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The Impact of Financial Education for Youth in Ghana

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SUMMARY

Governments and non-governmental organizations promote school-based financial literacy programs as means to instill financial behaviors that can persist through adulthood. We conduct a randomized trial of two financial literacy education programs in government-run Ghanaian primary and junior high schools. The first integrated both financial and social education, while the second included only financial education. Our study finds that after nine months, both programs had positive impacts on self-reported savings at school relative to the control group, but there were no statistically significant increases in aggregate savings nor in hypothesized mechanisms such as attitudes, preferences, or knowledge. The financial education-only treatment led to a weakly statistically significant increase in child labor relative to the control group, although the difference in impact between the two treatment groups was not statistically significant. The lack of short-term effects of these programs on financial behaviors and attitudes indicate that alternative program designs should be evaluated to understand whether and how these outcomes can be influenced among students in this age group.

1. Introduction

Governments and donors often support policies to promote financial literacy with the aim of improving households' financial decisions. Financial literacy is defined as one's ability to understand financial concepts, plan one's finances, and understand financial services and products. While financial literacy is correlated with more prudent financial decisions and the use of formal savings and insurance products (Xu & Zia, 2012), this correlation does not imply that teaching financial literacy will lead to more prudent financial behavior. Perhaps as a result of a presumed causal relationship, a multitude of financial literacy programs have emerged over the past several decades spanning a variety of content and delivery mechanisms.

Many of these programs target youth. Even though children are under the financial umbrella of their parents, the hypothesis is simple: teaching financial literacy to children rather than adults may more effectively shape long-term behaviors than teaching such skills later in life. Although there are a number of studies of financial literacy training for adults, there is limited evidence that such training affects financial behavior, such as increased savings (Fernandes, Lynch, & Netemeyer, 2014; Karlan, Ratan, & Zinman, 2014). This may be because some habits that shape financial decisions are hard to change for adults. Moreover, it is hard to reach adults, and many programs are plagued with low take up rates. Children, on the other hand, are easier to reach through schools, and there is evidence that financial socialization by parents during childhood (e.g., teaching children to save) positively affects financial behavior later in life (Bucciol & Veronesi, 2014; Grohmann, Kouwenberg, & Menkhoff, 2015). As children in middle and high schools have limited exposure to money compared with adults, the short-run effects of financial literacy programs on total savings would likely be modest. If, however, such programs can change attitudes toward financial decision making that last into adulthood, they offer a potentially cost-effective way to achieve long-lasting impacts on financial decision making.

There is, however, a potential downside of introducing children to the world of finance too early: Financial inclusion programs may lead children to prioritize income-generating activities at the expense of schooling (James-Wilson et al., 2008). This may occur, for example, when programs promote entrepreneurship among children (Canadian International Development Agency, 2007). Several studies have found a negative effect of early socialization with the world of work and money with financial behavior later in life (Grohmann et al., 2015; Webley & Nyhus, 2013). This concern has led some youth financial education programs to also include

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social values and other such material in their curriculum, to mitigate unintended negative consequences (UNICEF, 2012).

Despite this potential tradeoff, financial literacy programs for children are common. For example, the Banking on Our Future program in South Africa promotes financial literacy, entrepreneurship, and youth empowerment through school programs (Operation HOPE, 2016). In Peru, the Financial Education Program for Secondary Students focuses on training teachers to disseminate knowledge of financial services to their students who are subsequently expected to transmit that knowledge to their families at home (OECD International Gateway for Financial Education, 2013). In Somalia, financial literacy programs targeting youth rely on mass media, soap opera broadcasts, and mobile phones to teach children about saving and other aspects of finance (Xu & Zia, 2012).

Although there is significant policy interest in youth financial education, little is known about its impact, particularly in developing countries, or about effective approaches for mitigating the potential consequence of reduced school attendance. We address this knowledge gap by testing the impact of two school-based financial literacy programs in Ghana. The first program followed a curriculum developed by Aflatoun. Aflatoun is a large, international non-governmental organization (NGO) that has developed school-based curricula for financial literacy training and provides technical assistance to local partners, usually NGOs or ministries of education, to implement these curricula.[1] As of 2015, its program had been implemented in over 100 countries in more than 40,000 schools and centers, reaching 4.1 million children. The program is either integrated into the regular curriculum or conducted as an after-school activity and includes financial education, social education, and a school savings club.[2] The social education component focuses on personal exploration and children's rights and responsibilities, while also highlighting the pitfalls of youth labor, such as forgoing school for work and the risk of dangerous working conditions. Key outcomes in Aflatoun's theory of change include increased savings (primarily from reductions in expenditures rather than increases in labor supply), more favorable attitudes toward savings, and increased financial literacy.

We compare the impact of Aflatoun's program against a second program, the Honest Money Box (HMB), which was designed for this evaluation and is directly modeled after the financial components of Aflatoun's program, while omitting the social components. HMB thus focused strictly on improving financial skills and savings behavior. This treatment design allows us to evaluate the marginal benefits of the social component of the Aflatoun program when added to the financial literacy component.

We conducted the study during the 2010–11 school year in 135 primary and junior high schools in southern and eastern Ghana. Our study focused on students in grades 5 and 7 who were, on average, 13 years old. Schools were randomly assigned to receive either the full Aflatoun program (45 schools), the Honest Money Box program (45 schools), or to a control group (45 schools). We measured a variety of outcomes, including financial decision-making, support for savings at home, labor, risk and time preferences, financial literacy, consumption, confidence, and academic performance.

Membership data suggest that around 20% of the children in schools joined the savings clubs of the Aflatoun and HMB program. Unfortunately, these membership data are only available for a subset of schools. Our results are intent-to-treat estimates, which do not rely on club membership data.

We find positive and statistically significant impacts on savings held at school but no impact on the percentage of children who save nor on the total amount saved. This suggests that the programs led students to shift existing savings into school. We also find no evidence for impacts on the secondary outcomes of savings attitudes, support for savings at home, risk aversion, time preference, financial literacy, expenditures, confidence, or academic performance.

Although we find no evidence for impacts on savings, we do find that the HMB program, but not the Aflatoun program, led youth to work more, although the difference between the two estimates is not statistically significant. School attendance did not change, which suggests a possible shift away from leisure or home production instead; however, we do not have direct evidence of a reduction in these alternative activities.

Our results have several implications. From a policy perspective, the main lesson is that while there are signs of some process changes occurring that are part of the theory of change, the intended systematic changes did not materialize. Children did not save more or change other attitudes or behaviors which could be associated with improved financial decision making during adulthood. These results are important because the programs evaluated utilize a common method of scaling up financial education for youth: As described above, the Aflatoun program has reached over 40,000 schools, and many governments and donors continue to promote such curricula. As such, the treatment effect on the full set of targeted students that we estimate are important policy parameters to understand. We speculate that the lack of impacts on savings could be a result of the program's reliance on voluntary enrollment in after-school groups. Further research is necessary to understand whether interventions with higher take-up (for example, ones that integrate the curriculum into regular teaching practices) could have impacts on the target population of students.

The marginally significant increase in paid work as a result of the HMB intervention, which did not include Aflatoun's social component, lends support to those who argue that financial and social education must be combined to mitigate potential impacts on child labor. However, because the increases in child labor did not displace schooling and because we cannot statistically distinguish impacts between the Aflatoun and HMB treatments, these results should be taken with caution.

From a methodological perspective, our limited attendance data highlight the importance of collecting monitoring and management data as part of impact evaluations (see Gugerty, Karlan, & Welsh, 2016). In retrospect, additional monitoring data would have helped to provide a richer understanding of the programs' functioning and the mechanisms underlying the observed results, both positive and null.

Studies on the effects of financial literacy programs on primary and middle school children—the groups targeted in our study—are especially scarce. Several non-experimental studies have found positive impacts of financial literacy training in primary and middle schools using comparisons of participants with non-participants, or using before-after comparisons of participants (Hagedorn, Schug, & Suiter, 2012; Harter & Harter, 2007; Sherraden, Johnson, Guo, & Elliott, 2010). Among experimental evaluations, Alan and Ertac (2014) report on a randomized controlled trial in Turkey in which elementary schoolchildren were provided a program that encouraged forward-looking behavior. The program leads to an increase in patience and decreases in reported behavioral problems. In the United States, Hinojosa et al. (2009) use a randomized controlled trial to evaluate a financial literacy program for children in grades 4–10 and find positive impacts on mathematics scores and financial knowledge, although the analysis does not account for substantial attrition and non-compliance in the sample.

[1] See http://aflatoun.org/.

[2] Providing access to a safe place to save, through bank accounts or through providing a safety box to groups has been shown to increase savings in various programs focusing on adults in developing countries (Dupas & Robinson, 2013; Jamison, Karlan, & Zinman, 2014; Prina, 2015).

A somewhat larger literature evaluates the impact of financial literacy education at the secondary level. In non-experimental work in the US, Cole, Paulson, and Shastry (2015) use variation in state-mandated programs to identify the effects of financial literacy education in high school. They find no evidence that exposure to financial literacy education affects later savings. A number of non-experimental studies have found mixed evidence on the effects of financial literacy training on high school students (Carlin & Robinson, 2010; Mandell & Klein, 2009; Walstad, Rebeck, & MacDonald, 2010). Using a randomized-controlled-trial, Bruhn, de Souza Leao, Legovini, Marchetti, and Zia (2016) study a financial education program in Brazilian public high schools. The authors find positive effects on financial proficiency, saving for purchases, and financial budgeting in data collected four and 16 months after the start of program implementation.

Most closely related to our study are two evaluations of primary-school-based savings programs in Uganda. Karlan and Linden (2014) evaluate a savings club program that particularly encouraged saving for school expenses. They find, like we do, that students moved savings to the school savings accounts and the program had no impact on student attitudes (time preference, aspirations, savings attitudes). Parental outreach in combination with the savings program had positive effects on students' test scores, and, while insignificant, the point estimates suggest that it helped to avoid an increase in child labor. Supanantaroek, Lensink, and Hansen (2016) conduct a randomized evaluation of the Aflatoun program in Uganda. The program was integrated into the school curriculum but did not include a savings club. Somewhat in contrast with our findings, the authors find that the program led to improved savings attitudes (awareness of money, preference for saving vs. spending) and suggestive evidence that it led to increased overall savings. However, as this study collected a somewhat limited set of outcome variables, it is difficult to compare our results in greater depth.

In relation to the available literature, our paper contributes to the limited body of rigorous evidence on the effectiveness of youth financial literacy training, and particularly training that targets primary and middle school students. Our study is relatively unique in evaluating a standard implementation of a financial and social education model that has been scaled to millions of children around the world. We also compare this model with an alternative that isolates the savings component, whereas much of the literature evaluates a single program at a time.

