Crowding Out Temptation: Experimental Evidence on Savings and Health Behaviors in Kenya*

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Abstract

Alcohol use, transactional sex, and gambling carry significant health and economic consequences. We conducted a randomized controlled trial in Kenya to assess whether these behaviors could be altered with a savings intervention that provided lottery-based interest, goal-setting support, and savings reminders. Over 24 months, the intervention increased formal savings and assets, financed primarily by lower spending on alcohol, transactional sex, and gambling. It also reduced hazardous drinking by 26 percent and intimate partner violence by 15 percent. HIV/STI incidence declined by 8 percent, though this was not statistically significant. Savings interventions can simultaneously boost financial security and change health behavior.

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1 Introduction

Promoting savings and asset accumulation is a central policy objective in countries around the world. In low- and middle-income countries, a large experimental literature finds that improving access to savings technologies can raise savings and productive investment (Karlan et al., 2014; Dupas and Robinson, 2013; Brune et al., 2016). At the same time, a parallel policy priority in a number of settings and populations has been to shift spending away from harmful or risky behaviors, such as alcohol use, gambling, and transactional sex (Banerjee and Mullainathan, 2010; Schilbach, 2019). These two goals are connected: when temptation spending and savings compete for the same marginal dollar, an intervention that makes saving more feasible and attractive has the potential to crowd out temptation spending through multiple pathways including the mechanical opportunity cost of saving and a greater orientation toward the future (Banerjee and Mullainathan, 2010). Despite the appeal of this joint mechanism, however, experimental evidence that savings interventions can meaningfully shift harmful spending patterns and health behaviors remains scarce. We provide the first experimental evidence on this question, assessing whether a multi-component savings intervention designed to appeal to men engaged in risky behaviors can result in meaningful changes in their spending patterns, health behaviors, and health outcomes.

We focus primarily on two health behaviors among men that are especially consequential in low-income settings in sub-Saharan Africa (SSA) that have a high disease burden: alcohol use and engagement in transactional sex. Alcohol use is a leading contributor to morbidity and mortality globally. It was responsible for 2.6 million deaths in 2019, and SSA is the region with the highest burden of alcohol-related disease and injury (World Health Organization, 2024). The alcohol burden also falls disproportionately on men, who account for 77 percent of alcohol-attributable deaths. Similarly, transactional sex — the exchange of money or material goods for sex — is common in high HIV prevalence settings and is a leading driver of HIV and other sexually transmitted infections (STIs) (Stoebenau et al., 2016; Wamoyi et al., 2016; UNAIDS and STRIVE, 2018). A meta-analysis of 87 population-based surveys in SSA between 2000-2020 with information on engagement in transaction sex found that 8

percent of sexually active men reported ever paying for sex, with substantial variation across countries (Hodgins et al., 2022). Regions with a high prevalence of HIV and other STIs like western Kenya indicate that a much higher share of men report paying for sex. Among fishermen along Lake Victoria, for example, 65 percent of men reported ever having transactional sex (Kwena et al., 2010) and in a pilot study we conducted in the same region, 47% of men reported paying for sex in the past 3 months (Moscoe et al., 2019). Furthermore, heavy alcohol use is also associated with greater engagement in transactional sex and higher HIV risk (Reed et al., 2026), through its dis-inhibiting effects on sexual behavior and its tendency to cluster among risk-seeking individuals (Baliunas et al., 2010; Takahashi et al., 2017; Kendagor et al., 2018; Gutin et al., 2026). For men who drink heavily or purchase sex, these activities impose substantial financial costs and the two behaviors often co-exist in ways that compound both their health and economic costs (Kwena et al., 2010; Seeley et al., 2012).

This study's focus on men is also driven by the observation that most approaches to reducing transactional sex have largely focused on adolescent girls and young women, i.e. the supply side of the market for transactional sex. For example, prior studies have explored interventions such as information provision (Dupas, 2011), education subsidies (Duflo et al., 2015), and conditional and unconditional cash transfers directed to adolescent girls and young women (Baird et al., 2012; Richterman and Thirumurthy, 2022). Many policies and programs in SSA have relied on such interventions not only to reduce women's economic vulnerability but also to decrease their likelihood of engaging in transactional sex (UNAIDS and STRIVE, 2018). Furthermore, proven biomedical approaches such as pre-exposure prophylaxis (PrEP) have been prioritized more recently as a vital way to reduce the risks that women face from engagement in transactional sex (Peck et al., 2024; UNAIDS, 2026). Despite being essential, however, the overall effectiveness of these interventions in reducing the transmission risk for HIV and other STIs has been hindered by the relative lack of research on effective ways to reduce men's demand for transactional sex. A similar gap also exists for interventions to reduce men's engagement in heavy alcohol use. While a large literature comprising studies conducted primarily in high-income countries has explored the use of targeted financial incentives for reducing substance use (Stitzer, 2026; Getty et al., 2026), experimental evidence

on whether economic or behavioral interventions can reduce heavy alcohol use among men in SSA remains extremely limited.[1]

We hypothesize that a savings intervention with multiple components that have previously shown promise — goal-setting, strong incentives to save, and periodic reminders to save — has the potential to decrease men's engagement in alcohol use and transactional sex. Our hypotheses can be viewed through the framework of Banerjee and Mullainathan (2010), in which individuals anticipate that a portion of any resources they carry into the future will be dissipated on temptation goods. This "temptation tax" lowers the effective return to saving, so that spending on immediate gratification can be a rational response to the savings technologies actually available to the poor. A key implication is that an intervention which raises the attractiveness, salience, and security of saving can shift spending away from temptation goods without any change in individuals' underlying preferences.

There are several other complementary ways through which the different components of the savings intervention that we test in this study could influence decision making. First, making saving more feasible and attractive (with mobile banking and strong incentives to save) raises the opportunity cost of spending on temptation goods: each dollar spent on alcohol, transactional sex, or gambling is a dollar that is not saved. Mobile banking features can reduce transaction costs and enable frequent small deposits (Suri and Jack, 2016), and super-charging the incentive to save by providing interest in the form of lottery-based rewards — as is common in "prize-linked savings accounts in several countries" — could be further motivate savings. Such incentives could be especially well-suited for men who exhibit risk-seeking preferences, as they channel the appeal of gambling and potentially other risk-seeking behaviors toward productive saving rather than spending (Cole et al., 2022; Filiz-Ozbay et al., 2015). Second, encouraging men to set clear savings goals and periodically reminding them about it may strengthen their future orientation and reduce the pull of present temptations (Gargano and Rossi, 2022). Notably, these

[1]Two exceptions are recent randomized controlled trials conducted in Kenya and Uganda. Murphy (n.d.) found that cognitive behavioral therapy and medication provision to households in rural Kenya reduced the likelihood of heavy drinking and led to improvements in agricultural outcomes. Chamie et al. (2023) found a significant reduction in hazardous alcohol use as a result of providing escalating financial incentives conditional on alcohol abstinence to people with HIV who have latent tuberculosis infection and hazardous alcohol use.

mechanisms do not require that a savings intervention changes deep parameters such as men's time or risk preferences; behavior can shift solely because the intervention changes the relative returns to saving versus temptation spending. A small pilot randomized trial that we conducted previously provided proof of concept for the feasibility and potential effectiveness of the prize-linked savings component of the intervention: among 300 men in western Kenya, the intervention increased total savings (Moscoe et al., 2019).

We test these hypotheses in a randomized controlled trial among 1,500 income-earning men in western Kenya. Eligible participants were men aged 18-39 years with regular income who reported recent alcohol use and engagement in transactional sex. At baseline, participants' spending on alcohol, gambling, and transactional sex together absorbed about 50 percent of monthly income. Fewer than one in four participants reported having a formal savings account. Participants were randomly assigned to a control group or to the savings intervention. We followed participants for 24 months, measuring savings and asset accumulation; expenditures on alcohol, transactional sex, and gambling; health behaviors such as heavy alcohol use and engagement in transactional sex; intimate partner violence (IPV); and biological outcomes including incidence (i.e. new cases) of HIV and three other STIs.

Consistent with our hypotheses, we find that a savings intervention substantially increases participants' savings and asset accumulation: total savings rise by 31 percent, formal bank savings by 171 percent, and non-financial assets — household durable goods, livestock, and vehicles — by 12 percent. Notably, these gains are financed primarily through reductions in participants' spending on alcohol, transactional sex, and gambling: the combined spending reductions closely match the savings gains, while food and other household spending are unchanged. The intervention also generates substantial changes in health behaviors: a 26 percent reduction in hazardous drinking, a 4 percent decline in the probability of any engagement in transactional sex, reductions of 8-15 percent in numbers of sexual partners, transactional sex partners, and transactional sex encounters, and declines of 13 and 15 percent in experiencing and perpetrating IPV, respectively.

We also observe increases in life satisfaction, expected longevity, and future

orientation in the treatment group, consistent with the intervention working in part by strengthening men's orientation toward the future, though our study design does not allow us to formally establish mediation. Despite the changes in alcohol use and sexual behavior, however, the intervention does not generate a statistically significant reduction in composite HIV/STI incidence (an indicator of whether a participant acquired HIV, HSV-2, gonorrhea, or chlamydia over the 24-month study period): incidence is 8 percent lower in the treatment group than in the control group, but this difference is not statistically significant.
Pre-specified subgroup analyses reveal a theoretically consistent pattern: the estimated protective effect on HIV/STI incidence is largest among participants who had at least one STI at baseline and among those with greater baseline risk-seeking — precisely the groups we would expect to be most responsive to lottery-based savings rewards. We cannot reject equality of effects across subgroups, however, so we interpret this pattern as suggestive.

Our work is related to three distinct research areas in both economics and public health. The first is research on how to promote savings in low- and middle-income countries and on the behavioral effects of interventions that successfully boost savings. The central goal of any savings intervention is to motivate individuals to shift resources from immediate consumption toward future goals (Karlan et al., 2014). Evidence from several countries demonstrates that access to formal and informal savings technologies can increase savings and productive investments (Dupas and Robinson, 2013; Brune et al., 2016). Other studies have demonstrated the promising potential of interventions that leverage mental accounting, goal setting (Dupas and Robinson, 2013; Karlan et al., 2016). Additionally, some studies have shown that offering lottery-like rewards for savings (i.e. prize-linked savings accounts) are an effective way to promote savings and may be especially effective among unbanked individuals and those with risk-seeking preferences (Cole et al., 2022; Filiz-Ozbay et al., 2015; Gertler et al., 2023). However, very few studies of savings interventions have explored whether or not they alter people's expenditures on temptation goods and health behaviors like smoking, heavy drinking, gambling, or transactional sex. Reasons for this evidence gap include a lack of measurement of such behaviors or a low prevalence of such behaviors among study participants. In this context, our study provides evidence that interventions designed to boost savings and

financial security can have impacts in an important but previously-unrecognized realm: they can improve public health outcomes by reducing engagement in behaviors like alcohol use and transactional sex.

