0.032	0.105	0.014	0.044	0.062	0.705**	0.659*	0.049*	0.061
	(0.033)	(0.066)	(0.038)	(0.039)	(0.047)	(0.273)	(0.393)	(0.028)	(0.054)
Incentive	-0.047	-0.076	-0.052	-0.033	0.033	0.607*	0.469	-0.015	-0.143**
	(0.048)	(0.081)	(0.049)	(0.050)	(0.051)	(0.323)	(0.463)	(0.036)	(0.066)
Incen.*Empow.	0.050	0.017	0.019	0.033	-0.104	-0.453	-0.396	-0.031	0.064
	(0.058)	(0.108)	(0.058)	(0.071)	(0.081)	(0.408)	(0.632)	(0.045)	(0.082)
Control Mean	0.34128	0.45310	0.13373	0.24189	0.22886	12.38634	11.74218	0.20085	0.27626
Observations	1638	709	709	1297	599	1296	599	1652	714
FE	Union	Union	Union	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

Table 6.42: Main outcomes, unmarried girls age 15-17 at program launch

	Health		Empowerment		IGA	
	Age 15-17	Age 15	Age 15-17	Age 15	Age 15-17	Age 15
	(1)	(2)	(3)	(4)	(5)	(6)
Empow.	0.023	0.071	0.054**	0.071	0.187***	0.329***
	(0.027)	(0.043)	(0.027)	(0.045)	(0.066)	(0.090)
Incentive	-0.010	-0.080	0.081***	0.034	0.110	0.072
	(0.034)	(0.061)	(0.028)	(0.047)	(0.078)	(0.110)
Incen.*Empow.	0.040	0.086	-0.112***	-0.092	-0.194*	-0.163
	(0.047)	(0.076)	(0.039)	(0.067)	(0.110)	(0.156)
Control Mean	0.00408	0.00771	-0.00415	-0.00964	0.03449	-0.03527
Observations	1655	715	1655	715	1654	715
FE	Union	Union	Union	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.17 Instrumenting Empowerment by Distance to Closest Safe Space

Table 6.43: Last class passed, unmarried girls age 15-17 and in school at program launch

	100 meters	200 meters	300 meters
	(1)	(2)	(3)
Empow.	0.707*	0.321*	0.286*
	[-0.095,1.509]	[-0.022,0.665]	[-0.018,0.589]
Incentive	0.237	0.213	0.249
	[-0.121,0.594]	[-0.132,0.558]	[-0.216,0.713]
Incen.*Empow.	-0.642	-0.229	-0.194
	[-2.026,0.742]	[-1.038,0.581]	[-0.930,0.542]
Control Mean	11.64835	11.64835	11.64835
Observations	10800	10800	10800
FE	Union	Union	Union

2SLS regressions with modified Huber-White SEs clustered at the community level and adjusted for stratification and baseline characteristics.

6.18 Results of the Cost-Benefit and Cost-Effectiveness Analyses

Table 6.44: Comparison of studies included

Intervention	**Location**	**Outcome measure**	**Outcome per $1,000 spent** (implementer and beneficiary)	**Outcome per $1,000 invested** (implementer)	**Benefit-cost ratio** (implementer and beneficiary)	**NPV ($) per $1,000** (implementer and beneficiary)
Conditional incentive to delay marriage	Bangladesh	Additional years unmarried	1.48	6.34	2.08	1,078.16
		Child marriages averted	0.33	1.43		
		Additional years of schooling	1.00	4.31		
Empowerment program	Bangladesh	Additional years unmarried	0.00	0.00	1.95	953.79
		Child marriages averted	0.00	0.00		
		Additional years of schooling	1.00	4.30		
FSSAP (Hahn et al.)	Bangladesh	Additional years unmarried	0.03	0.23	0.93	-67.64
		Child marriages averted	0.02	0.16		
		Additional years of schooling	0.14	0.15		
FSSAP (Hong and Sarr)		Additional years unmarried	0.65	3.61	1.93	932.02
		Additional years of schooling	0.86	2.45		
Vouchers for private schools	Columbia	Child marriages averted	0.07	0.08	1.00	-4.38
		Additional years of schooling	0.21	0.24		
Free school uniforms	Kenya	Child marriages averted	0.16	0.98	1.93	933.65
		Additional years of schooling	0.91	2.98		
UCT	Malawi	Additional years unmarried	0.81	1.41	1.52	518.93
		Additional years of schooling	0.55	0.95		
BRAC	Uganda	Child marriages averted	0.22	0.46	1.31	313.72
		Additional years of schooling	0.67	1.39		