2. Program description and evaluation design

(a). Program description

The Aflatoun curriculum was developed by the international NGO and has been adapted and implemented in over 100 countries. Aflatoun operates as a (non-profit) franchise. It has developed a youth financial and social education curriculum and supports education ministries and NGOs to adjust it to local contexts. The program is then implemented by these local organizations. The model involves training school teachers to implement the curriculum with students either during or outside normal school hours. The Ghana program was implemented as an after-school model, supported by local NGOs.

The HMB curriculum was adapted from Aflatoun by Ask Mama Development Organization and Innovations for Poverty Actions (IPA) staff, and derived its name from the money box used to safeguard the savings deposits of club members. It contained the financial but not the social components of the Aflatoun program.

The HMB curriculum consisted of eight structured one-hour sessions conducted by teachers who acted as facilitators for school clubs set up as part of the program. The clubs met weekly for one hour after school. The content and objectives of the sessions are provided in Table 1. Sessions included discussions on the importance of money and how money is used for savings and spending, the benefits of savings, methods of saving, planning and budgeting, and small-scale entrepreneurship.[3]

The Aflatoun program included encouragement of savings but integrated it with education on personal exploration and children's rights and responsibilities.[4] Table 2 provides details on this additional content (beyond the savings content listed in Table 1). For example, the Aflatoun curriculum taught children their rights as described in article 32 of the United Nations Convention on the Rights of the Child: "Children (under the age of 16 years) are entitled to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with their education or to be harmful to their health or physical, mental, spiritual, moral or social development." The curriculum also included several stories about children who were forced to work instead of attending school. These stories emphasized the difficult and dangerous working conditions experienced by children and encouraged students to see child labor as a violation of their basic rights. In part because the Aflatoun curriculum contained lessons dedicated these social topics, it was designed to take more time to cover than the HMB curriculum (around 24 h in total).

While the goal of the HMB program's design was to include only the savings components of Aflatoun, the integrated nature of the Aflatoun program's savings and social components led to slightly different presentation of savings concepts. For example, whereas the HMB curriculum focused on conveying the importance and process of savings, the Aflatoun curriculum had a stronger focus on changing behavior by making children feel good about saving. For instance, both programs had a ledger book to record savings and withdrawals, but the Aflatoun program included a worksheet in which children could collect stars for "greeting people at home after waking up," "brushing teeth and washing face," as well as "putting money in the savings box at school." Saving regularly was thus equated with behavior parents generally encourage for their children.

Both programs provided the schools with a metal padlocked savings box which was used to safeguard children's deposits. Each deposit and withdrawal was recorded by the teacher or a student club officer in the club ledger book and in the member's passbook. The proper use of these tools was monitored by the implementing organizations throughout the study period. Because both programs provided these savings boxes and met weekly to use them, we cannot disentangle the impacts of provision of boxes, or weekly savings club meetings with no curriculum, from the impacts of the Aflatoun and HMB curricula. We highlight this as an important area for future research.

After clubs had completed the Aflatoun or HMB curriculum, they continued to operate as savings clubs where children met weekly to deposit or withdraw their savings. Thus, while the Aflatoun curriculum was longer than the HMB curriculum, both programs continued to have meetings until the end of the intervention in July 2011. In addition, the HMB program's 8 sessions were often split across weeks, so that the curriculum took longer than 8 weeks to cover.

[3] In both the HMB and Aflatoun programs, the content was designed largely around discussions of each topic rather than quantitative exercises, such as computing interest. The goal of these sessions was to develop basic understanding and habits, rather than to teach the students more complex financial processes.

[4] The curriculum was taught at different levels for primary and junior secondary students but covered the same set of core concepts. In program schools that contained both primary and junior secondary grades, children were typically divided into separate clubs by age.

Table 1
Honest money box curriculum

Core elements	Objectives
Form Club	Explain the function and operation of the money box club State rules for club functioning Identify leaders, elect President, Treasurer, and Secretary and assign roles and responsibilities
What is money?	Explain money as a medium of exchange Identify honest ways of making money
Saving and Spending	Understand: The purpose of saving How to save Types of saving, including non-monetary resources Responsible spending behavior
The money box	Understand: Features of the money box, procedures for depositing and withdrawing How to record transactions
Planning and budgeting	Understand financial goals and develop own financial goals Create a budget plan
Entrepreneurship	Understand: Business organization Types of businesses Skills necessary for running a business

Table 2
Additional elements of aflatoun curriculum

Core elements	Objectives
Character and Motto	Orient children to the Aflatoun value framework, and enhance their creativity, problem-solving, and reasoning skills Encourage children to learn more about Ghana and its unique cultural heritage Facilitate an understanding among children that they can contribute to their environment, by teaching about the contributions made by different people and things
Personal Understanding and Exploration	Enable children's positive self-image through self-awareness and appreciation, and highlight the different factors which contribute toward building self-image Provide children an opportunity to assess themselves and then discuss the experience of being their own judge Allow children to express their likes and dislikes in a non-threatening environment, and facilitate an understanding of the differences and similarities among people
Rights and Responsibilities	Teach children a sense of responsibility for their actions toward everything and everyone in their environment, and an understanding that everything and everyone needs to be treated with respect Orient children to their rights as described in the United Nations Convention on the Rights of the Child Create awareness of the various marginalized groups who do not get their rights in Ghana and around the world, and develop a sense of responsibility toward those whose rights are violated Sensitize children to the issues of working children and provide children an opportunity to interact with working children, thereby facilitating a process of dispelling myths and stereotypes Sensitize children to issues related to gender and create awareness on the different forms of gender discrimination Identify social projects and campaigns that could improve children's communities

To the best of our knowledge, before the intervention, none of the schools had after-school programs related to savings. While no Aflatoun and HMB programs were set up in the control schools during the program period, we do not have specific data on establishment of other savings programs during this time. However, our endline data indicate very little savings held at school in control schools, suggesting limited savings club activity. Only 2.8% of students in the control schools reported savings at school, and in only one out of 35 control schools did more than 10% of surveyed students report doing so.[5]

Both programs in this study were implemented by the same Ghanaian organizations.[6] The local organizations and international NGOs also coordinated with the Ghana Education Service, a government agency.

The interventions began in October 2010 and lasted through the close of the school year, in July 2011. In workshops on club curriculum and protocols, IPA and local organizations trained the teachers selected by their schools to lead an Aflatoun or HMB club.[7] They also monitored program implementation throughout the study period by visiting schools and interviewing teachers and students about the progress and activities of the club. The timing of implementation varied across schools. Out of the 83 Aflatoun and HMB schools for which monitoring data are available, the majority established clubs in December 2010 and January 2011; by the end of February 2011, 72 of these schools (87%) had established a club.

(b). Evaluation design and participation

(i). Experimental design and Econometric specifications

Three areas in Ghana were chosen for the study based on the location of implementing partners: Greater Accra East, Sekondi Takoradi Metropolitan Area (STMA) in the coastal area of western Ghana, and the eastern districts of Nkwanta North and Nkwanta South near the border with Togo. These areas vary considerably in terms of geographic location, urbanization, poverty, and ethnic composition. Figure 1 displays the location of the study districts. The Greater Accra East and STMA districts are peri-urban areas that are less poor than Ghana as a whole. Using Ghana's national poverty line, the headcount ratios of Greater Accra East and SMTA are 4.8% and 12.9%, respectively, compared to Ghana's overall headcount ratio of 23.6%. Nkwanta, by contrast, is primarily rural and poorer, with a headcount ratio of 38.1% (Ghana Statistical Service, 2015). Each area has a different composition of ethnic groups and local languages, although English is the primary medium of instruction in all schools.[8]

District officials and implementing partners initially provided a list of 200 schools, including primary (grades 1–6), junior high (grades 7 and 8), and "basic" (combined primary and junior secondary) schools. In order to limit spillovers, two exclusion criteria were applied: first, we excluded "shift" schools that host two different groups of students in the morning and afternoon.[9] Second,

[5] By contrast, in Aflatoun and HMB schools, more than 10% of those surveyed reported saving in school in 38 out of 90 schools.

[6] The contracting partner was the Netherlands Development Organization who in turn partnered with Women and Development Project, the Ask Mama Development Organization, Berea Social Foundation, and Support for Community Mobilization Projects and Programs.

[7] Teachers had no explicit incentives to participate in the program beyond certificates of participation and souvenir t-shirts. Based on observations by field staff, a primary motivation for participation was career value from the training and experience of participating in the program.

[8] In our data, the largest ethnic groups in Greater Accra East, STMA, and Nkwanta are Ewe, Fante, and Konkomba, respectively, and each group speaks a separate language. There is, however, considerable diversity in each area, particularly in Greater Accra East.

[9] Shift schools were also excluded from the study because of concerns that the programs would be difficult to operate in these schools outside of school hours.

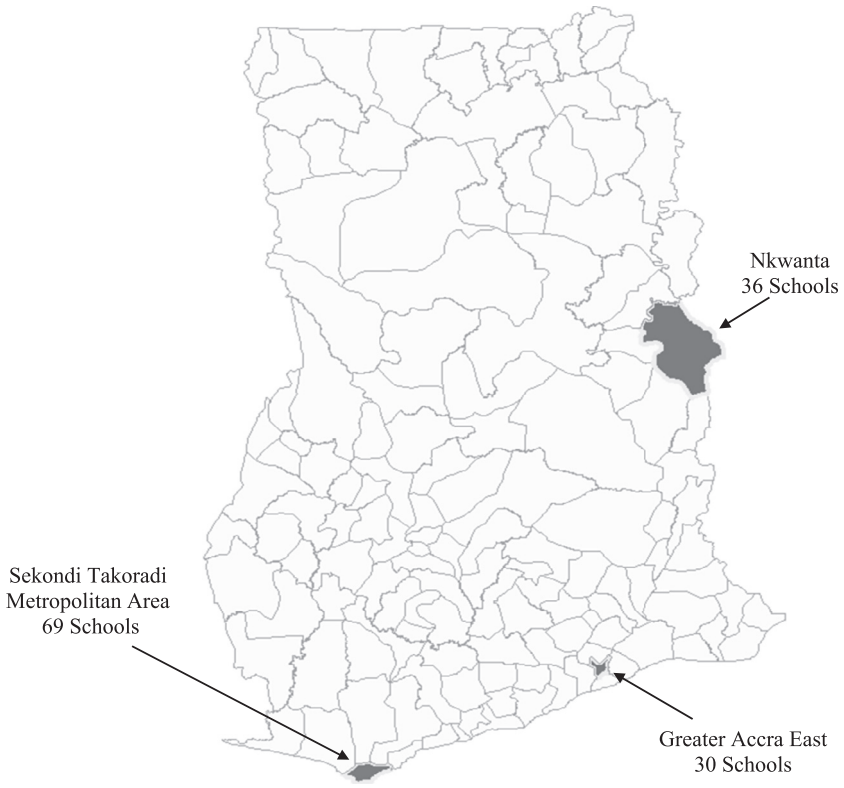

Figure 1. Map of program districts.

when multiple schools were clustered together within the same compound, we randomly selected only one of those schools to join the pool of potential study schools. From the resulting list of 165 schools, 135 were randomly selected to be in the program: 30 in Greater Accra East, 69 in STMA, and 36 in Nkwanta.