The second area is on interventions to reduce engagement in behaviors that are harmful to health, such as smoking, heavy drinking, and unsafe sex. For reducing smoking and excess drinking, many studies have examined the effectiveness of incentives (Stitzer, 2026; Chamie et al., 2023) and of commitment contracts that help self-aware individuals to voluntarily constrain their future consumption behavior (Volpp et al., 2009; Giné et al., 2010). While these approaches have shown promise, they have seldom been adopted at scale in low- and middle-income countries. For reducing unsafe sex, prior studies in SSA have provided some evidence that the provision of cash payments conditioned on having negative test results for STIs (de Walque et al., 2012; Björkman Nyqvist et al., 2018) may be effective at reducing HIV and STI incidence. Cash transfers that are unconditional or are conditioned on school attendance for adolescent girls have been tested more widely. In Malawi, a conditional cash transfer program tied to school attendance reduced HIV and HSV-2 prevalence among adolescent girls by approximately one-third (Baird et al., 2012). Similarly, in Kenya, an unconditional cash transfer program reduced the risk of sexual debut among youth aged 15-25 by 31 percent (Handa et al., 2014). A trial in South Africa of cash transfers conditional on school attendance found no significant effect on HIV incidence among young women (Pettifor et al., 2016), suggesting that the effectiveness of cash transfers for HIV prevention may depend on program design and context. Few studies have focused directly on men who pay for sex, however. Our study is the first to focus on this population and evaluate an intervention designed to encourage savings and jointly reduce their engagement in alcohol use and transactional sex.

The third area to which we contribute is research on gender, risk-seeking behaviors, and IPV. Men exhibit different patterns of risk-taking and time preferences compared to women, with many studies finding that they display greater risk-taking (Croson and Gneezy, 2009; Falk and Hermle, 2018) and some finding that they have lower future orientation (Dittrich and Leipold, 2014). These gendered patterns are likely to be implicated in men's health and

economic behaviors, and they call for interventions that are targeted to men and designed to appeal to them. The intervention we test in this study is one such example, as it uses lottery-based rewards and other measures to promote saving among men. Our work also contributes to a much larger body of work that addresses the public health problem of IPV. One in four women globally and one in three women in SSA have been subjected to IPV in their lifetime (World Health Organization, 2025), and in the population we study, men also report high rates of both experiencing and perpetrating IPV. Several studies in economics and public health have explored ways to reduce IPV in low- and middle-income countries (Shah and Barski, 2026). Recent work in SSA has demonstrated the potential for interventions that engage men to be effective in reducing IPV (Shah et al., 2025). Since alcohol use is one of the most common and well-established risk factors for IPV (Tanyos et al., 2026; Melkam et al., 2024; KNBS and ICF, 2023), this study shows the large reductions in IPV that can result from interventions that successfully decrease hazardous drinking. Lastly, our finding that an intervention with lottery-like rewards for saving resulted in significantly lower spending on gambling is also worth highlighting. Gambling is becoming a growing concern in many countries globally, and our study reveals a promising approach for decreasing gambling expenditures that warrants further exploration. Collectively, our findings demonstrate that savings interventions can therefore generate a wide range of secondary benefits.

The remainder of the paper is organized as follows. Section 2 describes the study design, including the savings intervention and the data that were collected. Section 3 describes the empirical strategy. Section 4 reports the main results for savings and assets, expenditure patterns, health behaviors, HIV/STI incidence, and several mechanisms. Section 5 concludes.

2 Study Design

We conducted this study in Siaya County, a primarily rural region in western Kenya with a population of approximately one million. Prior research among men in Siaya County documents high rates of heavy alcohol use and engagement in transactional sex (KNBS and ICF, 2023; Gutin et al., 2026). The region additionally bears a high burden of HIV and other STIs, with the 2018

Kenya Population-Based HIV Impact Assessment (a nationally representative biomarker survey) indicating that Siaya County had the third highest adult HIV prevalence in Kenya (9.6 percent among men aged 15-49 years). Another population-based study in three administrative areas within Siaya County found that HIV prevalence among sexually active males aged $\geq$ 13 years was 14.3 percent (National AIDS and STI Control Programme, 2022; Awuoche et al., 2024). Although Siaya County is a region with high poverty, many men earn steady income through fishing, transport-sector work, and informal labor. We focus on the large segment of this population that reports alcohol use and engagement in transactional sex, as these are known to be important contributors to HIV and STI risk (Hodgins et al., 2022; Gutin et al., 2026).

2.1 Recruitment and eligibility criteria

The study sample and participant flow, from screening through randomization and follow-up, are summarized in Figure 1. Working with village elders and local organizations such as beach management units that maintain a register of fishermen in communities along Lake Victoria, study staff first mapped all venues where men congregate in the town of Bondo and in nearby communities. This included venues such as transportation centers, workplaces, trading hubs, and fishing landing sites. The staff then met with men at these venues, described the study, and screened them to assess whether they were eligible to participate in the study. Men who met the following pre-specified criteria were eligible: aged 18–39 years, having a steady weekly cash income, self-reporting alcohol or substance use in the past month, reporting engagement in transactional sex in the past 3 months, residing in the study communities and intending to remain there for 2 years. Additional eligibility requirements pertaining to the feasibility of the study intervention (described below) included possession of a mobile phone, a national identification card, a Kenya Revenue Authority PIN (or be willing to create one), and willingness to open a bank account with the partner financial institution. Importantly, HIV status was not an eligibility criterion; men who tested HIV-positive or HIV-negative during the baseline data collection were included since the goal of the intervention was to promote changes in alcohol use and sexual behavior among both groups of men. Men who met the eligibility criteria were given additional information about the study and asked

to provide informed consent. The study protocol and an accompanying protocol paper provide additional details on the study procedures (Egbe et al., 2022).

2.2 Baseline data collection and randomization

Eligible men who provided consent were administered a baseline survey that including questions about their economic status, spending behavior, savings behavior, alcohol use, and sexual behavior. Detailed contact information for multiple close friends or relatives was collected to facilitate follow-up data collection. In addition, trained counselors working with our study tested all participants for HIV, *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), and herpes simplex virus type 2 (HSV-2). HIV testing followed the Kenyan national algorithm: Determine HIV-1/2 rapid test, confirmation with First Response HIV 1–2 card test for those who had a reactive result, and Uni-Gold HIV assay as a tie-breaker when discordant results occurred. Participants who tested HIV-positive were referred to local health facilities for treatment. For gonorrhea or chlamydia, urine samples were collected and tested with the GeneXpert CT/NG assay (Cepheid). Finally, for HSV-2, blood samples were collected and tested using the Kalon HSV-2 IgG ELISA assay (Kalon Biological). Results from STI testing were provided to participants by phone once laboratory testing was complete. Those who tested positive for gonorrhea or chlamydia, which are both curable bacterial STIs, were provided curative treatments by the study nurse according to Kenyan national guidelines; these participants were asked to return to the study office for treatment and offered reimbursement for transportation costs. If a participant could not visit the study office, study staff arranged to meet him at a convenient location and administered treatment on site. Following the baseline data collection and HIV/STI testing, participants were stratified by baseline HIV status and randomized in equal proportions to intervention and control groups using a computer-generated sequence with block sizes of 10.

2.3 Intervention and control group

The primary goal of the intervention was to encourage participants to save more of their income rather than spend it on alcohol, transactional sex, and gambling. The intervention comprised three components: establishment of savings goals at

baseline, provision of a formal savings account with lottery-based incentives to save, and periodic text message reminders to save. This intervention built on insights from a smaller 300-participant pilot study of prize-linked savings that we conducted previously to gather important contextual information, establish recruitment procedures, and assess feasibility of the intervention (Moscoe et al., 2019). The intervention components related to goal setting and reminders were informed by prior studies of savings interventions in low- and middle-income countries.

At enrollment, research assistants held brief discussions with participants in the treatment group about their motivations for saving, their savings goals, and the challenges they faced in setting money aside each month. Participants listed concrete savings goals — such as investment in farming or business, household expenditures on durable goods, or children's education — along with a target monthly deposit amount to achieve those goals. The second intervention component was the provision of a formal savings account with Equity Bank, one of the Kenya's largest banks with branches nationwide. Equity Bank accounts included mobile banking features that enabled account holders to view balances on their phone as well make deposits, withdrawals, money transfers. At enrollment, participants received an initial deposit of KSh 500 (about USD 4)[2] in their account and a brief financial education session (delivered by Equity Bank) covering the benefits of saving, interest accrual, and deposit and withdrawal procedures. Importantly, the bank accounts also featured lottery-based incentives to save: lottery entries were allocated at one ticket per KSh 100 increase in the bank account balance in a given calendar month, capped at 15 tickets per participant per month. Each month, 108 winners were randomly selected to receive prizes: two large (KSh 10,000, USD 77), six medium (KSh 5,000, USD 39), and 100 small (KSh 500, USD 4). Winners were notified by text message and prizes were deposited directly into their Equity Bank accounts. The third intervention component consisted of monthly text message reminders reinforcing participants' savings goals and highlighting the possibility of winning lottery prizes.

In the control group, participants received basic information on the importance

[2]All KSh values throughout this paper are converted to USD at a rate of KSh 117.87 = USD 1.00, reflecting the World Bank exchange rate at study baseline in 2022.

of saving for the future as well as education about HIV and STIs that is part of the Kenya Ministry of Health's standard pre- and post-testing protocols when conducting HIV and STI testing.

2.4 Follow-up Data Collection

Participants were followed for 24 months, with follow-up survey questionnaires administered at 6, 12, 18, and 24 months. The questionnaires assessed participants' employment, income, savings, and expenditures (including spending on alcohol, gambling, and transactional sex) as well as sexual partnerships and condom use, alcohol use, and psychosocial outcomes including stress, financial strain, and future orientation. HIV testing and testing for gonorrhea and chlamydia were conducted at 12 and 24 months; HSV-2 testing was conducted at 24 months only. The HIV and STI testing followed the same procedures as at baseline.

To minimize attrition, research assistants followed a structured tracking protocol involving phone calls and home visits. Participants who migrated were retained in the study and their access to mobile banking meant the savings intervention remained available regardless of where they resided. Follow-up completion for the primary outcome, HIV/STI incidence, was 95 percent, and was similar across arms. As shown in Table A1, baseline characteristics of the 75 participants not measured for the primary outcome were broadly similar to those of the 1,425 who were: they did not differ significantly in age, marital status, educational attainment, occupation, earnings, bank account ownership, or financial and non-financial assets. The one notable difference was in household composition, as participants lost to follow-up had smaller households (3.1 vs. 3.7 members) and fewer children (1.1 vs. 1.5). The low rate of lost-to-follow-up and balance across follow-up status, particularly in financial characteristics, suggests that attrition is unlikely to meaningfully bias the main estimates of the intervention's effectiveness.

2.5 Baseline Characteristics

Table 1 reports baseline characteristics of the 1,500 study participants. Participants' average age is 27.9 years and 62 percent are either married or

cohabiting. Educational attainment is modest: approximately 40 percent completed primary school or less, and 47 percent completed secondary school or higher. Households contain 3.7 members on average, participants have 1.4 children, and 85 percent report being the household head. The most common occupations are bicycle and motorcycle taxi driving (51 percent) and informal skilled labor (30 percent), with an additional 7–10 percent engaged in fishing- or trading-related activities. This reflects both the recruitment strategy we used and the typical occupations of men in the study communities who are earning income on a regular basis. Average weekly earnings are approximately USD 33. One quarter of participants report holding a bank account and average total savings (the sum of formal and informal savings) are USD 73, the majority of which is held as informal savings. Non-financial assets are valued at USD 753 on average.[3] Baseline characteristics are balanced across the treatment and control groups.