Table 6.45: Cost-effectiveness of the conditional incentive

Outcome measure	**Discount rate** (%)	**Outcome per $1,000 spent** (implementer and beneficiary)	**Outcome per $1,000 invested** (implementer)
Additional years unmarried	3	1.24	6.22
	5	1.48	6.34
	10	2.03	6.62
Child marriage averted	3	0.28	1.40
	5	0.33	1.43
	10	0.46	1.49
Additional years of schooling	3	0.84	4.23
	5	1.00	4.31
	10	1.38	4.50

Table 6.46: Cost-effectiveness of the empowerment program

Outcome measure	**Discount rate** (%)	**Outcome per $1,000 spent** (implementer and beneficiary)	**Outcome per $1,000 invested** (implementer)
Additional years unmarried	3	0.00	0.00
	5	0.00	0.00
	10	0.00	0.00
Child marriage averted	3	0.00	0.00
	5	0.00	0.00
	10	0.00	0.00
Additional years of schooling	3	0.84	4.29
	5	1.00	4.30
	10	1.36	4.31

Table 6.47: Cost-benefit of the conditional incentive

Discount rate (%)	**Benefit-cost ratio** (implementer and beneficiary)	**NPV($) per $1,000** (implementer and beneficiary)
3	2.87	1,868.81
5	2.08	1,078.16
10	1.11	110.73

Table 6.48: Cost-benefit of the empowerment program

Discount rate (%)	**Benefit-cost ratio** (implementer and beneficiary)	**NPV($) per $1,000** (implementer and beneficiary)
3	2.77	1,768.77
5	1.95	953.79
10	0.94	-61.40

Figure 8: Comparison of years unmarried/$1,000 of interventions affecting marriage. Studies with marriage age outcome included. Costs include costs to implementer only