We exploited the intended phase-in of the Aflatoun program to employ an experimental design.[10] Within each district, sample schools were sorted by average within-grade class size and then grouped into triplets. Within these triplets, schools were randomly assigned to the Aflatoun intervention, the HMB intervention, or a control group.[11] There were a total of 45 strata in the randomization. Baseline surveys were conducted in September 2010, and endline surveys nine months later in June and July 2011.[12] Both programs were still being implemented at the time of the endline surveys; the impact estimates we present are thus the short-term impacts of these programs.

Our primary data consist of surveys of students in the study schools. We sampled an average of 40 students in each school.[13] Although children of all grades were eligible to participate in the after-school clubs, our surveys targeted children in grades 5 and 7 because these children would presumably have more access to money and familiarity with finances than their younger peers. Additionally, these students would remain in the same schools the following school year, and would therefore be easier to locate if a follow-up occurred.[14] In primary and junior high schools, 40 students were randomly selected from grades 5 and 7, respectively. In basic (combined) schools, 20 students were randomly selected from grade 5, and 20 were selected from grade 7. When schools contained fewer than the target number of students in a given grade, additional students were randomly selected from adjacent grades. The final sample contains 45% from grade 5, 46% from grade 7, and 9% from adjacent grades.[15] Surveys were conducted in school by enumerators trained by staff of Innovations for Poverty Action (IPA). Participation in the surveys was voluntary, and there were no incentives to participate.

The outcomes we examine are based on the main outcomes in the theory of change of the Aflatoun and HMB interventions as well as on hypothesized mechanisms or secondary outcomes the programs may have encouraged. We briefly outline these outcomes below and provide additional detail in Section 3.

Because savings was a key component of both programs, we include a number of variables related to both savings behaviors and attitudes. Within these outcomes, the key variables of interest are whether the child saves and the amount saved. In addition, we include measures of savings attitudes that capture the importance the child attaches to savings, as well as measures of perceived support for savings at home. We next include a set of variables that indicate the children's engagement in paid work, as a key feature of the evaluation design was to understand whether the Aflatoun program's social components led to less child labor relative to the HMB program.

Beyond savings and work outcomes, we measured several intermediate and secondary outcomes. First, we measured risk and time preferences through hypothetical choices and student self-reports

[10] The intended phase-in did not materialize. As a result of budget issues, the program was not extended to control group schools.

[11] The randomized assignment was implemented correctly in all but two schools: one school assigned to the Aflatoun treatment implemented the HMB treatment, and one school assigned to the HMB treatment implemented the Aflatoun treatment. The analysis is based on the original randomized assignment.

[12] Surveys are available online at http://poverty-action.org/project/0465.

[13] In 118 schools, we surveyed exactly 40 students. Due to surveyor error or logistical constraints, we surveyed between 22 and 39 students in ten schools, and between 41 and 47 students in seven schools.

[14] Students often change schools after grade 6, hence our reason for excluding them from the survey sample.

[15] The main results are robust to restricting the sample to only 5th and 7th graders.

to examine whether the planning components of the programs discouraged risk-taking and increased patience, or whether risk-taking could have increased through the programs' encouragement of entrepreneurship. Second, we include outcomes indicating financial literacy and expenditures that relate to the money, planning, and budgeting components of the Aflatoun and HMB programs. Third, we include a set of variables relating to child self-esteem, as this was a domain particularly targeted by the Aflatoun program's social component.[16] Finally, we include several academic outcomes to examine whether the programs encouraged more educational investment, or whether program or work activities came at the cost of worse schooling outcomes.

Our outcomes are based on student self-reports, which raises the concern that our impact estimates would be biased if these self-reports were biased differentially across treatment and control groups. In our case, of particular concern are experimenter demand effects, in which students in the Aflatoun or HMB programs provide biased responses consistent with the goals of the programs. However, our results do not display a systematic pattern of such effects. We discuss this issue further in Section 3.h.

To deal with multiple hypothesis issues, we focus on two key savings outcomes (whether the student saves and total amount saved) and group the other outcomes into 10 indices. These indices include savings attitudes, home savings support, work, risk preference, time preference, financial literacy, expenditures on self, expenditures on temptation goods, confidence, and academic performance. Across these 12 main outcomes, we additionally present false-discovery-rate (FDR) adjusted q-values using the procedure developed by Benjamini and Hochberg (1995). When discussing impacts on individual variables in each index, we additionally present FDR q-values across the components of the index.

To construct each of the 10 outcome indices we follow the method employed by Kling, Liebman, and Katz (2007). The summary index for child i over the set of N_d outcome variables in group d is defined as the mean of the z-scores of the non-missing outcome variables in that group.[17] Each variable is scaled such that it contributes positively to the header or overall concept used for the index.

$$\tilde{y}_{id} = \frac{1}{N_d}\sum_{d=1}^{N_d}\frac{y_{id}-\bar{y}_d}{\sigma_d} \quad (1)$$

where $\bar{y}_d$ and σ_d are the mean and standard deviations of variable y_{id} estimated from the control group schools. The resulting index $\tilde{y}_{id}$ is then normalized by subtracting the mean and dividing by the standard deviation from the control group. The final summary index thus provides an equal weight to each component variable and has a mean of zero and a standard deviation of one in the control group.

To obtain the impact estimates we employ the regression model

$$y_{ij,endline} = \alpha + \beta_1(Aflatoun_j) + \beta_2(HMB_j) + \gamma y_{ij,baseline} + \delta X_j + \varepsilon_{ij} \quad (2)$$

where y_{ij} denotes the outcome of student i in school j, $Aflatoun_j$ and HMB_j are dummies indicating the school's inclusion in either the Aflatoun or the HMB treatment, and X_j represents controls for strata (district and average class size). Standard errors are clustered at the school level, the unit of randomization. When outcome variables were not included in the baseline survey, $\gamma y_{ij.baseline}$ is omitted from the specification. Where baseline values are missing for some but not all observations, we recode the missing baseline value to zero and include a dummy variable to indicate that the value was missing. When we do not have a full set of baseline values for components of an index, we construct the baseline index using only the components included in the baseline survey.

The impact estimates are intent-to-treat effects, and do not consider whether the child participated in the savings club or not. An instrumental variable approach, to estimate the treatment on the treated, would require precise measures on participation in savings clubs in all schools in the study. We do not have such measures. Even if participation data were available, the instrumental-variables estimation would require assuming no impact on non-participants in treatment schools. Such an assumption would be difficult to substantiate because the theory of change of the program includes spillovers: untreated individuals influence the attitudes and thus behaviors of their fellow students (although we do not find a direct effect on savings attitudes). Furthermore, aside from technical obstacles to the treatment on the treated, the intent-to-treat estimate provides the more policy relevant estimate of the average impact of programs such as these.

(ii). Orthogonality of treatment assignment and attrition

Table 3 presents summary statistics, including verification of orthogonality of treatment assignment with baseline values. Half of the respondents are female and the average age is about 13 years. At baseline, many children had already started saving: 47% of students in the control group already had some savings, with average reported savings of 5 cedis.[18] There are few statistically significant differences in baseline characteristics and behaviors between the treatment groups. As shown in Column 5, two out of the 13 measures are not balanced at the 10% level across both the Aflatoun and HMB treatment groups (work index and temptation expenditures index). All impact specifications include controls for the stratification variables as well as the baseline value of the outcome measure, if it exists.

Attrition rates for the endline survey were low (1.4%) and uncorrelated with assignment to treatment.[19] To test for differential attrition by treatment status along baseline characteristics, we regress completion of endline survey on Aflatoun and HMB treatment dummies, the full set of baseline variables in Table 3, and these variables interacted with each treatment dummy. The F-test that the treatment dummies and all interaction terms are jointly equal to zero has p-value = 0.35 (result not shown in table). We thus find no evidence that attriters have different baseline characteristics across treatment groups.

(c). Participation in saving clubs

The total number of students in each school participating in Aflatoun or HMB clubs was collected during monitoring visits over the course of the program. Club membership averaged 53 students in Aflatoun schools,[20] representing 18.9% of enrolled students, and averaged 54 students in HMB schools, representing 20.3% of enrolled students. The difference in club membership between Aflatoun and HMB schools is not statistically significant (p-value = 0.31).

[16] These measures were designed based on discussions with Aflatoun as key outcomes of interest relating to the social component of the Aflatoun program. We note, however, that we do not have precise measures relating to all of the social elements of the Aflatoun program, as listed in Table 2

[17] This is equivalent to imputing missing values as the mean z-score of the non-missing variables for that individual. Our main results are unchanged when we set indices as missing when any of the component variables is missing.

[18] The exchange rate from Ghana cedis to USD was 1.4 at the time of the baseline survey, in September 2010.

[19] The attrition rate was 1.36% in the control group and in each of the two treatment groups.

[20] Program administrative data from Aflatoun indicate a slightly higher participation rate. The 2011 Aflatoun International Annual Survey, which is based on reports from implementing NGOs to the Aflatoun head office, indicates that the program in Ghana reached 24,321 children in 325 schools, which implies an average participation of 75 children per school (Source: Personal communication with Aflatoun Research Manager).