Table 2 describes baseline expenditure patterns and health behaviors. On average, participants report spending USD 217 on alcohol and USD 132 on transactional sex in the past six months (these are calculated based on self-reports for the past 4 weeks and 3 months for alcohol and transactional sex, respectively). Normalizing both to a monthly basis (e.g., dividing by six) and comparing it to participants' income, expenditures on alcohol and transactional sex together account for approximately 40 percent of monthly income – a strikingly large share that is in line with some prior studies conducted among higher risk populations of men in the region (including gambling expenditure, the share rises to 50 percent).[4] Consistent with the study eligibility criteria and the expenditure data, health risk behaviors are highly prevalent at baseline: 54 percent screen positive for hazardous alcohol use on the Alcohol Use Disorders Identification Test-Consumption scale (AUDIT-C; score ≥ 4) and participants report an average of 4.2 sexual partners in the past three months, of whom 3.5 are transactional partners. IPV is also extremely common: 44 percent report experiencing IPV in the past year and 42 percent report perpetrating it. The high prevalence of both experiencing and perpetrating IPV is similar to other findings

[3]Non-financial assets include household goods and furniture; agricultural tools and non-agricultural tools; livestock and animals; and motor vehicles, but does not include land.

[4]It is worth underscoring that these high shares are at least partially explained by the study eligibility criteria, which screen for men who use alcohol and engage in transactional sex.

from the region, including the 2022 Demographic and Health Survey and other studies (KNBS and ICF, 2023; Waila et al., 2022; Odemba et al., 2023).[5] These characteristics are similarly distributed across treatment and control groups.

Lastly, Table 3 reports baseline HIV and STI prevalence among study participants. Overall, 9.5 percent of participants tested HIV-positive. HSV-2 prevalence is substantially higher, at 38.7 percent, reflecting the well-documented co-epidemics of HIV and herpes in the region. Prevalence of curable bacterial STIs is also high: 14.3 percent of participants test positive for *Chlamydia trachomatis* and 2.5 percent for *Neisseria gonorrhoeae*. Taken together, 50.4 percent of participants test positive for either HIV or one of the three STIs (i.e. the composite outcome). As with demographic and behavioral characteristics, HIV/STI prevalence is balanced across treatment and control groups. In a previously published baseline paper, we described the characteristics of participants as well as the high prevalence of STIs among them, and we identified characteristics associated with bacterial STIs in particular (gonorrhea and chlamydia) using logistic regression (Napierala et al., 2025). The main findings from that analysis were that compared with participants uninfected with bacterial STIs, those testing positive for gonorrhea or chlamydia were younger (p=0.001), had more sexual partners (p=0.027) and transactional sex partners (p=0.039), were less likely to have used a condom at last sex (p=0.015) and were more likely to self-report having an STI besides HIV in the past 12 months (p=0.002).

3 Empirical strategy

We conduct intention-to-treat (ITT) analyses using the full sample of study participants. Section 3.1 describes our specification for the primary outcome, composite HIV/STI incidence at 24 months. Section 3.2 describes our specification for the secondary outcomes, measured at 6, 12, 18, and 24 months.

[5] A study among men residing in slums in the city of Kisumu, Kenya, found that 76 percent reported ever having experienced IPV (Odemba et al., 2023). In the 2016 Uganda Demographic and Health Survey, the prevalence of experiencing IPV during the 12 months was 30.5 percent among all men (Waila et al., 2022), whereas in the 2022 Kenya Demographic and Health Survey it was 23.1 percent among all men (KNBS and ICF, 2023). IPV is strongly correlated with alcohol use in the Kenya survey, with a nearly three-fold higher prevalence of experiencing IPV among women whose intimate partners drink heavily vs. those whose partners do not drink (84 vs 32 percent). Given the eligibility criteria for our study (men who drink alcohol), these other findings from Kenya and Uganda indicate that the prevalence of both experiencing and perpetrating IPV among study participants is highly plausible.

Section 3.3 describes pre-specified subgroup analyses for the primary outcome.

3.1 Primary outcome

We estimate the ITT effect of the savings intervention on composite HIV/STI incidence using the following specification:

$$E[Y_i] = \exp(\alpha + \beta_1 I(Z_i = 1) + \beta_2 HIV_i + \delta X_i + \log(Exposure_i)) \quad (1)$$

Equation (1) is the mean for a Poisson pseudo-likelihood estimator with a log link — the same family of estimator used in econometrics for non-negative outcomes (Santos Silva and Tenreyro, 2006). With robust standard errors, this estimator yields consistent estimates of $\exp(\beta_1)$, the rate ratio of the primary outcome between treatment and control (Zou, 2004). Y_i represents the primary outcome for participant *i*: a binary indicator of whether the participant acquired one or more of HIV, HSV-2, CT, or NG between baseline and the 24-month follow-up. For participants who test HIV-positive and/or HSV-2-positive at baseline, the outcome is defined over all STIs other than those for which they tested positive at baseline. For the curable STIs (CT and NG), we attempted to provide treatment to all participants who tested positive at baseline or at the 12-month follow-up, thus making it possible to define incidence for these infections among the participants who received treatment.[6]

$I(Z_i = 1)$ is an indicator for assignment to the treatment group, which received the savings intervention. The parameter of interest is $\exp(\beta_1)$, the rate ratio of composite HIV/STI incidence in the treatment group relative to the control group, conditional on covariates and exposure time. The model controls for baseline HIV status (HIV_i), which was used to stratify randomization and was pre-specified as a control. The vector X_i includes other pre-specified baseline covariates: HSV-2 status (since HSV-2 is not a curable STI and thus affects the primary outcome), age, marital status, and primary occupation. We also adjust

[6] Among 241 participants who tested positive for CT or NG at baseline 99 % (N=238) received treatment from the study. The disposition of the three not treated participants was: the first was lost to follow-up; the second was seen at 12 months, was treated and was negative for other conditions, then was negative for all conditions at 24 months; and the third was seen at 24 months and was negative for all four conditions. The latter two participants are included as not incident in analyses of the primary outcome. All participants who tested positive for CT or NG at the 12-month follow-up were treated.

for exposure time ($Exposure_i$), defined as the number of days that participant i is at risk of contracting eligible HIV/STIs.[7]

The primary outcome is considered non-missing if participants were tested for HIV/STIs at 24 months, or if they tested positive for CT, NG, or HIV at the 12-month visit. Our primary hypothesis test evaluates whether the log of the rate ratio of composite HIV/STI incidence differs from zero:

$$H_0 : \beta_1 = 0$$
$$H_a : \beta_1 \neq 0$$

We use a two-sided test with Type I error rate of 0.05. With only one pre-specified primary hypothesis, we do not adjust for multiple comparisons.

We assess the robustness of the estimates for the primary outcome to several alternative specifications. First, we report best-case and worst-case bounds for the treatment effect under alternative assumptions about the HIV/STI status of the 5 percent of participants lost to follow-up.[8] Second, we estimate the same model by ordinary least squares (OLS) — equivalent to a linear probability model for the binary outcome — which yields the risk *difference* rather than the rate ratio. Third, we re-estimate Equation (1) by treating participants' self-reported cases of CT and NG from the 6-monthly follow-up surveys as additional incident cases, to assess sensitivity to potential undermeasurement of the laboratory-confirmed primary outcome.[9]

3.2 Secondary outcomes

To trace the full range of the intervention's impacts, including on proximal health and economic behaviors, we examine various pre-specified secondary outcomes measured in the 6, 12, 18, and 24 month surveys: economic outcomes

[7]This adjusts for variation in the number of days between study visits, as the 12- and 24-month visits tended to occur within a 1-month window before or after. For participants who tested positive for CT and/or NG at baseline, the exposure time is measured from the date of treatment for the baseline infection to the 24-month follow-up, accounting for variation in the time elapsed between baseline treatment and follow-up testing.

[8]For the best case scenario all savings intervention participants missing primary outcome measurement are coded as not incident, and all control participants missing primary outcome measurement are marked as incident. For the worst case scenario the coding is reversed.

[9]Including self-reported cases, composite incidence was 36.0% in the control arm (an additional 8.4%) and 32.7% in the intervention arm (an additional 7.6%).

(total savings, formal and informal savings, non-financial assets, and investment in education); expenditure patterns (food, non-food household spending, alcohol, transactional sex, and gambling); sexual risk behaviors and alcohol use (number of sexual partners, engagement in transactional sex, number of transactional sex partners, number of transactional sex encounters, condom use, and hazardous drinking); experiencing and perpetrating IPV; and measures of well-being (future orientation, financial security, and stress).

We estimate intention-to-treat effects on secondary outcomes using an ANCOVA panel specification with a participant random intercept, following McKenzie (2012):

$$g(E[Y_{it} \mid X, u_i]) = \alpha + \beta I(Z_i = 1) + \gamma Y_{i,0} + \sum_{s>6} \delta_s \mathbf{1}\{t = s\} + \phi HIV_i + X_i'\theta + u_i \tag{2}$$

The model is fit jointly to the four follow-up waves $t \in \{6, 12, 18, 24\}$ for each participant i. The baseline value of the outcome, $Y_{i,0}$, enters the regression as a covariate, and the corresponding baseline observation is excluded from the estimation sample. The wave indicators $\mathbf{1}\{t = s\}$ are wave fixed effects, with month 6 as the omitted reference. HIV_i is the randomization stratification variable (baseline HIV status), and X_i contains the same baseline demographic covariates as in the primary-outcome specification (age, marital status, primary occupation; for the education-spending regression, also number of children in school). u_i is a participant-level mean zero normally distributed random intercept that captures within-person serial correlation across the repeated measurements; the model is estimated by maximum likelihood. The link function $g(\cdot)$ is the identity for continuous outcomes, in which case Equation (2) reduces to OLS with a participant random intercept. For binary and count outcomes, $g(\cdot)$ is the log link, and the model is estimated by Poisson pseudo-likelihood as in the primary specification, with robust standard errors for the binary outcomes (Zou, 2004). For continuous outcomes, β is the level shift in the outcome attributable to treatment, averaged across the four follow-up waves — that is, the typical treatment-control gap at any given follow-up survey, averaging over the 6-, 12-, 18-, and 24-month assessments. For binary and count outcomes, $\exp(\beta)$ is the risk ratio (binary) or incidence rate ratio (count),

assumed constant across all waves, for a participant assigned to the savings intervention versus control.

Our pre-analysis plan specified a procedure for choosing between the pooled main-effects specification of Equation (2) and a per-wave specification with treatment-by-time interactions. We first estimate the per-wave specification and conduct a likelihood-ratio test of the joint null that all treatment-by-time interaction coefficients are zero, at $\alpha = 0.10$. If the test rejects, we report per-wave treatment effects with Holm-Bonferroni adjusted p-values at $\alpha = 0.05$; otherwise, we report the pooled main effect. As shown in Table A2, with one exception p-values for the likelihood-ratio tests were >0.10, and we thus report pooled main effects throughout.[10]

We additionally conduct a series of sensitivity analyses. First, for secondary outcomes we estimate Equation (2) using pooled OLS (or pooled Poisson with a log link, for binary and count outcomes) with standard errors clustered at the participant level, as an alternative to the random-intercept estimator used in the main text. In our setting — a time-invariant treatment indicator, an approximately balanced panel, and wave fixed effects orthogonal to the treatment indicator by construction — the random-intercept estimator and pooled OLS with participant-clustered standard errors yield roughly equivalent point estimates on β and similar standard errors.[11] Tables A8 and A9, and A10 report the pooled-OLS and pooled-Poisson estimates for the headline savings, spending, and health-related secondary outcomes.