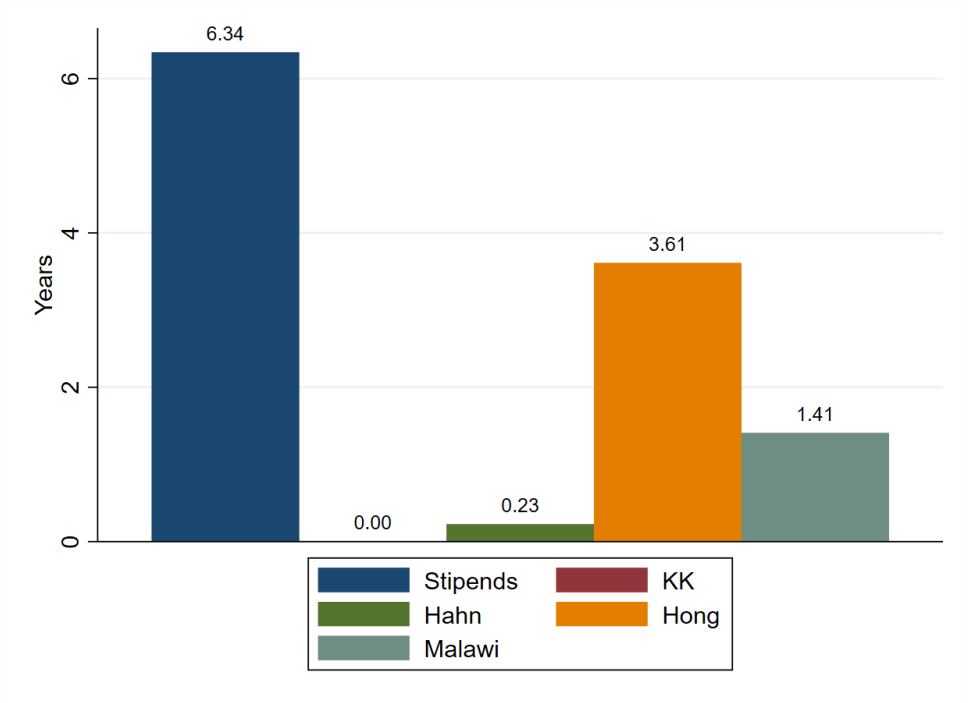


Figure 9: Comparison of child marriages averted/$1000 of interventions affecting marriage. Studies with child marriage outcome included. Costs include costs to implementer only

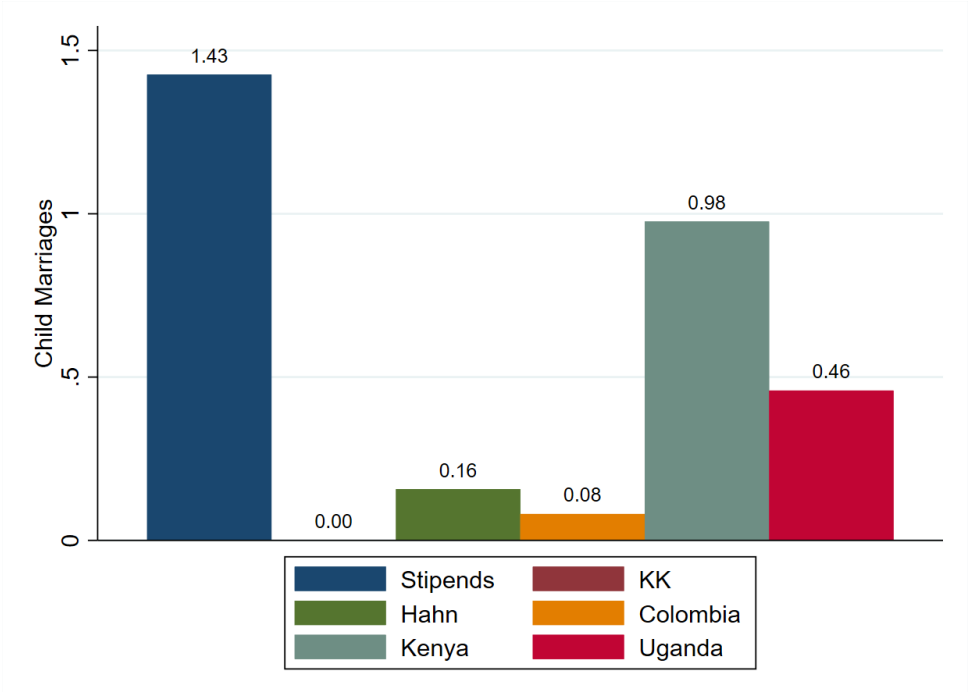


Figure 10: Comparison of benefit-cost-ratios of interventions affecting marriage. Costs include costs to implementer and beneficiary