Table 3
Baseline summary statistics and orthogonality tests

		Difference from control		p-Value from *F*-test		
	Control mean	Aflatoun	HMB	Afla = HMB	Afla = HMB = Control	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.500	−0.003	−0.020	0.395	0.525	5291
	[0.500]	(0.020)	(0.019)			
Age	12.806	0.256	−0.058	0.126	0.250	5359
	[1.989]	(0.204)	(0.219)			
Student Has Money Saved	0.467	−0.040	−0.005	0.223	0.275	5362
	[0.499]	(0.027)	(0.028)			
Amount Saved	5.041	−0.792	−0.236	0.480	0.401	5337
	[17.966]	(0.605)	(0.846)			
Savings Attitudes Index	0.000	0.076	0.004	0.232	0.375	5362
	[1.000]	(0.060)	(0.057)			
Home Savings Support Index	0.000	−0.013	0.023	0.461	0.755	5364
	[1.000]	(0.047)	(0.047)			
Work Index	0.000	−0.102*	0.014	0.0332	0.0678	5364
	[1.000]	(0.061)	(0.065)			
Risk Preference Index	0.000	0.036	0.073	0.514	0.469	5354
	[1.000]	(0.056)	(0.059)			
Time Preference Index	0.000	0.011	0.008	0.956	0.975	5355
	[1.000]	(0.049)	(0.054)			
Financial Literacy Index	0.000	0.052	0.016	0.571	0.726	5364
	[1.000]	(0.071)	(0.074)			
Expenditures on Temptation Goods Index	0.000	−0.113**	−0.047	0.237	0.0574	5364
	[1.000]	(0.047)	(0.058)			
Expenditures on Self Index	0.000	0.004	0.053	0.599	0.854	5352
	[1.000]	(0.045)	(0.095)			
Academic Index	0.000	0.015	−0.067	0.313	0.589	5364
	[1.000]	(0.077)	(0.088)			
Completed Endline Survey	0.986	0.000	0.000	0.905	0.993	5364
	[0.116]	(0.004)	(0.004)			

Columns (2)–(5) present the results of regressions of the variable in each row on Aflatoun and HMB treatment dummies, controlling for stratification dummies (region and standardized average class size). Standard deviations in square brackets; standard errors, clustered at the school level, in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Unfortunately, due to a lack of oversight during implementation, we do not have student-level club membership data for all schools. We were only able to collect membership information for a subset of ten Aflatoun schools and seven HMB schools.[21] This information consists of rosters of students who attended the clubs at least once.

Within the subsample of 17 schools, the monitoring data indicate that average membership in the Aflatoun schools was 43.2 students (representing 17.5% of enrolled students), while average membership in the HMB schools was 47.3 students (representing 24.6% of enrolled students).[22] The membership rosters were matched to our survey data by the students' names and schools. Following this procedure, we were able to match membership data to 16% of students in Aflatoun schools and 30% in HMB schools, which represents an average of 6.5 and 11.6 students matched per monitored school, respectively. The higher match rate in the HMB schools could be a result of more intensive targeting of HMB in the grades that our survey sampled. This explanation is in line with the higher rates of in-school savings that we find for the HMB schools, as shown in 3.a. below. However, since we do not have the complete distribution of participants in each program across grades in all schools, we cannot fully verify that this explanation drives the difference in match rates.

Within our matched sample of students, Table 4 examines the determinants of take-up by regressing an indicator for club membership on baseline values of our outcome variables and indices as well as a set of five demographic and academic variables. [23] Column 1 restricts the sample to the Aflatoun schools for which we have data. The explanatory variables in this regression have little predictive power. Out of the 13 variables in the regression, the only statistically significant variables are gender and durables ownership (both positive and statistically significant at the 10 and 5% levels, respectively).[24] Column 2 repeats the analysis for the HMB schools. In this case, students who save at baseline are significantly more likely to be members of the HMB clubs (significant at the 5% level), as well as students who are female, more financially literate, and spend more (significant at the 10, 5, and 1% levels, respectively). This suggests that interest in the HMB clubs could depend on prior experience with savings and money. However, because of the small number of schools for which we have data, and because of the low match rate between survey and membership data, these results should be taken as suggestive.

3. Results

Table 5 presents the impact of the programs on the two main savings outcomes and 10 summary indices.[25] Appendix Table 7 displays results for additional savings measures, while Appendix Tables 8–17 show the results for the individual variables used to construct the indices. As described above, these are intent-to-treat results, considering all sampled children, irrespective of whether they joined a savings group.

[21] Club membership lists were not stored as part of the program, and we were not able to gather full lists from all schools after the program ended. This sample frame is therefore not representative via an explicitly random process. However, we are also not aware of any specific biases generated by the process that would lead these schools to be non-representative.

[22] The subsample of schools for which we have take-up data also had similar patterns of implementation to those in the full sample. As in the full sample, the majority of schools in the take-up subsample established clubs in December 2010 and January 2011.

[23] These additional variables include gender, age, a dummy for whether student has ever repeated a school grade, a dummy for whether the student saved at baseline, and a measure of durables ownership.

[24] The measure of durable goods ownership is constructed as the first principal component of ownership of 14 household assets.

[25] The main results are largely unchanged using an individual fixed-effects model (see Online Appendix Table 1).

Table 4
Relationship between baseline characteristics and program takeup

	Aflatoun (1)	HMB (2)	Combined (3)
Student Has Money Saved	0.0115	0.156**	0.0690*
	(0.0464)	(0.0438)	(0.0353)
Savings Attitude Index	0.0110	0.00534	0.00728
	(0.0191)	(0.0350)	(0.0167)
Home Savings Support Index	−0.0272	−0.0232	−0.0226
	(0.0271)	(0.0369)	(0.0214)
Work Index	−0.0104	0.0219	0.00827
	(0.0166)	(0.0392)	(0.0226)
Risk Preference Index	0.0162	−0.0106	0.00584
	(0.0187)	(0.0227)	(0.0168)
Time Preference Index	−0.00937	0.000660	−0.00522
	(0.0215)	(0.0416)	(0.0220)
Financial Literacy Index	0.0166	0.0909**	0.0492**
	(0.0130)	(0.0346)	(0.0206)
Expenditures on Temptation Goods Index	0.0255	0.0146	0.0334
	(0.0300)	(0.0369)	(0.0219)
Expenditures on Self Index	0.0300	0.0176***	0.0174***
	(0.0282)	(0.00373)	(0.00395)
Academic Performance Index	0.0123	−0.00469	0.00154
	(0.0106)	(0.0392)	(0.0176)
Female	0.109**	0.110*	0.118**
	(0.0555)	(0.0525)	(0.0409)
Age	0.00464	−0.0364	−0.0224
	(0.0163)	(0.0218)	(0.0161)
Student ever repeated grade	0.0590	0.0276	0.0635*
	(0.0343)	(0.0520)	(0.0311)
Index of durable goods ownership	0.0164**	−0.0358	−0.00487
	(0.00624)	(0.0345)	(0.0212)
	0.162	0.297	0.217
Mean of dependent variable	388	271	659
R-squared			
Number of observations	0.0550	0.114	0.0621
Number of Schools	10	7	17

Takeup is defined as attendance at one or more Aflatoun or HMB club meetings, as indicated by the club roster sheet or attendance logs. Row variables are measured at baseline. Each column presents the results of an OLS regression of takeup on the row variables in the Aflatoun and/or HMB schools for which club rosters or attendance logs were collected. The index of durable goods ownership is constructed as the first principal component of ownership of a mobile phone, television, radio, mattress, bicycle, car, motorcycle, stove, fridge, three types of livestock, school uniform, and shoes for the student. Standard errors clustered at the school level, in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

(a). Savings

As shown in Table 5, neither program resulted in statistically significant increases in the likelihood that a student saves, although point estimates are positive: The Aflatoun program resulted in a 2.4 percentage-point increase (s.e. = 2.2), while the HMB program resulted in a slightly larger 3.1 percentage-point increase (s.e. = 2.5). Estimates are also not significant when both treatments are pooled. We also do not find any impact on the total amount saved, but the 95% confidence interval on that variable is large (the upper bound of the treatment effect of Aflatoun is 25% of the control group mean).

Appendix Table 7 displays impacts on six additional measures of savings, including savings inside and outside of school and regularity of savings. Both programs show positive effects on the proportion of children that save at school (5.2 percentage points, s.e. = 1.5 for Aflatoun, and 9.1 percentage points, s.e. = 1.5 for HMB) and the amount of money children have saved at school (0.44 Ghana cedis, s.e. = 0.17, for Aflatoun, 0.47 Ghana cedis, s.e. = 0.14 for HMB, control mean = 0.17). These estimates are robust to correcting for the false discovery rate, with *q*-values all below 0.05. However, a lack of an effect on total savings suggests that the program caused students to move some of their savings to the school accounts. This is consistent with the fact that we do not find any impact on the expenditure variables, as described below.

The savings attitude index captures children's opinions on the importance of savings. The index is constructed from ten questions, nine of which are Likert-style questions where the respondent indicates their level of agreement with a statement on a scale from zero (strongly disagree) to three (strongly agree). Three statements relate to the student's general view of savings, four relate to whether the student believes s/he should save in addition to adults, and one question measures whether the student saves whenever possible. The final component of the index is the student's allocation to savings if s/he were hypothetically given five cedis. As shown in Table 5, we find a precise null pooled treatment effect of 0.031 standard deviation (s.e. = 0.039). Appendix Table 8 presents similar null results on each component.

The home savings support index reflects how the student's family perceives the student's savings, as well as access to savings at home. The five component variables measure whether the student talks to relatives about savings, how adults in the household view child savings, the perceived safety of savings with family, and the number of household bank accounts. As shown in Table 5, we find a precise null pooled treatment effect of 0.012 standard deviations (s.e. = 0.04). Appendix Table 9 presents similar null results on all but one component: we find a positive impact on the perception of students in the HMB group that their parents would be proud of them for saving, significant at the 10% level. However, this result does not survive the FDR adjustment (*q*-value = 0.63).

(b). Labor supply

Neither treatment encouraged children to seek paid work, but the theory of change of the Aflatoun program was that the social component would discourage child labor. For the Aflatoun program, we thus have competing forces: the emphasis the Aflatoun program puts on planning for the future and child self-esteem may lead children to prioritize education over work, but the emphasis on savings and financial matters may result in children thinking proactively about work as a way, for instance, to accumulate savings. Because the HMB program did not include the social component, we hypothesized that it could increase work through the second mechanism.

The work index includes 11 variables measuring incidence of work, intensity of work, and earnings. As shown in Table 5, we find that the HMB program led to a 0.102 standard deviation (s.e. = 0.056) increase in this index. The estimate for the Aflatoun program is 0.038 standard deviations (s.e. = 0.05). However, the test comparing Aflatoun and HMB fails to reject equality (*p*-value = 0.26). The impact of the HMB program on the work index also does not survive the correction for multiple hypothesis testing (*q*-value = 0.82).

Appendix Table 10 disaggregates the effects on the different components of the work index. To put the results in context, it is important to first note that many children work. In the control group, 24% of children reported having worked for money in the past four months (February to May).