For headline binary secondary outcomes whose probabilities are not at the boundary of the unit interval (engagement in transactional sex; hazardous alcohol use (AUDIT-C $\geq$ 4); experiencing and perpetrating IPV), we additionally report OLS (i.e., linear probability model) estimates in Table A10. The linear probability model coefficient closely approximates the risk difference, providing a complement to the risk-ratio estimates reported in the main text. Estimates use the same panel ANCOVA specification as Equation (2), but with an identity link

[10]The p-value for the joint test was <0.10 for one secondary outcome, food insecurity. As a result, we additionally report the time specific savings intervention estimates in Table A5.

[11]The two estimators are formally distinct: random-intercept generalized least squares is efficient under an exchangeable within-person error structure, while pooled OLS with cluster-robust standard errors is agnostic to the within-person correlation structure. Their point-estimate equivalence in our setting follows from the fact that the GLS quasi-demeaning transformation rescales any time-invariant regressor by a single constant that factors out of the OLS first-order conditions.

rather than a log link, so the coefficient on $I(Z_i = 1)$ is the risk difference rather than the log risk ratio.

Finally, for continuous economic outcomes (total savings; formal and informal savings; non-financial assets; investments in housing and education; food and non-food expenditures; expenditures on alcohol, transactional sex, and gambling), we winsorize at the 95th percentile to limit the influence of long right tails, consistent with our pre-analysis plan's allowance for transformation of continuous outcomes for model fit. Estimates based on the original outcomes and outcomes winsorized at the 99th percentile are reported as a robustness check in Tables A8 and A9.

3.3 Pre-specified subgroup analyses

We pre-specified subgroup analyses of the primary outcome treatment effect along five dimensions: risk-seeking preferences at baseline (low vs. medium/high); positivity for HIV or any other STI at baseline (none vs. any, as a proxy for a participant's baseline risk level); age (above vs. below the sample median); socioeconomic status (above vs. below the sample median of total assets at baseline); and marital status (married or living as married vs. not). Following Wang et al. (2007), inference is based on tests of the interaction between the treatment effect and each subgroup indicator.

4 Results

4.1 Intervention Take-up and Engagement

Table 4 documents take-up and engagement with the prize-linked savings accounts that participants in the treatment group received. Take-up was high: 99 percent of the treatment group opened a savings account at Equity Bank, and 98 percent completed the financial education and goal-setting session offered at baseline. Most participants (81 percent) saved money in their accounts at least once over the course of the study. On average, participants deposited additional savings in their accounts 5.1 of the 24 study months. Lottery participation was substantial: 73 percent of account holders received at least one lottery ticket, and 54 percent won at least one prize during the study. Among winners, the average

number of lottery wins was 5.6, with mean total winnings of KSh 5,456 (USD 46).

4.2 Effects on Savings and Expenditures

One of the central objectives of the intervention was to influence men's savings behavior and expenditure patterns. Figure 2 displays the pre-specified savings and expenditure outcomes at baseline and at each 6-month follow-up survey in both study groups. Overall, the treatment and control groups diverge meaningfully over the follow-up period in the expected directions. Total savings (the sum of formal and informal savings) grows steadily in both groups but jumps in the treatment group, beginning at the 6 month follow-up. This divergence is driven entirely by formal bank savings, which rises sharply among treated participants. Informal savings, by contrast, follows a nearly identical trend in both study groups throughout the follow-up period, suggesting that the intervention encouraged accumulation of new savings rather than a reallocation from informal to formal savings mechanisms. Finally, the trajectory of non-financial assets mirrors that of total savings, with the treatment group having faster growth than the control group.

On the expenditure side, spending on alcohol, transactional sex, and gambling declines in both groups over time, but in general the treatment group experiences a larger decline than the control group. Trends in food spending, on the other hand, are virtually identical across study groups, indicating that the increase in savings does not come at the expense of food spending.

Building on the findings shown in the figure, Table 5 reports intent-to-treat estimates of the intervention's impact on total savings, disaggregated into pre-specified savings and investment outcomes.[12] The headline finding is that the intervention results in a large and statistically significant increase in total savings: across all 6-month follow-up surveys, a participant in the treatment group has USD 22 more in total savings than a participant in the control group. This represents a 31 percent increase relative to the control mean (USD 71). Nearly all of this gain is concentrated in formal savings, with a participant in the treatment group holding USD 19 more in formal savings at each follow-up (a 171

[12] Results are estimated on the full sample including zeros, and amounts are winsorized at the 95th percentile within follow-up month.

percent increase relative to the control mean). In contrast, the amount participants have in informal savings is not significantly different across study arms. Treated participants also accumulate significantly more non-financial assets, with the total value of their assets being nearly USD 92 higher than participants in the control group. This represents a 12 percent increase relative to the average value of the control group's assets across the four follow-up waves (USD 746) and is the largest absolute treatment-control difference of any savings category. Table A3 disaggregates the USD 92 gain by asset type: it is broadly distributed across household goods (USD 30), motor vehicles (USD 30), and livestock and animals (USD 22), all statistically significant, while non-agricultural tools show a small but significant increase (USD 5) and agricultural tools show no significant change. Finally, we find that spending on education in the past 6 months is also significantly higher among participants randomized to the savings intervention, by almost USD 4 more per period. The effects on total savings, formal savings, and assets are large and precisely estimated; the educational spending effect, while statistically significant, is more modest in magnitude and should be interpreted with some caution given its lower precision.[13]

A natural question raised by these findings is how treated participants financed these savings gains: whether through reductions in spending on alcohol, transactional sex, and gambling; reductions in essential household expenditures on categories like food; or through higher earnings and labor supply. Table 6 reports the effects on expenditures. There is no evidence that the savings gains crowd out household food or non-food expenditures, which are statistically indistinguishable between participants in the two study groups. Instead, the intervention results in significant reductions in spending on alcohol, transactional sex, and gambling.[14] Averaged across each 6-month follow-up period, a participant in the treatment group spent USD 15 less on alcohol, a 7 percent reduction relative to the control mean (USD 213).[15] Spending on

[13]One additional investment outcome was pre-specified: any housing improvements in the past 6 months. Across the follow-ups, 29.3 percent reported making improvements in the treatment group vs. 27.7 in the control group, with a relative risk of 1.06 (0.05).

[14]Spending in different categories was reported for varying recall windows. For example, the recall period was two weeks for food and three months for transactional sex. We converted these to a common 6-month basis for comparability across categories.

[15]We report alcohol spending on self and others in the table. We additionally pre-specified that we would analyze

transactional sex is USD 8 lower per period (6 percent decrease, control mean USD 129), and gambling expenditures are USD 9 lower (11 percent, control mean USD 81). We also find no evidence that increased earnings or labor supply financed these gains: point estimates on both weekly earnings and hours worked are negative, not positive (Table A4). The estimates are imprecise, however, and the 95 percent confidence interval does not rule out a modest positive contribution from earnings. As we discuss next, we view the near-exact correspondence between the savings gains and the changes in expenditures documented above as stronger evidence that earnings and labor supply were not economically important financing sources.

Notably, there is strong internal consistency when we compare the estimated effects of the intervention on savings and expenditures. The average total increase in savings attributable to the intervention (USD 129 over 24 months, summing effects on total savings, non-financial assets, and education spending)[16] is *very similar* to the combined reduction in expenditures on alcohol, transactional sex, and gambling (totaling USD 127 over 24 months). This one-for-one correspondence is noteworthy given that the savings and expenditure data were collected in separate survey modules with different recall periods. The consistency across independently elicited measures substantially increases our confidence in the validity of the self-reported data. In particular, it makes it unlikely that our findings are driven primarily by social desirability bias, since it would be difficult to generate an accounting identity of this kind through reporting distortions alone.

Overall, these results are consistent with the intervention having its intended effect: it motivates men to channel their income *toward* saving for the future and *away from* alcohol, transactional sex, and gambling. This prompts us to examine the intervention's effects on health behaviors.

alcohol spending on self alone, but given that the results were substantively duplicative we omitted this outcome for brevity.

[16]This is obtained by adding the point estimates for total savings and non-financial assets and four times the point estimate for spending on education (since the latter point estimate is an average for spending over 6 months, whereas the former two point estimates are average differences between participants in each arm over the 24-month study period).

4.3 Effects on health behaviors

Table 7 reports intent-to-treat estimates of the intervention's impact on health-related risk behaviors. In accordance with the expenditure results, treated men report significant reductions in hazardous alcohol use. The probability of scoring at or above the AUDIT-C threshold of 4 (i.e. hazardous drinking) declines by 26 percent relative to the hazardous drinking rate among control participants.[17] This represents the largest behavioral effect we estimate and one that substantially exceeds what has been observed for other behavioral interventions targeting harmful drinking, such as incentive-based approaches in Uganda (Chamie et al., 2023).

The intervention's effects on sexual behavior are more heterogeneous across measures. While there is not a significant change in condom use at the last sexual encounter, there is a small (4 percent) significant decline in the probability of *any* transactional sex engagement. Correspondingly, the intervention reduces the *number* of sexual partners and *number* of transactional sex partners by 8 percent and 11 percent, respectively, as indicated by the incidence rate ratios in columns 4 and 5. It also reduces the number of transactional sex encounters by 15 percent (column 6). These results suggest that the intervention reduced both the intensity of engagement in transactional sex and also the extensive margin of engagement.

IPV was also a pre-specified secondary outcome since there are well-documented links between heavy alcohol use, financial stress, and IPV. Table 8 shows that the intervention leads to large and statistically significant reductions in reports of both experiencing and perpetrating IPV. Against a very high prevalence of IPV among control participants during the follow-up period (about 1 in 4 men report experiencing and perpetrating IPV), participants randomized to the intervention reported a 13 percent relative decline in experiencing IPV in the past six months, and 15 percent relative decline in perpetrating IPV.

The pattern of results across Tables 5–8 portrays a coherent picture. Men randomized to the savings intervention have higher savings and asset

[17] Throughout this section, extensive margin effects are estimated as relative risks. Results are essentially identical when estimated using a linear probability model; see Table A10. For example, Panel B, column 1 in Table A10 shows that the intervention decreases the probability of hazardous drinking of 7 percentage points, which is a 25 percent decrease compared to the control mean of 28 percent.

accumulation. And they finance these gains through reduced engagement in (and spending on) hazardous drinking, transactional sex, and gambling. The directions and magnitudes of these effects are mutually reinforcing: the largest behavioral effect is on alcohol use — a 26 percent reduction in hazardous drinking — which contributes substantially to both risky sexual behavior and intimate partner violence.

4.4 Effects on Future Orientation and Well-Being

Motivated by evidence that savings interventions may shift time preferences (Carvalho et al., 2016) in addition to strengthening financial security, we explored the intervention's impact on several psychosocial outcomes, financial well-being, and food security. Table 9, which focuses on life satisfaction and future orientation, shows that the intervention results in a modest improvement in participants' life satisfaction (measured by the Cantril Scale). Treated men also report a small but significantly higher perceived probability of living to age 70 years (0.15 units higher on a scale from 0 to 10), suggesting that the intervention may have shifted participants' expectations about their own longevity. This finding is in line with the substantial reductions in health risk behaviors reported above. Lastly, the intervention also appears to increase men's future orientation: participants in the treatment group have a higher probability of being in the most future-oriented category of the four-level ordinal time discounting measure that we used in the survey.