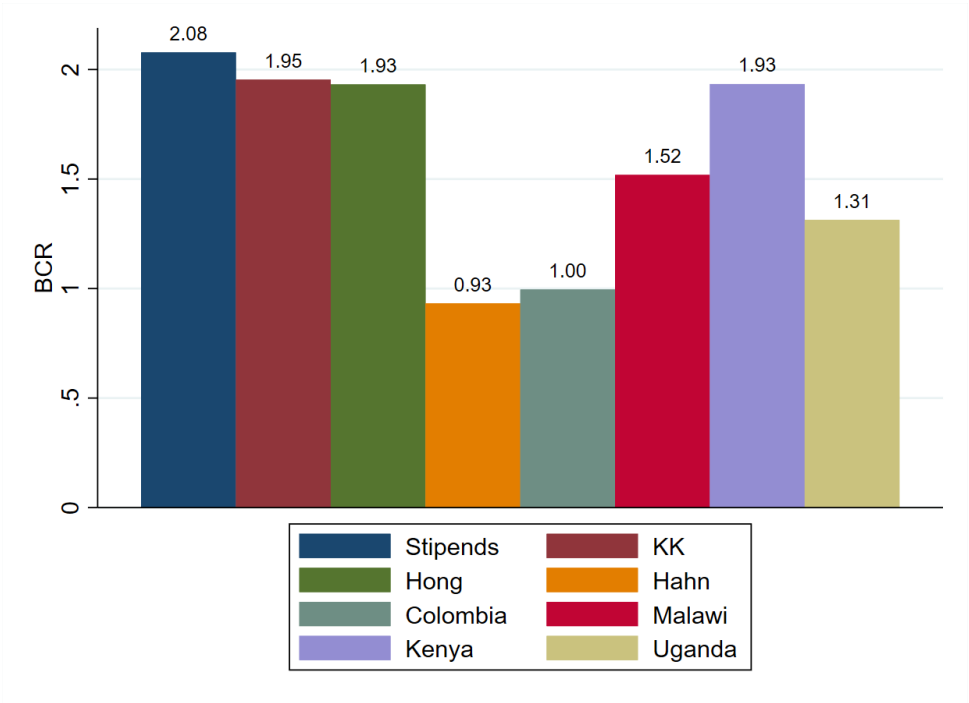
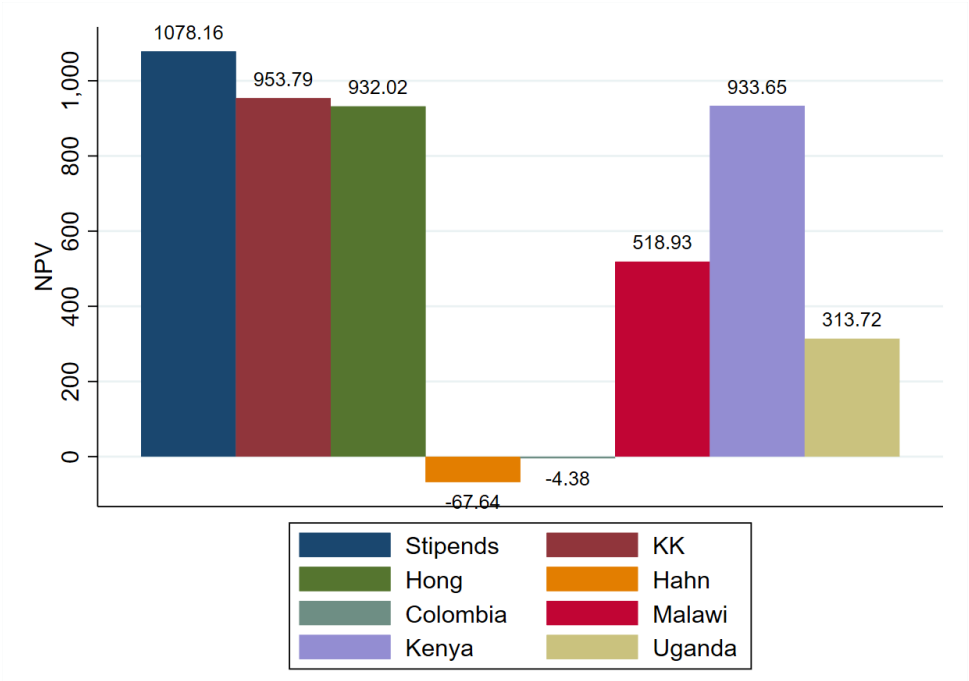


Figure 11: Comparison of NPV/$1000 of interventions affecting marriage. Costs include costs to implementer and beneficiary



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