Across the components of the work index, we find suggestive evidence that the HMB program increased the frequency of working, although the individual estimates do not survive corrections for multiple hypothesis testing, with *q*-values all above 0.3. The HMB program led to a 4.2 percentage point increase in the likelihood of engaging in any work (s.e. = 0.025) during the four months prior to the endline survey, whereas we see no effect in the Aflatoun group (1.4 percentage points, s.e. = 2.2), but the *p*-value for the test to reject equality of Aflatoun and HMB is 0.25. The same pattern is found when looking month by month. The increase for the HMB program was statistically significant in two out of the four months, whereas the change for Aflatoun was not significant in any month (*p*-values for difference across treatments are 0.14, 0.12, 0.07 and 0.14 for each of the four months).

Table 5
Treatment effects on key outcome variables

Outcome variable	Aflatoun (1)	Honest money box (2)	*p*-Value, Afla = HMB (3)	Pooled effect (4)	Obs (5)
Student Has Money Saved	0.024	0.031	0.769	0.027	5291
	(0.022)	(0.025)		(0.020)	
	[0.824]	[0.824]		[0.656]	
Amount Saved	−0.287	−1.088	0.501	−0.686	5291
	(1.297)	(1.264)		(1.136)	
	[0.861]	[0.836]		[0.656]	
Savings Attitudes Index	0.013	0.049	0.468	0.031	5291
(positive attitude toward savings)	(0.043)	(0.048)		(0.039)	
	[0.861]	[0.824]		[0.656]	
Home Savings Support Index	−0.027	0.052	0.134	0.012	5291
(home environment conducive to saving)	(0.050)	(0.049)		(0.042)	
	[0.836]	[0.824]		[0.841]	
Work Index	0.038	0.102*	0.257	0.070	5291
(more likely to work, more hours, etc.)	(0.049)	(0.056)		(0.045)	
	[0.836]	[0.824]		[0.656]	
Risk Preference Index	−0.064	−0.076	0.804	−0.070	5291
(higher = less risk averse)	(0.054)	(0.054)		(0.049)	
	[0.824]	[0.824]		[0.656]	
Time Preference Index	0.033	0.031	0.975	0.032	5291
(higher = lower discount rate of the future)	(0.049)	(0.052)		(0.043)	
	[0.836]	[0.836]		[0.656]	
Financial Literacy Index	0.015	−0.005	0.714	0.005	5291
	(0.055)	(0.057)		(0.049)	
	[0.861]	[0.929]		[0.915]	
Expenditures on Temptation Goods Index	−0.033	−0.022	0.766	−0.027	5291
(propensity to spend on temptation goods)	(0.048)	(0.044)		(0.042)	
	[0.836]	[0.836]		[0.656]	
Expenditures on Self Index	−0.016	−0.064	0.287	−0.040	5291
(propensity to spend on goods for self)	(0.050)	(0.046)		(0.043)	
	[0.861]	[0.824]		[0.656]	
Confidence Index	−0.047	−0.011	0.456	−0.029	5291
	(0.045)	(0.045)		(0.038)	
	[0.824]	[0.861]		[0.656]	
Academic Performance Index	−0.033	−0.047	0.798	−0.040	5291
(school attendance and test scores)	(0.064)	(0.064)		(0.058)	
	[0.836]	[0.836]		[0.656]	

Columns (1) and (2) present individual regressions of each variable or index on Aflatoun and HMB treatment dummies. Column (4) presents individual regressions of each variable or index on dummies for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values for the index, if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. See Appendix Tables 8–17 for component variables of each index. Money amounts reported in Ghana cedis. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (all coefficients in Columns (1) and (2) or all coefficients in Column (4)). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

We also find that the HMB program increased the number of days worked in the past 30 days by 0.68 days (s.e. = 0.35). This represents an increase in 30% over the control group mean of 2.2 days. Although we cannot experimentally separate the impacts on the intensive and extensive margins of working, the increase in the incidence of work by 4.2% likely accounts for a small portion of the effect on days worked: at the control mean of 2.2 days per month, a 4.2% increase would only result in 0.092 additional days, a small portion of the estimated impact of 0.68 days.[26]

Although we estimate increased work participation in the HMB group, this did not appear to lead to extra earnings in the thirty days prior to the survey (1.02 Ghana cedis, s.e. = 1.68). We note, however, that this estimate is relatively imprecise, with the 95% confidence interval admitting an effect size of 4.32 cedis, relative to the control mean of 6.9.

As shown in Columns 10 and 11 of Appendix Table 10, part of the difference in the extensive margin of working between Aflatoun and HMB appears to be driven in large part by work inside the household: Where we observe a small and statistically insignificant increase of 1.1 percentage points in the HMB treatment over the control group, there is a small and marginally significant *decrease* of 1.4 percentage points for the Aflatoun treatment. This is a larger difference in impacts than that observed for work outside of the home (3.5 percentage points for HMB and 2.3 percentage points for Aflatoun). To explore this difference further, we conduct similar analysis for days worked by separating work inside the home and outside the household in the last 30 days (results not shown in table). Again, we find a small increase of 0.038 days for the HMB treatment and a decrease of 0.097 days worked inside of the household for the Aflatoun treatment (although neither estimate is statistically significant). However, unlike the extensive margin of working, the difference in impacts is larger for work outside of the home (0.46 days for HMB vs. 0.29 days for Aflatoun). Regardless, the differences in impacts between the HMB and Aflatoun treatments on both the extensive margin of working and on the number of days worked is driven in part by work inside of the household.

Although the Aflatoun curriculum was longer than the HMB curriculum, it is unlikely that this difference would have driven the difference we observe in work outcomes. Even though the Aflatoun program's curriculum took longer to cover, both programs met as savings clubs throughout the program period after the curriculum had been completed. This is confirmed by our monitoring data from the latter portion of the program period: During visits in May, June and July 2011, about three-quarters of clubs in both Aflatoun and HMB schools reported meeting at least weekly, with the remainder meeting every two weeks. In addition, as shown in Col-

[26] If we attribute the remaining 0.59 days to the extensive margin, and given that the 24% of students in the control group were working, this represents an increase in 2.5 days worked (0.59/.24) among those already working, relative to a base of 9.2 days (2.2/0.24).

umns 6 to 9 of Appendix Table 10, we observe differences in work between Aflatoun and HMB (although not statistically significant) earlier in the program period in February and March 2011, and these differences persist in April and May.

(c). Risk and time preferences

We next examine two indices measuring risk and time preferences. The predicted impact of the Aflatoun and HMB programs on risk preferences is theoretically ambiguous. On one hand, the promotion of entrepreneurship in these programs may lead participants to feel more comfortable taking risks. On the other hand, the encouragement of long-term planning and savings may encourage taking fewer risks. Indeed, both programs presented savings as a way to reduce risk, and the Aflatoun program discouraged risky behaviors such as those that may lead to HIV transmission. However, for time preferences, the prediction is less theoretically ambiguous: we expect the treatments to lead children to place greater value on future outcomes and thus display more patient time preferences.

Our risk preference index is constructed from three hypothetical choices between risky and safe bets, a self-reported scale of the child's willingness to take risks, and the child's hypothetical preference to start a high-risk, high-return business over a low-risk, low-return business. The impact estimates are shown in Table 5 and Appendix Table 11. We do not observe statistically significant changes in the risk preference index for either program (pooled results for the index is −0.070 standard deviations, s.e. = 0.049). However, in both Aflatoun and HMB schools, we observe marginally significant decreases in one component: children's self-reported willingness to take risks. This question asked students, "Are you generally very prepared to take risks or do you try to avoid taking risks?" Students answered on a scale of 0 (unwilling to take risks) to 10 (fully prepared to take risks), which we converted to a range of 0–1 for analysis. The treatment effects for this component were −0.034 (s.e. = 0.015) and −0.025 (s.e. = 0.014) for Aflatoun and HMB, respectively.[27]

We measure time preference through two hypothetical intertemporal choices and one question on whether the child would prefer to wait for a medicine that heals completely or receive a medication now that doesn't heal completely. We find no statistically significant changes in time preferences from either individual treatment or from the pooled treatment (Table 5 and Appendix Table 12; 0.032 standard deviations for the pooled treatment, s.e. = 0.043).

(d). Financial literacy and control of spending

We now turn to measures of financial literacy. Financial literacy was measured through two hypothetical "shop games" in which the child was given a list of goods and prices and a certain amount of money, all of which had to be spent on the available goods.[28] The child was then asked to report how much of each item s/he would buy. For each game, the index includes an indicator of whether the child correctly allocated the money (i.e., spent exactly the amount of money given), the absolute value of the difference between the child's allocation and the correct allocation, and the number of seconds taken to respond. We also include an indicator of whether the student makes a spending plan each week. The results are shown in Table 5 and Appendix Table 13. The effects of the programs on the financial literacy index are small and not statistically significant (0.005 standard deviations for the pooled treatment, s.e. = 0.049), and none of the seven individual components of the index show statistically significant effects.

Table 5 and Appendix Table 14 examine the student's propensity to spend on temptation goods, based on three variables measuring actual and hypothetical spending on snacks and entertainment. We find no evidence for treatment effects on this index (Table 5; −0.027 standard deviations for the pooled treatment, s.e. = 0.042). Among the individual components, the Aflatoun treatment reduced hypothetical spending on entertainment by 0.14 cedis (s.e. = 0.059), but there are no other statistically significant results, and this estimate is not robust to the FDR correction (q-value = 0.13).

We next examine personal spending by the child using an index which consists of two questions on the amount the child spent on him/herself in the past seven days and the amount s/he expects to spend in the next seven days. We do not find a statistically significant impact on this expenditure index from either individual treatment or for the pooled treatment (Table 5; −0.040 standard deviations for the pooled treatment, s.e. = 0.043) or on either question individually (Appendix Table 15).

(e). Child confidence

Table 5 and Appendix Table 16 display the program impacts on measures of confidence. The Aflatoun program placed emphasis on this domain, while the HMB program did not. We thus expected these variables to be positively impacted by the Aflatoun program but not by the HMB program. Our measure includes five Likert questions on self-esteem and confidence at school. We find no evidence of impacts, though point estimates on the aggregate index are negative for both programs (−0.029 standard deviations for the pooled treatment analysis, s.e. = 0.038). Across all the individual measures, the only measure that is significantly different in the treatment groups (10% level of significance) is an increased likelihood of agreeing with the statement "My teacher makes me feel I am not good enough" in Aflatoun schools. While this result could reflect a lower sense of confidence among the Aflatoun group, it should be interpreted tentatively as no other indicator within the index shows statistically significant impacts, and the significance of the estimate does not survive the FDR correction (q-value = 0.99).