In addition, estimates from Table 10 show that, consistent with the material gains in savings and assets documented above, the intervention generates a modest but significant improvement in self-reported financial well-being (measured with an 8-question scale adapted from Fu (2020)). Effects on food insecurity, perceived stress, helplessness, and self-efficacy are in the expected directions but are small in magnitude and not statistically significant.[18] Taken together, the results in Tables 9 and 10 are consistent with the intervention's impact on spending and health behaviors operating at least partially through psychological channels (future orientation and survival expectations), although the relatively small effect

[18] While we present the average effects across follow-ups in Table 10, time-specific effects of the savings intervention on food insecurity in Table A5 indicate that there was a significant decrease in food insecurity at 12 months that was not present at 6, 18, or 24 months.

sizes for these channels underscore the importance of other, more direct pathways (e.g., the savings incentives and the goal-setting support).

4.5 Effects on HIV/STI Incidence

Table 11 reports the 12-month and 24-month incidence of HIV and other STIs among all participants and in each study group. Composite incidence of HIV, CT, and NG at 12 months is 13.8 percent in the control group and 11.4 percent in the treatment group. At 24 months, composite incidence of HIV, HSV-2, CT, and NG is 27.5 percent and 25.1 percent in the control and treatment groups, respectively. The highest incidence is observed for CT, accounting for the majority of composite incidence in both groups. Incident HIV is rare in both study groups over the follow-up period, with only 6 cases observed over 24 months.

Table 12 reports intent-to-treat estimates of the intervention's effect on composite HIV/STI incidence at 24 months, the pre-specified primary outcome and the one that is most downstream from sexual behavior. The intervention resulted in an 8 percent reduction in composite incidence (rate ratio 0.92), but this effect was not statistically significant (p=0.36). To assess the sensitivity of this effect to attrition, we also report best-case and worst-case bounds under alternative assumptions about the HIV/STI status of the 75 participants (5 percent) lost to follow-up (columns 2 and 3). The best-case scenario yields a rate ratio of 0.77 (p<0.01), while the worst-case scenario yields a rate ratio of 1.11 (p=0.20), bracketing the plausible range of true effects.[19] Column 4 reports the results from estimating an OLS model for the primary outcome, showing that the intervention led to an absolute decrease in composite incidence of 2 percentage points that is not statistically significant. Lastly, since STI testing occurred at 12 and 24 months only, a small number of incident gonorrhea or chlamydia cases may have been missed among participants who were diagnosed and treated outside of the study visits (i.e. at local clinics). Column 5 addresses this concern by reporting results for a composite outcome that incorporates both objective test results and

[19]During the study design phase, concerns were raised that the lottery rewards could have potential adverse effects if participants spent them on health-harming goods and behaviors. The worst-case scenario estimate helps to alleviate some of those concerns, indicating that in this study, even when we set all missing outcomes for intervention participants to incident and control participants to not incident, there isn't evidence intervention participants would have had significantly higher HIV/STI incidence.

self-reported diagnoses; the rate ratio is unchanged at 0.92, suggesting that under-measurement of incident STIs is unlikely to explain the null result.

The overall 8 percent reduction in HIV/STI incidence due to the intervention is lower than the roughly 20 percent reduction that our study was powered to detect (80 percent power). We assumed annual incidence of 15–20 percent in the control group and 20 percent attrition in our power calculations. In reality, attrition was considerably lower than what we assumed in our conservative power calculations (this should increase our statistical power) and composite HIV/STI incidence in the control group (27.5 percent over 24-months) was fairly similar to what we assumed. Our power calculations were informed by evidence from a limited number of prior studies of behavioral interventions that had achieved meaningful reductions in STI outcomes. For example, one study in Tanzania found that cash transfers conditional on negative STI test results reduced composite incidence of four STIs by 27 percent over 12 months among those eligible for higher-value transfers (de Walque et al., 2012). Another study in Lesotho found that a lottery-based incentive program conditional on STI-negative test results reduced HIV incidence by 21 percent over two years (Björkman Nyqvist et al., 2018). Although the interventions and target populations in these studies differed from those in our study, these results suggested that behavioral interventions with strong financial incentives to reduce engagement in transactional sex could plausibly achieve reductions of about 20 percent.

That we document large and consistent behavioral changes without a statistically significant reduction in HIV/STI incidence may be due to several, non-mutually-exclusive reasons. Epidemiologically, because transmission risk is a multiplicative function of exposure frequency, partner-level infection prevalence, and per-act transmission probability, only sufficiently large reductions in risk exposure may be enough to move incidence by a detectable amount, particularly against the high background STI prevalence in our setting; the reductions in alcohol use and transactional sex we document, while large in relative terms, may simply not have been large enough in absolute terms to shift incidence. Other reasons include insufficient power to detect incidence effects on the order of 8–10 percent, a longer time horizon required for behavior change to

manifest biologically, or some degree of social desirability bias in the self-reported behaviors (although our results above suggest the last reason is less likely to be the case).[20] A similar disconnect between behavioral and biological outcomes has been documented in other studies, including the EXPLORE trial, one of the largest behavioral HIV prevention trials among men who have sex with men in the United States (Koblin et al., 2004). That reductions in sexual risk behavior did not translate into a statistically significant reduction in HIV incidence in that trial either suggests that behavior change of the magnitude we and others have observed may not be sufficient to generate a large reduction in HIV/STI incidence.

When examining the intervention's effect on composite HIV/STI incidence in five pre-specified subgroups (Tables A6 and A7), a consistent pattern emerges: the effects are largest among participants who exhibit the highest baseline risk (Table A6). Among participants who tested positive for at least one HIV/STI at baseline (indicating elevated biological risk and, likely, higher rates of the risk behaviors that the intervention targets) the rate ratio is 0.82 (SE = 0.10). And among participants with medium or high risk preferences at baseline, the rate ratio is 0.80 (SE = 0.13), consistent with the hypothesis that the savings intervention - with its lottery-based incentive - is more effective for this group. In both cases, the savings intervention's estimated 18-20 percent reduction in HIV/STI incidence in these higher risk subgroups is substantial. By contrast, among participants who were HIV/STI-negative at baseline and those with low risk preferences the point estimates of the treatment effect are close to one (i.e. no risk reduction). Across the remaining pre-specified subgroups of age, assets, and marital status (Table A7), effects are broadly similar to the full-sample estimate. The estimates seen among the highest-risk participants is theoretically coherent and suggests that the intervention may have its greatest effect on health when targeted at men with elevated baseline risk. However, given the p-values for the interaction tests between treatment and subgroup indicators are >0.1 for all the subgroups we examined in Tables A6 and A7, these results should be interpreted as suggestive rather than conclusive, and warrant replication in studies with

[20] By contrast, our trial had ample power to detect meaningful effects on outcomes related to savings and spending on alcohol, transactional sex, and gambling. The estimated changes in these outcomes due to the intervention either meet or exceed the minimum detectable effect sizes that we calculated when designing the study.

adequate power to detect treatment effect heterogeneity along these dimensions.

Taken together, the incidence results indicate that the behavioral changes we document — in particular, substantial reductions in hazardous drinking and transactional sex — did not translate into a statistically significant reduction in composite HIV/STI incidence over the 24-month follow-up, though the direction of the effect is consistently protective and the trial was powered to detect effects that were larger than those observed here.

4.5.1 Robustness

Our main results on the savings, expenditure, and health and sexual behavior outcomes are robust to various alternative estimation and specification choices. Panel C of Tables A8 and A9 report pooled OLS estimates with participant-clustered standard errors as an alternative to the random-intercept estimator used in the main text; point estimates and standard errors are virtually identical across the two approaches, confirming that the random-intercept structure is not driving the results. Pooled Poisson models for the binary and count outcomes seen in Table A10 yield a similar conclusion.

For the binary health and IPV outcomes, Table A10 reports linear probability model estimates, which yield risk differences with signs and statistical significance that are consistent with the relative risk estimates in the main text.

For the continuous savings and investment outcomes, the estimates are based on winsorization at the 95th percentile to limit the influence of extreme values. Panels A and B of Table A8 show that the results are insensitive to this choice: estimates based on winsorizing at the 99th percentile (Panel A) and no winsorizing (Panel B) are larger in magnitude but qualitatively identical in sign and significance across all outcomes, confirming that the effects on savings and assets are not driven by a small number of outliers. The same conclusion holds for the expenditure outcomes: Panels A and B of Table A9 show that the null effects on food and non-food spending and the significant reductions in alcohol, transactional sex, and gambling expenditures are unchanged under alternative winsorization thresholds.

5 Conclusion

This study provides new evidence that savings interventions can generate substantial reductions in high risk health behaviors like heavy drinking, transactional sex, and gambling. To our knowledge, this is the first experimental study to document that savings interventions can reduce engagement in risk behaviors that involve inter-temporal tradeoffs in costs and benefits. The intervention we tested generated large gains in formal bank savings and non-financial assets that were financed primarily by reductions in spending on alcohol, transactional sex, and gambling. The intervention appeared to have the largest impacts on hazardous drinking and intimate partner violence, for which there were reductions of 26 percent and 15 percent respectively. Despite these large and consistent behavioral effects, however, the intervention did not produce a statistically significant reduction in the downstream outcome HIV/STI incidence over a 24-month follow-up period. Whether this reflects insufficient power to detect smaller magnitude effects, the need for a longer time horizon to observe biological effects, or the possibility that the behavioral changes we document are not large enough to meaningfully reduce transmission risk, remains an open question.

Several features of our findings are worth emphasizing. First, the close correspondence between the estimated increase in savings and the reduction in spending on risky behaviors — derived from independently elicited survey modules with different recall periods — increases confidence in the validity of the self-reported data on expenditures and on health behavior. Second, the pattern of findings is internally consistent with hazardous drinking operating as an important channel for the effects on sexual behavior and intimate partner violence: it is the largest behavioral effect we detect, and it is a mechanism plausibly linked to both of those outcomes. Because drinking, sexual behavior, and IPV are all measured concurrently as post-treatment outcomes, however, our design does not let us establish this causal ordering formally. Third, the intervention resulted in increased financial well-being, perceived longevity, and future orientation alongside its effects on risk behaviors, suggesting broader welfare gains beyond those captured by the primary outcomes.

Our findings carry broader implications for the design of policies that seek to change health risk behaviors like heavy drinking or transactional sex, to reduce engagement in other risk behaviors like gambling, or even to promote better health outcomes in the future. By providing high-powered financial incentives to save alongside complementary savings interventions like goal setting support and reminders, it may be possible not only to boost financial security but also to shift expenditure patterns and health behaviors in meaningful ways that conventional behavioral interventions have not achieved. For transactional sex specifically, the findings highlight the value of demand-side interventions: while much of the existing research and programmatic effort has focused on women, our results demonstrate the benefit of delivering interventions targeting men's demand for transactional sex. This remains a substantially underexplored avenue in both economics and public health. Future work should also explore ways to expand the feasibility and reach of prize-linked savings approaches and other promising savings technologies, particularly for higher risk populations (e.g. those engaged in gambling or substance use) in which they can help fulfill multiple long-term objectives.