(f). Academic performance

Finally, we examine program impacts on school attendance and achievement. The survey included basic reading and math tests as well as student's self-reported attendance over the week prior to the survey. While neither program directly targeted general schooling outcomes, they could have increased schooling investments through encouragement of long-term planning. As referenced in the introduction, Karlan and Linden (2014) find that a combined savings and parental outreach program in Uganda resulted in significant increases in students' test scores, a result they attribute to increased spending on school supplies. Alternatively, increases in child labor as a result of the program could come at the cost of reduced schooling outcomes. To measure aptitude, students were given ten-question tests in English and math. Separate tests were given to 5th- and 7th-graders, although the structure of the tests was similar. Test scores were normalized based on the mean and standard deviations in each grade and survey round. As shown in Table 5 and Appendix Table 17, we find no evidence of program effects on the combined academic perfor-

[27] The treatment effects of the individual programs on this measure both have FDR q-values above 0.1; however, as shown in Panel B, the impact of both programs combined is still marginally significant after the FDR correction (q-value = 0.098).

[28] The shop games tested the student's ability to fully allocate money to goods and were separate from the hypothetical allocation across spending and saving if given 5 cedis (Appendix Table 8, Column 10).

mance index (−0.040 standard deviations for the pooled treatment, s.e. = 0.058), or on either component individually.

(g). Heterogeneity

In this section, we explore heterogeneity in treatment effects by several key subgroups. We note that because the subgroups chosen were not pre-specified, the analysis should be taken as suggestive.

Table 6 displays heterogeneity in the impacts of the Aflatoun and HMB treatments on three key outcome measures: whether the student saves, how much the student saves, and the work index. We implement this by augmenting Eqn. (2) with interactions with baseline variables:

$$y_{ij.endline} = \alpha + \beta_1(Aflatoun_j) + \beta_2(HMB_j) + \beta_3 Var_{ij} + \beta_4(Aflatoun_j * Var_{ij}) + \beta_1(HMB_j * Var_{ij}) + \gamma y_{ij,baseline} + \delta X_j + \varepsilon_{ij} \quad (3)$$

where Var_{ij} represents the interacted variable. We examine heterogeneity by gender, whether the student is in primary or junior high school, baseline savings, the baseline work index, and predicted take-up.[29]

Panel A considers the binary variable of whether a student saves as the outcome of interest. By examining the un-interacted indicators for the Aflatoun and HMB programs, we find some evidence that the HMB program was effective for primary school students: These students were 5.6 percentage points more likely to save at endline compared to the control group (s.e. = 2.3). There is no evidence for a similar effect in the Aflatoun treatment group. We also find that the HMB program increased savings among students who did not save at baseline (7.4 percentage points, s.e. = 2.2). We do not find evidence of heterogeneity by gender, the baseline work index, or predicted take-up. In the latter case, although take-up should be related to impact, the lack of heterogeneity by predicted take-up may be due to the relatively low predictive power of the take-up regressions in Table 4.

These results suggest that while the HMB treatment did not have significant impacts on savings overall, it did encourage savings among students who had not saved before. The treatment effect of HMB on younger students may also have been due to the lower likelihood of savings at baseline (41% for younger students vs. 49% for older students).

Panel B of Table 6 explores heterogeneity using the amount saved as the outcome of interest. In contrast to the results above, we do not find evidence that the HMB treatment increases the amount saved among younger students or among students who had not previously saved. We note, however, that these estimates are relatively noisy, with standard errors of about 1.6 cedis relative to a mean baseline savings amount of 4.6 cedis. The Aflatoun treatment did significantly increase savings among those who were initially working more: a one standard deviation higher baseline work index is associated with 3 additional cedis of savings (s.e. = 1.2). The interaction with the HMB treatment is also positive but not statistically significant.

Panel C of Table 6 runs the same analysis using the endline work index as the outcome of interest. Here we find a significant interaction between schooling level and the treatment groups: compared with primary school students, the impact on the work index for junior high school students was 0.23 standard deviations higher in the Aflatoun treatment (s.e. = 0.070) and 0.23 standard deviations higher in the HMB treatment (s.e. = 0.071). These differences could be driven by better work opportunities among older students. We do not find evidence for interaction effects by gender, savings at baseline, the baseline work index, or predicted take-up.

(h). Experimenter demand effects

As noted in 2.b.i., because our outcomes are primarily based on student self-reports, there is a risk of differential bias in responses that could influence the treatment effects estimated in this section. In particular, students in the Aflatoun and HMB programs may have provided biased responses that were consistent with the goals of the programs. However, the pattern of results is generally inconsistent with this possibility.

For both programs, we observe significant increases in reported savings at school, a behavior promoted by the programs. In addition, the increase in reported labor in the HMB treatment but not the Aflatoun treatment could also arguably be driven by misreporting because the Aflatoun treatment discouraged such activity.

However, we posit that experimenter demand effects are unlikely given that we do not observe any differential results on other outcomes that would also plausibly induce experimenter demand effects, if indeed the children perceived a benefit to misreporting. For example, we find no evidence of impacts on savings attitudes, even though both programs promoted a positive view of savings. In the case of savings at school, the behavior is more verifiable than savings attitudes, and it is unlikely that students would over-report a verifiable behavior and not unverifiable attitudes. In addition, analysis of data from the monitoring visits does not suggest substantial over-reporting of savings in school. According to these data, 9.7% of enrolled students in Aflatoun and HMB schools were using the savings boxes at the time of the monitoring visits. In the endline survey, 10.2% of surveyed students in those schools reported saving at school.

4. Conclusion

Through a randomized evaluation in Ghanaian schools we evaluate two school-based financial literacy programs: the financial and social education model of Aflatoun, which reaches millions of students each year, and an alternative model which does not include the social component of the Aflatoun curriculum. We find that both programs positively influenced savings in schools (which is explicitly facilitated through providing a locked savings box as part of the program), but we find imprecise null results for aggregate savings, and fairly precise null impacts on savings attitudes, home support for savings, risk and time preferences, spending patterns, confidence, and academic performance. We also find that the financial education-only program led to a marginally significant increase in child labor supply, while the integrated financial and social education program did not. However, the difference in child labor impacts between the two programs is not statistically significant.

As we have emphasized, a limitation of our study is the lack of full student-wise data on participation in the programs, limiting our ability to explore mechanisms of the impacts (or lack of impacts) that we observe. This highlights the importance of monitoring and management data to accompany impact evaluations (Gugerty et al., 2016).

There are several potential explanations for the lack of strong impacts on savings observed in this study. One possibility is that the target population may be too young for savings to be impacted by these programs. However, as our data show, many children already save at baseline, and our heterogeneity analysis suggests that the programs may have been more effective at inducing younger children to start saving.

[29] The specifications using predicted take-up consider take-up of either the Aflatoun or HMB programs (Column 3 of Table 4). Results are similar when the prediction is based on either Aflatoun or HMB take-up alone. Because the interacted variable is a generated regressor, standard errors in these regressions are computed based on 500 bootstrap replications, sampling by school.

Table 6
Heterogeneity in effects on selected outcomes

	Interacted variable				
	Female (1)	Junior high school student (2)	Saves at baseline (3)	Baseline work index (4)	Predicted takeup (5)
Panel A. Outcome: Saves					
Aflatoun	0.00750	0.0256	0.0292	0.0226	0.0149
	(0.0233)	(0.0238)	(0.0220)	(0.0164)	(0.0431)
HMB	0.0182	0.0562**	0.0742***	0.0309*	0.0180
	(0.0231)	(0.0229)	(0.0224)	(0.0164)	(0.0493)
Interacted Variable	0.0144	0.0215	0.198***	−0.00458	0.129
	(0.0234)	(0.0247)	(0.0234)	(0.0118)	(0.151)
Aflatoun * Variable	0.0303	−0.00193	−0.0101	−0.00627	0.0397
	(0.0330)	(0.0329)	(0.0330)	(0.0171)	(0.153)
HMB * Variable	0.0237	−0.0558*	−0.0931***	0.0104	0.0439
	(0.0330)	(0.0336)	(0.0329)	(0.0166)	(0.180)
P-value: Aflatoun Int. = HMB Int.	0.842	0.106	0.0115	0.335	0.982
Panel B. Outcome: Amount Saved					
Aflatoun	0.133	0.745	−0.0796	−0.0595	2.751
	(1.627)	(1.651)	(1.534)	(1.143)	(2.961)
HMB	0.968	−0.323	−0.860	−1.093	4.803
	(1.616)	(1.592)	(1.559)	(1.141)	(4.027)
Interacted Variable	0.0121	5.655***	4.496***	−0.637	4.309
	(1.638)	(1.717)	(1.645)	(0.819)	(12.33)
Aflatoun * Variable	−0.677	−1.624	−0.117	3.000**	−13.33
	(2.307)	(2.288)	(2.294)	(1.191)	(12.21)
HMB * Variable	−4.217*	0.219	−0.458	0.899	−25.42
	(2.309)	(2.336)	(2.289)	(1.158)	(16.19)
P-value: Aflatoun Int. = HMB Int.	0.124	0.426	0.881	0.0804	0.412
Panel C. Outcome: Work Index					
Aflatoun	0.000495	−0.0858*	0.00636	0.0404	0.0642
	(0.0490)	(0.0502)	(0.0466)	(0.0347)	(0.0922)
HMB	0.105**	−0.0107	0.0811*	0.103***	0.186*
	(0.0487)	(0.0483)	(0.0474)	(0.0346)	(0.104)
Interacted Variable	−0.176***	−0.149***	−0.00151	0.211***	−0.428
	(0.0493)	(0.0521)	(0.0495)	(0.0248)	(0.322)
Aflatoun * Variable	0.0587	0.233***	0.0714	0.0170	−0.153
	(0.0694)	(0.0695)	(0.0697)	(0.0361)	(0.338)
HMB * Variable	−0.0120	0.229***	0.0454	−0.0471	−0.351
	(0.0695)	(0.0709)	(0.0696)	(0.0351)	(0.366)
P-value: Aflatoun Int. = HMB Int.	0.307	0.949	0.708	0.0789	0.579

Each column presents the interaction of the variable indicated with the Aflatoun and HMB treatments. Standard errors, clustered at the school level, in parentheses. Regressions control for stratification dummies (region and standardized average class size) and the baseline value of the outcome variable. In Column (5) predicted takeup is computed based on the regression in Column (3) of Table 4. Because predicted takeup is a generated regressor, standard errors in Column (5) are computed based on 500 bootstrap draws, sampling by school. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Alternatively, while our process data are limited, the data we have suggest a relatively low take-up among students in the study sample. We speculate that interventions that target a greater portion of students could result in larger effects, such as the those studied in Supanantaroek et al. (2016) and Bruhn et al. (2016), which integrated the curriculum into the regular teaching schedule and found larger impacts on savings behaviors and attitudes.

In our context, the costs of developing and implementing school-based financial education were relatively modest, and expansion to a larger portion of students per school would likely result in substantially lower costs per student reached. Excluding fixed curriculum development costs, which amounted to $3,100, the marginal costs of training, monitoring, and materials for the HMB program amounted to $9,957. Given total enrollment of 16,118 in the HMB schools, the cost was $0.62 per enrolled student. Based on club membership of 53 students per school reported in the monitoring data, the cost was $4.15 per student attending the club. While we lack explicit data on the costs of the Aflatoun program from the implementing organizations, we expect they were similar, given the parallel structure of the program in terms of training, monitoring, implementation by teachers, and duration.[30]

While the cost per student attending the club was $4.15 per student, about two-thirds of these costs consisted of training and monitoring, which would likely decrease substantially if the program were scaled to more students in each school. Thus, implementation models that target a larger portion of students have the potential to be more cost effective per student reached.

Additional work could also provide more information on the potential impacts of social and financial education programs on child labor supply. While our results suggest that including social education can mute the negative effects of financial education on child work, we lack the statistical power to reject equivalence between the Aflatoun and HMB programs. In addition, because the additional child labor did not appear to displace schooling, the work behavior that increased due to the HMB program may not have been the type that the Aflatoun program was designed to discourage.[31] To the extent that more intensive interventions have larger impacts on child labor supply, it is important to evaluate

[30] By comparison Ghana's per pupil public expenditure on primary education was $369 in 2011 (World Bank, 2017), and annual household spending on education in Ghana was $261 per student as of 2012–13 (Ghana Statistical Service, 2014).

[31] An alternative explanation is that the HMB program was more effective at encouraging *savings*, and work behavior increased as a result. Although neither program had statistically significant impacts on the percentage of children who saved, the point estimate for HMB is 29% larger (3.1% vs 2.4%), and the HMB program did result in a significantly larger impact on the fraction of students saving at school (9.1% vs 5.2%). This could have been the result of the narrower focus of the HMB curriculum. However, this interpretation is speculative, particularly given that neither program had statistically significant impacts on our two main savings measures.

whether these interventions may indeed negatively impact schooling.

An additional area for future work is the potential for basic savings devices at school, without any accompanying curriculum, to encourage savings behavior. Because both programs we study included a savings product in addition to financial education and regular meetings, we cannot disentangle the impact of the savings box alone. It is possible that sufficient interest and support for savings already exists in this population, and students merely need a safe place to store their savings. Alternatively, financial education and formal club meetings may also be necessary to encourage use of these products. Future research could compare impacts of the combination of financial education and a money box that we study here with those of a money box alone.

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Appendix A

Table 7
Savings behavior

Dependent Variables	Has money saved right now (1)	Total money saved right now (GHC) (2)	Has money saved right now at school (3)	Total money saved at school right now (GHC) (4)	Has money saved outside school right now (5)	Total money saved outside school right now (GHC) (6)	Regularly saves money during the week (7)	Amount saved last week (GHC) (8)
Panel A: Individual Treatment Effects								
Aflatoun	0.024	−0.287	0.052***	0.440***	−0.007	−0.575	0.020	−0.272
	(0.022)	(1.297)	(0.015)	(0.166)	(0.022)	(1.381)	(0.020)	(0.218)
	[0.566]	[0.880]	[0.004]	[0.035]	[0.853]	[0.850]	[0.584]	[0.548]
HMB	0.031	−1.088	0.091***	0.474***	−0.009	−0.580	0.001	−0.265
	(0.025)	(1.264)	(0.015)	(0.141)	(0.022)	(1.355)	(0.020)	(0.225)
	[0.548]	[0.626]	[0.000]	[0.005]	[0.850]	[0.850]	[0.955]	[0.548]
p-Value for test of Aflatoun = HMB	0.769	0.501	0.046	0.858	0.938	0.997	0.378	0.952
Control mean	0.555	9.121	0.028	0.165	0.528	9.033	0.363	1.233
R-squared	0.038	0.050	0.022	0.008	0.010	0.006	0.075	0.015
Observations	5291	5291	5291	5291	5291	5291	5291	5289
Panel B: Pooled Treatment Effect								
Aflatoun or HMB	0.027	−0.686	0.072***	0.457***	−0.008	−0.577	0.010	−0.269
	(0.020)	(1.136)	(0.011)	(0.121)	(0.019)	(1.214)	(0.017)	(0.214)
	[0.422]	[0.674]	[0.000]	[0.001]	[0.674]	[0.674]	[0.674]	[0.422]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Savings amounts (Columns 2, 4, 6, 9) are self-reported and in Ghana cedis. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 8
Savings attitudes

Dependent Variables	Saving Attitude Index (1)	Thinks that saving is good (2)	Is happy if they save (3)	Thinks that spending now is better than saving for the future† (4)	Saves every time they get money (5)	Thinks that saving is for adults only† (6)	Thinks that saving is for parents only† (7)	Doesn't think they need to save because parents buy them what they need† (8)	Thinks they don't need to save if they're living at home† (9)	Proportion allocated to savings in hypothetical spending exercise (10)
Panel A: Individual Treatment Effects										
Aflatoun	0.013	−0.007	−0.003	−0.016	0.042	0.006	0.004	−0.021	−0.008	−0.009
	(0.043)	(0.027)	(0.023)	(0.027)	(0.028)	(0.027)	(0.026)	(0.025)	(0.026)	(0.017)
		[0.919]	[0.919]	[0.919]	[0.865]	[0.919]	[0.919]	[0.919]	[0.919]	[0.919]

(*continued on next page*)

Table 8 (*continued*)

Dependent Variables	Saving Attitude Index	Thinks that saving is good	Is happy if they save	Thinks that spending now is better than saving for the future†	Saves every time they get money	Thinks that saving is for adults only†	Thinks that saving is for parents only†	Doesn't think they need to save because parents buy them what they need†	Thinks they don't need to save if they're living at home†	Proportion allocated to savings in hypothetical spending exercise
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HMB	0.049	−0.002	0.016	−0.020	0.010	−0.013	−0.029	−0.051	−0.038	−0.021
	(0.048)	(0.024)	(0.025)	(0.029)	(0.028)	(0.026)	(0.023)	(0.031)	(0.029)	(0.018)
		[0.919]	[0.919]	[0.919]	[0.919]	[0.919]	[0.865]	[0.865]	[0.865]	[0.865]
p-Value for test of Aflatoun = HMB	0.468	0.868	0.391	0.889	0.218	0.536	0.205	0.322	0.315	0.429
Control mean	0.000	2.353	2.094	1.040	1.823	0.944	1.006	1.190	1.060	0.255
R-squared	0.027	0.002	0.016	0.009	0.032	0.008	0.012	0.015	0.007	0.037
Observations	5291	5287	5274	5285	5288	5284	5291	5290	5286	5281
Panel B: Pooled Treatment Effect										
Aflatoun or HMB	0.031	−0.005	0.006	−0.018	0.026	−0.003	−0.012	−0.036	−0.023	−0.015
	(0.039)	(0.022)	(0.021)	(0.024)	(0.024)	(0.022)	(0.021)	(0.024)	(0.023)	(0.016)
		[0.872]	[0.872]	[0.813]	[0.752]	[0.872]	[0.830]	[0.752]	[0.752]	[0.752]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Outcome variables in Columns (2) through (9) takes on integer values ranging from 0 (strongly disagree) to 3 (strongly agree). †indicates that the variable enters the index negatively. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 9
Home savings support

Dependent Variables	Home Savings Support Index	Has talked to parents or relatives about the importance of savings in last 7 days	Someone in household would be angry if they found out student was saving for self†	Parents would be proud of student for saving	Perceived safety of saving with family (0 being least safe, 4 most)	Number of household bank accounts
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Individual Treatment Effects						
Aflatoun	−0.027	−0.022	0.014	0.011	0.008	0.007
	(0.050)	(0.014)	(0.014)	(0.027)	(0.075)	(0.044)
		[0.748]	[0.748]	[0.915]	[0.915]	[0.915]
HMB	0.052	0.016	−0.004	0.049*	0.053	−0.017
	(0.049)	(0.017)	(0.013)	(0.026)	(0.074)	(0.048)
		[0.915]	[0.915]	[0.627]	[0.915]	[0.915]
p-Value for test of Aflatoun = HMB	0.134	0.020	0.235	0.174	0.485	0.616
Control mean	0.000	0.138	0.122	2.064	2.700	0.851
R-squared	0.053	0.003	0.037	0.006	0.017	0.228
Observations	5291	5287	5231	5263	5121	5291
Panel B: Pooled Treatment Effect						
Aflatoun or HMB	0.012	−0.003	0.005	0.030	0.031	−0.005
	(0.042)	(0.013)	(0.011)	(0.022)	(0.067)	(0.039)
		[0.895]	[0.895]	[0.895]	[0.895]	[0.895]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Outcome variable in Column (4) takes on integer values ranging from 0 (strongly disagree) to 3 (strongly agree). †indicates that the variable enters the index negatively. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 10
Work

Dependent Variables	Work Index	Worked in past 4 months to earn money	Days worked in past 30 days	Amount of money earned working in past 30 days	Amount of money earned working in past 30 days, winsorized at 95%	Worked in Feb	Worked in Mar	Worked in Apr	Worked in May	Worked inside household	Worked outside household	Worked "a lot" during school term
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Individual Treatment Effects												
Aflatoun	0.038	0.014	0.247	2.226	0.350	0.000	0.003	0.003	0.003	−0.014*	0.023	0.005
	(0.049)	(0.022)	(0.260)	(1.484)	(0.471)	(0.014)	(0.015)	(0.016)	(0.021)	(0.009)	(0.020)	(0.011)
		[0.694]	[0.565]	[0.313]	[0.694]	[0.989]	[0.931]	[0.931]	[0.937]	[0.313]	[0.451]	[0.770]
HMB	0.102*	0.042*	0.675*	1.024	0.337	0.023	0.028*	0.035*	0.036	0.011	0.035	0.016
	(0.056)	(0.025)	(0.354)	(1.681)	(0.515)	(0.015)	(0.015)	(0.018)	(0.023)	(0.010)	(0.022)	(0.012)
		[0.348]	[0.348]	[0.694]	[0.694]	[0.348]	[0.348]	[0.348]	[0.348]	[0.592]	[0.348]	[0.389]
p-Value for test of Aflatoun = HMB	0.257	0.249	0.226	0.528	0.981	0.138	0.119	0.074	0.139	0.008	0.581	0.325
Control mean	0.000	0.237	2.221	6.918	3.864	0.088	0.098	0.129	0.190	0.060	0.188	0.062
R-squared	0.038	0.050	0.027	0.013	0.035	0.013	0.010	0.003	0.009	0.013	0.048	0.009
Observations	5291	5291	5291	5291	5291	5291	5291	5291	5291	5291	5291	5291
Panel B: Pooled Treatment Effect												
Aflatoun or HMB	0.070	0.028	0.461*	1.626	0.343	0.012	0.015	0.019	0.019	−0.002	0.029	0.011
	(0.045)	(0.020)	(0.257)	(1.271)	(0.423)	(0.012)	(0.013)	(0.014)	(0.019)	(0.008)	(0.018)	(0.010)
		[0.414]	[0.414]	[0.414]	[0.460]	[0.436]	[0.414]	[0.414]	[0.414]	[0.823]	[0.414]	[0.414]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Outcome in Column (2) includes tasks or chores, either inside or outside the household, to earn money. Outcome variable in Column (5) censors the top 5% of observations of earnings variable. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Money amounts reported in Ghana cedis. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 11
Risk preference