Figure 1: Akiba participant recruitment and follow-up flow diagram

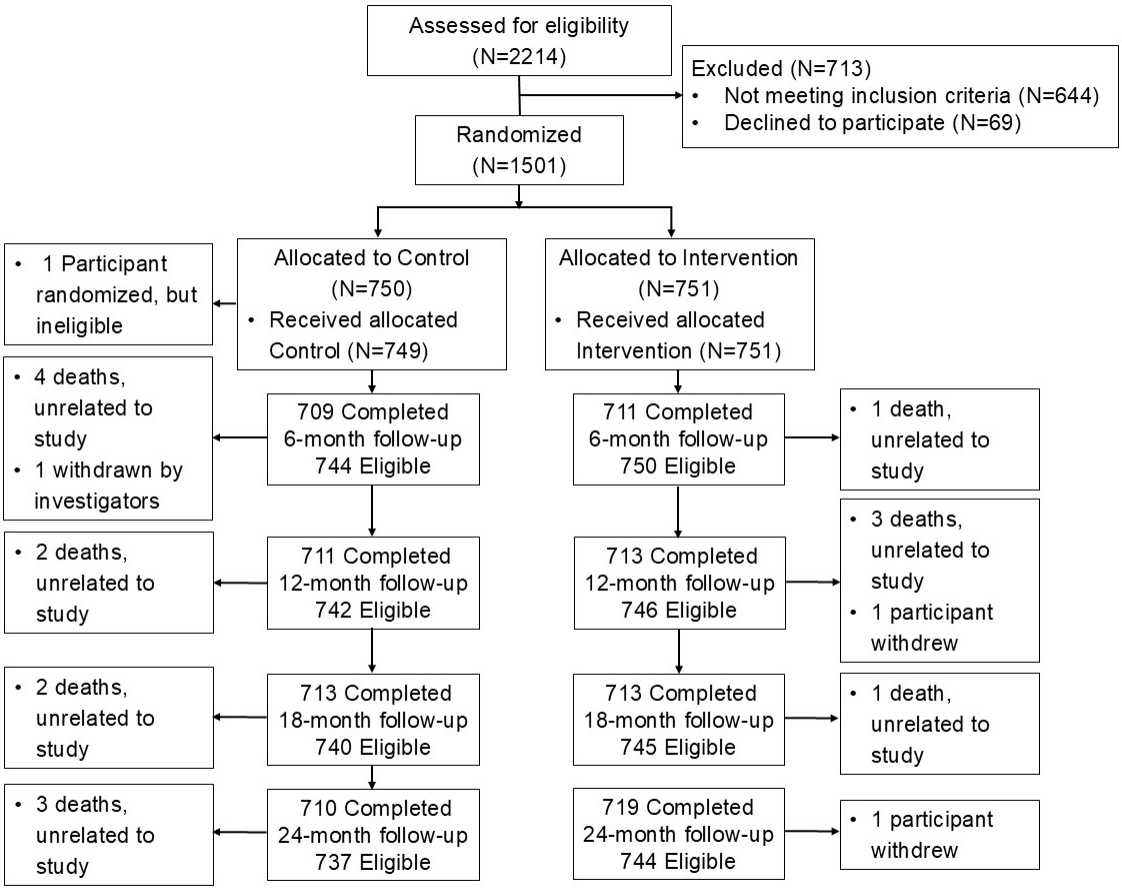
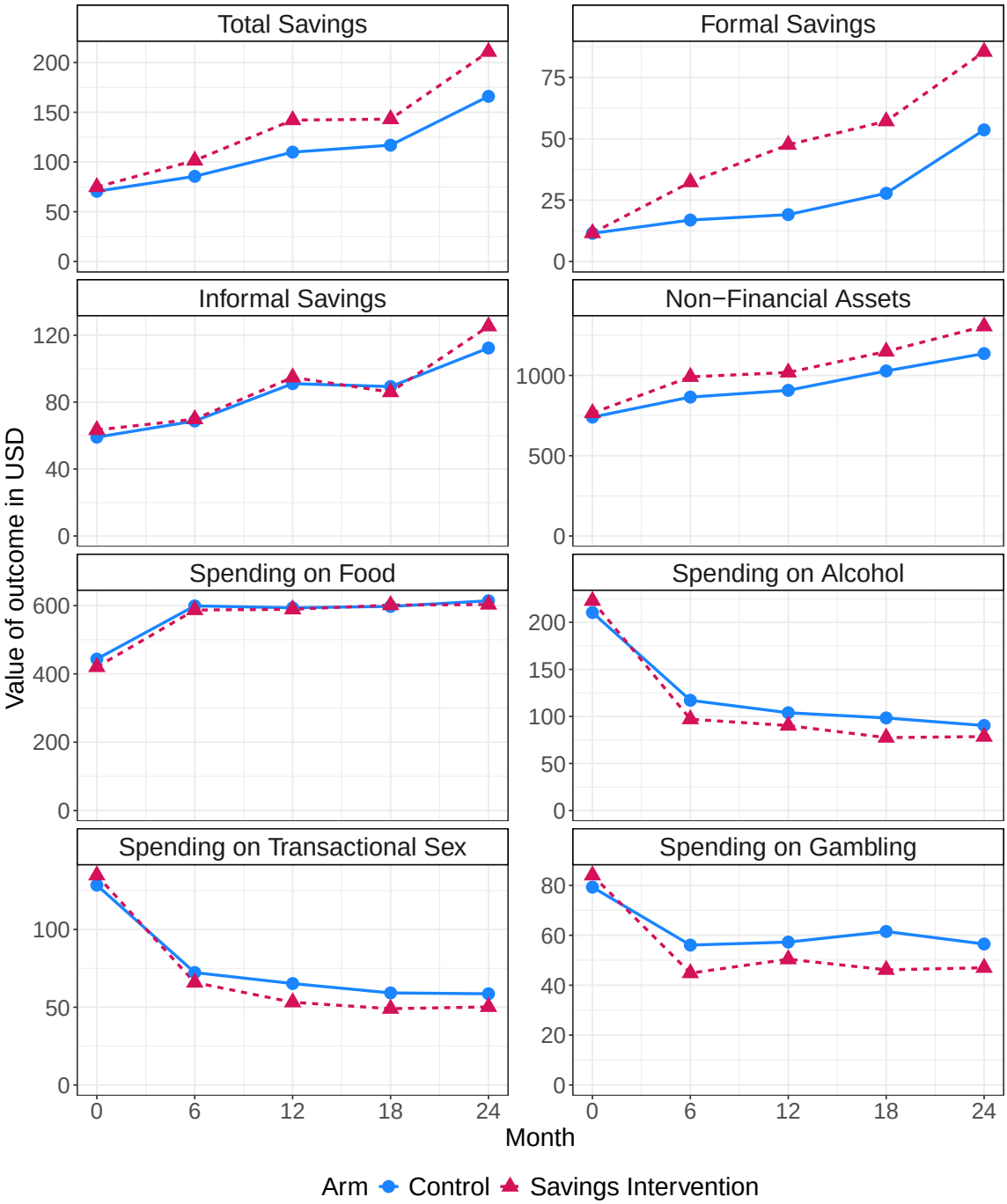


Figure 2: Trends in savings and expenditures over time, by study arm



Note: Each panel shows unadjusted means at baseline and at each 6-month follow-up survey for the two study arms. The lookback period for spending outcomes is 6 months. Values are in 2022 USD. All outcomes originally reported in Kenya Shilling (KSH) are converted to USD at KSH 117.87 = USD 1, the approximate rate at study baseline (2022). Note that y-axis scales differ across panels.

Table 1: Baseline demographic and economic characteristics, overall and by study arm

	Control (N=749)	Intervention (N=751)	Overall (N=1,500)
Age	27.9 (5.2)	27.9 (5.0)	27.9 (5.1)
Married or living as married	466 (62.2%)	467 (62.2%)	933 (62.2%)
Highest education			
Less than primary	112 (15.0%)	102 (13.6%)	214 (14.3%)
Primary	190 (25.4%)	186 (24.8%)	376 (25.1%)
Some secondary	106 (14.2%)	94 (12.5%)	200 (13.3%)
Secondary	260 (34.7%)	278 (37.0%)	538 (35.9%)
Post-secondary	81 (10.8%)	91 (12.1%)	172 (11.5%)
Number of people in household	3.7 (2.0)	3.7 (2.0)	3.7 (2.0)
Number of children	1.5 (1.4)	1.4 (1.3)	1.4 (1.4)
Number of children in school/college/university	1.4 (1.2)	1.3 (1.1)	1.3 (1.2)
Head of household	651 (86.9%)	630 (83.9%)	1,281 (85.4%)
Primary source of income			
Fishing	59 (7.9%)	56 (7.5%)	115 (7.7%)
Bicycle & motorbike taxi driving	389 (51.9%)	371 (49.4%)	760 (50.7%)
Informal skilled labor	217 (29.0%)	236 (31.4%)	453 (30.2%)
Traders/shopworkers	74 (9.9%)	80 (10.7%)	154 (10.3%)
Other	10 (1.3%)	8 (1.1%)	18 (1.2%)
Hours/wk at primary occupation	62.7 (18.1)	62.1 (17.7)	62.4 (17.9)
Have other source(s) of income	152 (20.3%)	156 (20.8%)	308 (20.5%)
Total earnings in last week	33.7 (32.8)	32.1 (28.1)	32.9 (30.5)
Has bank account(s)	188 (25.1%)	185 (24.6%)	373 (24.9%)
Total savings	70.5 (188.0)	74.9 (224.8)	72.7 (207.2)
Total formal savings	11.5 (107.8)	11.6 (128.8)	11.5 (118.8)
Total informal savings	59.1 (144.7)	63.4 (173.3)	61.2 (159.6)
Total non-financial assets	740.1 (706.4)	765.6 (729.9)	752.9 (718.1)

Note: Sample consists of 1,500 men enrolled in the study. Values are means (standard deviations) for continuous variables and counts (percentages) for binary variables. Income and savings are in USD. Total savings represents the sum of formal and informal savings. All outcomes originally reported in Kenya Shilling (KSH) are converted to USD at KSH 117.87 = USD 1, the approximate rate at study baseline (2022).

Table 2: Baseline spending and health behaviors, overall and by study arm

	Control (N=749)	Intervention (N=751)	Overall (N=1,500)
Spending on alcohol in the past 6mo	210.4 (244.7)	222.9 (208.5)	216.6 (227.3)
Spending on transactional sex in the past 6mo	128.5 (132.3)	134.8 (134.5)	131.7 (133.4)
Spending on gambling in the past 6mo	79.3 (149.4)	84.0 (143.5)	81.7 (146.4)
Hazardous alcohol use (AUDIT-C $\geq$4)	389 (51.9%)	414 (55.1%)	803 (53.5%)
Used condom at last sexual encounter	369 (49.3%)	373 (49.7%)	742 (49.5%)
Number of sexual partners in past 3mo	4.2 (2.5)	4.2 (2.2)	4.2 (2.3)
Number of transactional partners in the past 3mo	3.5 (2.4)	3.5 (2.1)	3.5 (2.3)
Number of transactional encounters in past 3mo	10.5 (10.5)	10.6 (10.5)	10.6 (10.5)
Experienced any IPV in the past 12mo	339 (45.3%)	320 (42.7%)	659 (44.0%)
Perpetrated any IPV in the past 12mo	328 (43.8%)	301 (40.1%)	629 (41.9%)

Note: Values are means (standard deviations) for continuous variables and counts (percentages) for binary variables. Spending is reported in USD. All outcomes originally reported in Kenya Shilling (KSH) are converted to USD at KSH 117.87 = USD 1, the approximate rate at study baseline (2022). AUDIT-C refers to the Alcohol Use Disorders Identification Test-Consumption scale. IPV refers to intimate partner violence.

Table 3: Baseline HIV/STI prevalence, overall and by study arm

	Control (N=749)	Intervention (N=751)	Overall (N=1,500)
HIV	74 (9.9%)	69 (9.2%)	143 (9.5%)
HSV-2	301 (40.2%)	280 (37.3%)	581 (38.7%)
Chlamydia trachomatis	109 (14.6%)	106 (14.1%)	215 (14.3%)
Neisseria gonnorhoeae	15 (2.0%)	22 (2.9%)	37 (2.5%)
Composite	389 (51.9%)	367 (48.9%)	756 (50.4%)

Note: Values are counts (percentages). Composite prevalence indicates whether a participant tested positive for one or more of the following, HIV, HSV-2, *Neisseria gonorrhoeae*, or *Chlamydia trachomatis*.

Table 4: Engagement with the Prize-Linked Savings Account

Measure	N (%) or mean (SD)
Participated in financial training & goal setting	737 (98.1%)
Got prize-linked savings account	740 (98.5%)
Ever saved any money in the account	610 (81.2%)
Number of months where additional money was saved	5.1 (4.9)
Ever got a ticket for the lottery (change in balance ≥100 KSH)	548 (73.0%)
Ever won the lottery	402 (53.5%)
Number of times won the lottery	5.6 (4.4)
Total amount each participant won in the lottery	5456 (6686)

Note: Ever used account and ever saved money in account are lower bounds. We observe account balances one time each month. If the month-to-month balance ever changes, we take that as evidence the participant used their account. If the change in the balance is ever 0, we take that as evidence the participant saved money in their account. Number of months where additional money was saved is reported based on the N=740 participants who received their prize-linked savings account. Number of lottery wins and amount of money won are among the N=402 who ever won the lottery.

Table 5: Effects of the savings intervention on savings and investments

	(1) Total Savings	(2) Formal Savings	(3) Informal Savings	(4) Non-Financial Assets	(5) Spending on Education
Savings Intervention	22.31**	19.18**	1.60	91.73**	3.83*
	(5.16)	(2.02)	(3.51)	(23.42)	(1.88)
Observations	5699	5699	5699	5699	5699
Control mean	71.13	11.22	59.88	745.71	48.32

Note: Values are in 2022 USD. Total savings is the sum of formal and informal savings. Non-financial assets include household goods and furniture; agricultural tools and non-agricultural tools; livestock and animals; and motor vehicles, but does not include land. Spending on education is reported over a 6-month recall period. Coefficients for Savings Intervention represent the mean difference in savings and investments for a participant receiving savings intervention versus control, estimated on the full sample including zeros; outcomes are winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6-, 12-, 18-, and 24-month follow-ups. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time points and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. Models for education spending additionally control for number of children in the household in school. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table 6: Effects of the savings intervention on expenditures

	(1) Food	(2) Non-Food	(3) Alcohol	(4) Transactional Sex	(5) Gambling
Savings Intervention	4.91	7.78	-15.30**	-7.72**	-8.73**
	(9.36)	(10.88)	(3.44)	(1.82)	(2.36)
Observations	5699	5699	5699	5699	5699
Control mean	443.79	84.26	212.78	129.30	80.61

Note: Values are in 2022 USD. Coefficients for Savings Intervention represent the mean difference in expenditures for a participant receiving savings intervention versus control, estimated on the full sample including zeros; outcomes are winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6-, 12-, 18-, and 24-month follow-ups. Expenditures in different categories were reported using varying recall periods (e.g., past two weeks for food, past three months for transactional sex) and we converted these to a common 6-month basis. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table 7: Effects of the savings intervention on alcohol use and sexual behavior

	(1) Hazardous drinking	(2) Used condom at last sexual encounter	(3) Engaged in transactional sex in past 3mo	(4) No. of sexual partners	(5) No. of transactional sex partners	(6) No. of transactional sex encounters
Savings Intervention	0.74**	1.03	0.96*	0.92**	0.89**	0.85**
	(0.05)	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)
Observations	5699	5699	5699	5699	5699	5699
Control mean	0.28	0.41	0.78	2.58	1.74	4.33

Note: Coefficients for Savings Intervention (1)-(3) represent relative risks, (4)-(6) represent incidence rate ratios for a participant receiving savings intervention versus control. Standard errors are in parentheses. Participants were hazardous drinkers if they scored ≥ 4 on the AUDIT-C. The lookback window for (2)-(6) is three months. Number of transactional sex encounters was winsorized at the 95th percentile. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table 8: Effects of the savings intervention on intimate partner violence

	(1) Experienced IPV	(2) Perpetrated IPV
Savings Intervention	0.87*	0.85**
	(0.05)	(0.05)
Observations	5688	5688
Control mean	0.26	0.26

Note: Coefficients for Savings Intervention represent relative risks for a participant receiving savings intervention versus control. Standard errors are in parentheses. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. Because study follow-ups occurred every six months, at follow-ups IPV was measured with a six month lookback period. However the baseline measure used a 12 month lookback. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.
To measure experiencing IPV we asked "During the past 6 months, has a female partner done the following when you were not doing the same (or something similar) to her?" with three subsequent yes/no questions addressing psychological, physical, and sexual IPV. To measure IPV perpetration we asked "During the past 6 months, have you done the following to a female partner when she was not doing the same (or something similar) to you?" with three subsequent yes/no questions addressing psychological, physical, and sexual IPV. The question addressing psychological IPV was, "Humiliated [you/her] in front of others, threatened to harm [you/her] or someone [you/she] care about, or insulted [you/her] or made [you/her] feel bad about [yourself/herself]?" The question addressing physical IPV was "Physically hurt [you/her] – e.g. pushed or slapped [you/her], pulled [your/her] hair, twisted [your/her] arm, punched or kicked or tried to choke [you/her], threatened or attacked [you/her] with a weapon (like a knife)" The question addressing sexual IPV was "Forced [you/her] (physically or with threats) to perform a sexual act or sexual intercourse with [her/you] when [you/she] did not want to"

Table 9: Effects of the savings intervention on life satisfaction and measures of future orientation

	(1) Cantril, Life Satisfaction	(2) Chances of living to age 70	(3) Most Future Oriented
Savings Intervention	0.09+	0.15**	1.11+
	(0.05)	(0.06)	(0.06)
Observations	5699	5699	5699
Control mean	4.77	7.75	0.28

Note: Coefficients for Savings Intervention (1)-(2) represent the mean difference for a participant receiving savings intervention versus control on an 11-pt Likert scale, where higher values mean greater life satisfaction and a higher probability of living to age 70. Coefficient (3) represents the relative risk for being in the most future oriented level (relative to the three least future oriented levels) of a four-level ordinal time discounting measure. Standard errors are in parentheses. Control means are averaged over the 6-, 12-, 18-, and 24-month follow-ups. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table 10: Effects of the savings intervention on financial well-being and stress

	(1) Financial well-being	(2) Food insecurity	(3) Cohen's Perceived Stress Scale	(4) Cohen's Helplessness subscale	(5) Cohen's Self-efficacy subscale
Savings Intervention	0.11**	-0.09	-0.25	-0.18	-0.10
	(0.04)	(0.06)	(0.20)	(0.15)	(0.09)
Observations	5699	5699	5699	5699	5699
Control mean	2.96	3.83	21.69	13.07	8.62

Note: Coefficients for Savings Intervention represent mean difference for a participant receiving savings intervention versus control in units of the scale. Standard errors are in parentheses. The financial well-being scale, an 8-question scale adapted from (Fu, 2020), ranges from 1-8 in increments of 0.2 with 8 being the best well-being. The food insecurity scale ranges in integers from 0-9 with 9 being the worst insecurity. Cohen's perceived stress scale ranges in integers from 0-40 with 40 being the worst stress. The Helplessness subscale ranges from 0-24 with 24 being the worst, and the Self-efficacy subscale ranges from 0-16 with 16 being the worst. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + p < 0.1, * p < 0.05, ** p < 0.01.

Table 11: HIV/STI incidence at 12 and 24 months, overall and by study arm

	12-month incidence (N=1,424)			24-month incidence (cumulative) (N=1,425)		
	Control (N=711)	Intervention (N=713)	Overall (N=1,424)	Control (N=712)	Intervention (N=713)	Overall (N=1,425)
HIV	3 (0.5%)	1 (0.2%)	4 (0.3%)	5 (0.8%)	1 (0.2%)	6 (0.5%)
HSV-2	--	--	--	53 (12.6%)	56 (12.7%)	109 (12.7%)
Chlamydia trachomatis	90 (12.7%)	71 (10.0%)	161 (11.3%)	143 (20.1%)	127 (17.8%)	270 (19.0%)
Neisseria gonnorhoeae	8 (1.1%)	15 (2.1%)	23 (1.6%)	20 (2.8%)	25 (3.5%)	45 (3.2%)
Composite	98 (13.8%)	81 (11.4%)	179 (12.6%)	196 (27.5%)	179 (25.1%)	375 (26.3%)

Note: Table reports incidence of HIV and other STIs at 12 and 24 months in the control group, the savings intervention group, and among all participants. Values are N (percent). Composite incidence indicates whether a participant tested positive for HIV, HSV-2, *Neisseria gonorrhoeae* (NG), or *Chlamydia trachomatis* (CT). At baseline, two participants were not treated for CT and one was not treated for NG. 24-month cumulative incidence also includes ad hoc visits N=6 participants made between 12 and 24 months; N=5 were incident with CT and/or NG. Denominators for HIV incidence at 12 months are Comparison N=644, Intervention N=649, and Total N=1,293. Denominators for HIV incidence at 24 months are Comparison N=641, Intervention N=644, and Total N=1,285. Denominators for HSV-2 incidence at 24 months are Comparison N=422, Intervention N=440, and Total N=862. Denominators for *Neisseria gonorrhoeae* at 24 months are Comparison N=709, Intervention N=712, and Total N=1,421.

Table 12: Effects of the savings intervention on composite HIV/STI incidence at 24 months

	(1) Composite Incidence	(2) Best Case Scenario	(3) Worst Case Scenario	(4) OLS model	(5) Incidnce based on Self-Report or Objective
Savings Intervention	0.92	0.77**	1.11	-0.02	0.92
	(0.08)	(0.06)	(0.09)	(0.02)	(0.07)
N	1425	1500	1500	1425	1425

Note: Coefficients in columns (1)-(3) and (5) are relative risks, while column (4) is risk difference. Standard errors are in parentheses. Controls include baseline age, marital status and occupation, as well as the baseline HSV-2 status and baseline HIV status. + p < 0.1, * p < 0.05, ** p < 0.01.

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Table A1: Baseline demographic and economic characteristics, by primary outcome measurement

	Not measured (N=75)	Measured (N=1,425)	p-value
Age	27.3 (5.1)	27.9 (5.1)	0.249
Married or living as married	41 (54.7%)	892 (62.6%)	0.167
Highest education			
Less than primary	10 (13.3%)	204 (14.3%)	0.628
Primary	18 (24.0%)	358 (25.1%)	
Some secondary	14 (18.7%)	186 (13.1%)	
Secondary	27 (36.0%)	511 (35.9%)	
Post-secondary	6 (8.0%)	166 (11.6%)	
Number of people in household	3.1 (1.8)	3.7 (2.0)	0.017
Number of children	1.1 (1.2)	1.5 (1.4)	0.034
Number of children in school/college/university	1.2 (1.0)	1.3 (1.2)	0.359
Head of household	64 (85.3%)	1,217 (85.4%)	0.987
Primary source of income			
Fishing	2 (2.7%)	113 (7.9%)	0.337
Bicycle & motorbike taxi driving	37 (49.3%)	723 (50.7%)	
Informal skilled labor	26 (34.7%)	427 (30.0%)	
Traders/shopworkers	8 (10.7%)	146 (10.2%)	
Other	2 (2.7%)	16 (1.1%)	
Hours/wk at primary occupation	61.1 (16.8)	62.4 (18.0)	0.540
Have other source(s) of income	17 (22.7%)	291 (20.4%)	0.639
Total earnings in last week	31.4 (16.3)	33.0 (31.1)	0.663
Has bank account(s)	17 (22.7%)	356 (25.0%)	0.651
Total savings	55.3 (98.6)	73.6 (211.3)	0.454
Total formal savings	8.7 (60.1)	11.7 (121.1)	0.835
Total informal savings	46.5 (70.0)	62.0 (163.0)	0.413
Total non-financial assets	679.9 (675.6)	756.7 (720.3)	0.367

Note: Values are means (standard deviations) for continuous variables and counts (percentages) for binary variables. P-values for continuous variables from t-tests, for categorical variables from Chi-Sq tests, and for count variables from Wald test associated with coefficient from Poisson regression. Income and savings are in USD. All Kenya Shilling (KSH) values are converted at KSH 117.87 = USD 1, the approximate rate at study baseline (2022).

Table A2: Joint test for choosing between pooled main effects or treatment by time interactions

Secondary Outcome	p-value
Total Savings	0.24
Formal Savings	0.50
Informal Savings	0.20
Non-financial Assets	0.23
Spending on Education	0.23
Spending on Food	0.80
Spending on Non-food	0.35
Spending on Alcohol	0.33
Spending on Transactional Sex	0.48
Spending on Gambling	0.43
Total Spending	0.61
Hazardous Drinking	0.87
Condom Use	0.63
Engagement in Transactional Sex	0.96
Number of Sexual Partners	0.57
Number of Transactional Sex Partners	0.55
Number of Transactional Sex Encounters	0.25
Experiencing IPV	0.55
Perpetrating IPV	0.35
Cantril	0.16
Chance of living to 70	0.26
Time Discounting (ref 0)	0.94
Time Discounting (ref 0,1)	0.80
Time Discounting (ref 0,1,2)	0.77
Financial Wellbeing	0.97
Food Insecurity	0.01
Cohen's Perceived Stress Scale	0.69
Cohen's PSS, Helplessness subscale	0.59
Cohen's PSS, Self-efficacy subscale	0.66

Note: P-values from likelihood-ratio test of the joint null that all treatment-by-time interaction coefficients are zero. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. Outcomes are untransformed.

Table A3: Effects of the savings intervention on various asset categories

	(1) Household Goods	(2) Agricultural Tools	(3) Non-agricultural Tools	(4) Livestock and Animals	(5) Motor Vehicles
Savings Intervention	30.26**	0.06	5.36*	22.03*	29.84**
	(10.04)	(0.31)	(2.41)	(8.76)	(9.76)
Observations	5699	5699	5699	5699	5699
Control mean	468.70	12.67	54.74	193.56	253.06

Note: Values are in 2022 USD. Coefficients for Savings intervention represent mean differences for a participant receiving savings intervention versus control in specific assets, estimated on the full sample including zeros; outcomes are winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6-, 12-, 18-, and 24-month follow-ups. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table A4: Effect of savings intervention on earnings and labor supply

	(1) Weekly Earnings	(2) Weekly Hours Worked
Panel A: Earnings in USD or Hours worked (w99)		
Savings Intervention	-0.83	-0.04
	(0.84)	(0.56)
Observations	5699	5699
Control mean	36.61	64.81
Panel B: Earnings in USD or Hours worked (w95)		
Savings Intervention	-0.61	-0.13
	(0.69)	(0.55)
Observations	5699	5699
Control mean	36.61	64.81

Note: Coefficients on the Savings Intervention in Panel A report mean differences for a participant receiving savings intervention versus control (in 2022 USD) estimated on the full sample including zeros; outcomes are winsorized at the 99th percentile. Coefficients on the Savings Intervention in Panel B report mean differences for a participant receiving savings intervention versus control in hours; outcomes are winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6-, 12-, 18-, and 24-month follow-ups. All models are generalized linear mixed effects models incorporating outcome data from each follow-up time point and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, along with follow-up month and the baseline value of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table A5: Time by treatment impacts on food insecurity

	Savings Intervention
Follow-up	
6 month	-0.168
	(0.095)
12 month	-0.260*
	(0.095)
18 month	-0.020
	(0.095)
24 month	0.095
	(0.094)
N	5699

Note: Coefficients represent impact of the savings intervention at each particular follow-up time point. Standard errors are in parentheses. The model is a generalized linear mixed effects model incorporating outcome data from each follow-up time point, with a time by arm interaction term and participant random effects. Covariates include baseline age, marital status, occupation and HIV status, as well as the baseline measure of the outcome. P-values adjusted via Holm-Bonferroni, + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table A6: Heterogeneous treatment effects on composite HIV/STI incidence, by HIV/STI prevalence and risk preference at baseline

	(1) Prevalent with ≥ 1 HIV/STI	(2) Not prevalent	(3) Medium/High risk preference	(4) Low risk preference
Savings Intervention	0.82	1.04	0.80	0.98
	(0.10)	(0.13)	(0.13)	(0.10)
N	1425	1425	1425	1425

Note: Coefficients on the Savings Intervention are relative risks. Standard errors are in parentheses. Covariates include baseline age, marital status and occupation, as well as the baseline HSV-2 status and baseline HIV status. P-values for joint test of Savings Intervention and subgroup are as follows: baseline prevalence, p=0.19; risk preference, p=28. + p < 0.1, * p < 0.05, ** p < 0.01.

Table A7: Heterogeneous treatment effects on composite HIV/STI incidence, by age, marital status, and assets at baseline

	(1) Age $\leq$ 27	(2) Age $>$ 27	(3) Married	(4) Not married	(5) Below median assets	(6) Above median assets
Savings Intervention	0.92	0.93	0.96	0.87	0.93	0.92
	(0.11)	(0.13)	(0.11)	(0.12)	(0.12)	(0.11)
N	1425	1425	1425	1425	1425	1425

Note: Coefficients on the Savings Intervention are relative risks. Standard errors are in parentheses. Covariates include baseline age, marital status and occupation, as well as the baseline HSV-2 status and baseline HIV status. P-values for joint test of Savings Intervention and subgroup are as follows: age, p=0.98; married, p=0.58; assets, p=0.93 + p < 0.1, * p < 0.05, ** p < 0.01.

Table A8: Robustness of treatment effects on savings and investments to winsorization threshold and pooled OLS model

	(1) Total Savings	(2) Formal Savings	(3) Informal Savings	(4) Non-Financial Assets	(5) Spending on Education
Panel A: ANCOVA with random effects, winsorized at 99th percentile					
Savings Intervention	29.19**	24.59**	2.08	108.31**	4.67*
	(7.34)	(3.74)	(4.63)	(27.11)	(2.34)
Observations	5699	5699	5699	5699	5699
Control mean	71.13	11.22	59.88	745.71	48.32
Panel B: ANCOVA with random effects, no windsorizing					
Savings Intervention	27.44**	25.62**	2.45	117.51**	5.08*
	(8.84)	(5.69)	(5.36)	(31.66)	(2.55)
Observations	5699	5699	5699	5699	5699
Control mean	71.13	11.22	59.88	745.71	48.32
Panel C: Pooled OLS, winsorized at 95th percentile					
Savings Intervention	22.95**	19.50**	1.83	95.14**	3.96*
	(5.20)	(2.04)	(3.51)	(23.37)	(1.87)
Observations	5699	5699	5699	5699	5699
Control mean	71.13	11.22	59.88	745.71	48.32

Note: Values in 2022 USD. Coefficients on the Savings Intervention in represent mean differences in savings and investments for a participant randomized to savings intervention versus control. Coefficients in Panel A are winsorized at the 99th percentile and in Panel B are not winsorized. Panel A and Panel B report results from ANCOVA models with random effects. Panel C reports effects from pooled OLS models, with outcomes winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6, 12, 18, and 24 month follow-ups. Covariates include baseline age, marital status, occupation and HIV status, as well as follow-up month and the baseline measure of the outcome. Models for spending on education additionally control for number of children in the household in school. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table A9: Robustness of treatment effects on expenditures to winsorization threshold and pooled OLS model

	(1) Food	(2) Non-Food	(3) Alcohol	(4) Transactional Sex	(5) Gambling
Panel A: ANCOVA with random effects, winsorized at 99th percentile					
Savings Intervention	3.60	7.82	-16.69**	-9.25**	-10.61**
	(10.32)	(11.93)	(3.88)	(2.15)	(2.89)
Observations	5699	5699	5699	5699	5699
Control mean	443.79	84.26	212.78	129.30	80.61
Panel B: ANCOVA with random effects, no windsorizing					
Savings Intervention	3.02	3.60	-17.56**	-9.83**	-11.11**
	(10.80)	(12.65)	(4.07)	(2.29)	(3.21)
Observations	5699	5699	5699	5699	5699
Control mean	443.79	84.26	212.78	129.30	80.61
Panel C: Pooled OLS, winsorized at 95th percentile					
Savings Intervention	6.16	8.28	-14.98**	-7.53**	-8.76**
	(9.40)	(10.90)	(3.52)	(1.83)	(2.38)
Observations	5699	5699	5699	5699	5699
Control mean	443.79	84.26	212.78	129.30	80.61

Note: Values in 2022 USD. Coefficients for the Savings Intervention in represent mean differences in expenditures for a participant randomized to savings intervention versus control. Coefficients in Panel A are winsorized at the 99th percentile and in Panel B are not winsorized. Panel A and Panel B report results from ANCOVA models with random effects. Panel C reports effects from pooled OLS models, with outcomes winsorized at the 95th percentile. Standard errors are in parentheses. Control means are averaged over the 6, 12, 18, and 24 month follow-ups. Expenditures in different categories were reported using varying lookback windows (e.g. past two weeks for food, past three months for transactional sex), which were then converted to 6-month spending. Covariates include baseline age, marital status, occupation and HIV status, as well as follow-up month and the baseline measure of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Table A10: Health and Sexual Behavior and IPV, Pooled OLS and Linear probability model estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Hazardous drinking	Engaged in transactional sex in past 3mo	No. of sexual partners	No. of transactional sex partners	No. of transactional sex encounters	Experienced IPV	Perpetrated IPV
Panel A: Pooled Poisson							
Savings Intervention	0.75**	0.96*	0.91**	0.89**	0.87**	0.87*	0.85**
	(0.05)	(0.02)	(0.02)	(0.03)	(0.03)	(0.05)	(0.05)
Observations	5699	5699	5699	5699	5699	5688	5688
Control mean	0.28	0.78	2.58	1.74	4.33	0.26	0.26
Panel B: Linear Probability Model							
Savings Intervention	-0.07**	-0.04*				-0.03*	-0.04**
	(0.02)	(0.02)				(0.01)	(0.01)
Observations	5699	5699				5688	5688
Control mean	0.28	0.78				0.26	0.26

Note: Coefficients for the Savings Intervention in Panel A, columns (1)-(2) and (6)-(7) represent relative risks for a participant randomized to savings intervention versus control, while columns (3)-(5) represent incidence rate ratios. In Panel C, coefficients represent risk differences. Standard errors are in parentheses. Participants were hazardous drinkers if they scored ≥ 4 on the AUDIT-C. The lookback window for columns (2)-(5) is three months. Because study follow-ups occurred every six months, at follow-ups IPV was measured with a six month lookback period. However the baseline measure used a 12 month lookback. Covariates include baseline age, marital status, occupation and HIV status, as well as follow-up month and the baseline measure of the outcome. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.