Dependent Variables	Risk Preference Index	Would choose to play a game getting 6 cedis win and 0 cedis lose rather than a game getting 3 cedis win or lose	Would choose to play a game getting 6 cedis win and 0 cedis lose rather than a game getting 2 cedis win or lose	Would choose to play a game getting 6 cedis win and 0 cedis lose rather than a game getting 1 cedi win or lose	Self-reported willingness to take risks (0 high risk aversion—1 low risk aversion)	Would start a high risk-high return rather than low risk-low return business
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Individual Treatment Effects						
Aflatoun	−0.064	−0.022	−0.027	0.006	−0.034**	0.007
	(0.054)	(0.023)	(0.023)	(0.024)	(0.015)	(0.020)
		[0.516]	[0.516]	[0.879]	[0.314]	[0.879]
HMB	−0.076	−0.022	−0.030	−0.015	−0.025*	0.001
	(0.054)	(0.021)	(0.022)	(0.023)	(0.014)	(0.019)
		[0.516]	[0.516]	[0.689]	[0.421]	[0.958]
p-Value for test of Aflatoun = HMB	0.804	0.973	0.833	0.343	0.556	0.763
Control mean	0.000	0.346	0.429	0.535	0.515	0.202
R-squared	0.022	0.025	0.026	0.008	0.031	0.015
Observations	5291	5287	5287	5290	5288	5285
Panel B: Pooled Treatment Effect						
Aflatoun or HMB	−0.070	−0.022	−0.028	−0.005	−0.030**	0.004
	(0.049)	(0.019)	(0.020)	(0.021)	(0.013)	(0.017)
		[0.429]	[0.412]	[0.824]	[0.098]	[0.824]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 12
Time preference

Dependent Variables	Time Preference Index	Prefer 9 cedis in one week to 6 cedis now	Prefer 9 cedis in five weeks to 6 cedis in four weeks	Rather wait for medicine that heals completely than take one now that doesn't heal completely
	(1)	(2)	(3)	(4)
Panel A: Individual Treatment Effects				
Aflatoun	0.033	−0.011	0.010	0.031
	(0.049)	(0.020)	(0.018)	(0.023)
		[0.705]	[0.705]	[0.705]
HMB	0.031	0.011	−0.002	0.021
	(0.052)	(0.019)	(0.018)	(0.023)
		[0.705]	[0.890]	[0.705]
p-Value for test of Aflatoun = HMB	0.975	0.293	0.533	0.683
Control mean	0.000	0.737	0.820	0.667
R-squared	0.006	0.003	0.002	0.011
Observations	5291	5291	5290	5286
Panel B: Pooled Treatment Effect				
Aflatoun or HMB	0.032	−0.000	0.004	0.026
	(0.043)	(0.016)	(0.015)	(0.020)
		[0.983]	[0.983]	[0.566]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 13
Financial literacy

Dependent Variables	Financial Literacy Index	Difference between student's allocation and correct allocation in Shop Game 1†	Student made correct allocation in Shop Game 1	Seconds taken to complete Shop Game 1†	Difference between student's allocation and correct allocation in Shop Game 2†	Student made correct allocation in Shop Game 2	Seconds taken to complete Shop Game 2†	Student makes plan for how to spend their money during the week
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Individual Treatment Effects								
Aflatoun	0.015	−0.016	0.021	−0.071	0.015	0.003	0.899	0.014
	(0.055)	(0.025)	(0.026)	(2.620)	(0.022)	(0.016)	(2.141)	(0.027)
		[0.978]	[0.978]	[0.978]	[0.978]	[0.978]	[0.978]	[0.978]
HMB	−0.005	−0.016	0.003	−1.039	0.001	−0.014	0.221	−0.010
	(0.057)	(0.027)	(0.025)	(2.651)	(0.018)	(0.017)	(2.106)	(0.025)
		[0.978]	[0.978]	[0.978]	[0.978]	[0.978]	[0.978]	[0.978]
p-Value for test of Aflatoun = HMB	0.714	0.999	0.462	0.692	0.534	0.353	0.736	0.343
Control mean	0.000	0.248	0.444	44.049	0.129	0.843	39.491	0.654
R-squared	0.052	0.005	0.007	0.073	0.001	0.003	0.049	0.030
Observations	5291	5291	5291	5291	5291	5291	5290	5282
Panel B: Pooled Treatment Effect								
Aflatoun or HMB	0.005	−0.016	0.012	−0.554	0.008	−0.005	0.561	0.002
	(0.049)	(0.023)	(0.022)	(2.336)	(0.017)	(0.014)	(1.872)	(0.023)
		[0.926]	[0.926]	[0.926]	[0.926]	[0.926]	[0.926]	[0.926]

Two games were conducted as part of the survey, testing the ability of students to allocate money in hypothetical shopping scenarios. They were given a certain amount of money and a goods/price list and asked to allocate their money to purchase the goods. They were evaluated on whether they completely allocated the money, the amount of money left over, and how long they took. These games were separate from the student's hypothetical allocation of a given amount of money to spending and saving (Appendix Table 8, Column 10). Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. †indicates that the variable enters the index negatively. In Columns (2) & (5), because students were asked to allocate all of the money, the greater the difference between a student's allocation and the correct allocation, the worse their performance on the financial literacy test. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 14
Expenditures on temptation goods

Dependent Variables	Temptation Goods Index (1)	Amount spent on snacks in the last 7 days (2)	Amount spent on non-food goods and entertainment in the last 7 days (3)	Amount student would spend on fun if given 5 cedis (4)
Panel A: Individual Treatment Effects				
Aflatoun	−0.033	0.036	0.024	−0.142**
	(0.048)	(0.055)	(0.153)	(0.059)
		[0.956]	[0.956]	[0.126]
HMB	−0.022	0.003	−0.128	−0.012
	(0.044)	(0.061)	(0.118)	(0.050)
		[0.956]	[0.899]	[0.956]
p-Value for test of Aflatoun = HMB	0.766	0.565	0.255	0.029
Control mean	0.000	0.586	0.719	0.666
R-squared	0.052	0.029	0.013	0.037
Observations	5291	5291	5291	5291
Panel B: Pooled Treatment Effect				
Aflatoun or HMB	−0.027	0.020	−0.052	−0.077
	(0.042)	(0.051)	(0.119)	(0.047)
		[0.700]	[0.700]	[0.305]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Money amounts are reported in Ghana cedis. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 15
Expenditures on self

Dependent Variables	Expenditure Index (1)	Amount spent on self in the last 7 days (2)	Amount expects to spend in the next 7 days (3)
Panel A: Individual Treatment Effects			
Aflatoun	−0.016	0.054	−0.281
	(0.050)	(0.307)	(0.359)
		[0.861]	[0.594]
HMB	−0.064	−0.193	−0.528
	(0.046)	(0.269)	(0.336)
		[0.792]	[0.594]
p-Value for test of Aflatoun = HMB	0.287	0.386	0.446
Control mean	0.000	5.249	5.964
R-squared	0.154	0.142	0.094
Observations	5291	5291	5286
Panel B: Pooled Treatment Effect			
Aflatoun or HMB	−0.040	−0.069	−0.404
	(0.043)	(0.252)	(0.308)
		[0.785]	[0.385]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Regressions control for stratification dummies (region and standardized average class size) and baseline values of the dependent variable if available. Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Spending on self can include, for instance, money spent on food, clothes and school supplies. Money amounts are reported in Ghana cedis. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 16
Confidence

Dependent Variables	Confidence Index (1)	Confident in taking exams at school (2)	Has a low opinion of self† (3)	Often feels upset at school† (4)	Teacher makes them feel they are not good enough† (5)	Often gets discouraged at school† (6)
Panel A: Individual Treatment Effects						
Aflatoun	−0.047	−0.017	0.030	−0.006	0.045*	0.000
	(0.045)	(0.030)	(0.029)	(0.025)	(0.026)	(0.025)
		[0.986]	[0.986]	[0.986]	[0.986]	[0.986]
HMB	−0.011	−0.022	0.009	0.002	0.004	−0.018
	(0.045)	(0.029)	(0.031)	(0.022)	(0.023)	(0.023)
		[0.986]	[0.986]	[0.986]	[0.986]	[0.986]

(*continued on next page*)

Table 16 (*continued*)

Dependent Variables	Confidence Index	Confident in taking exams at school	Has a low opinion of self†	Often feels upset at school†	Teacher makes them feel they are not good enough†	Often gets discouraged at school†
	(1)	(2)	(3)	(4)	(5)	(6)
p-Value for test of Aflatoun = HMB	0.456	0.865	0.473	0.719	0.130	0.446
Control mean	0.000	2.047	1.066	1.160	1.055	1.070
R-squared	0.009	0.007	0.010	0.003	0.002	0.004
Observations	5291	5285	5281	5287	5281	5286
Panel B: Pooled Treatment Effect						
Aflatoun or HMB	−0.029	−0.019	0.019	−0.002	0.024	−0.009
	(0.038)	(0.026)	(0.026)	(0.020)	(0.021)	(0.021)
		[0.772]	[0.772]	[0.913]	[0.772]	[0.844]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. Individual outcome variables take on integer values ranging from 0 (strongly disagree) to 3 (strongly agree). †indicates that the variable enters the index negatively. Regressions control for stratification dummies (region and standardized average class size). Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 17
Academic performance

Dependent Variables	Academic Performance Index	Days of school attended in past week	Standardized aptitude test score
	(1)	(2)	(3)
Panel A: Individual Treatment Effects			
Aflatoun	−0.033	−0.037	−0.029
	(0.064)	(0.068)	(0.065)
		[0.819]	[0.819]
HMB	−0.047	−0.097	0.005
	(0.064)	(0.065)	(0.066)
		[0.701]	[0.937]
p-Value for test of Aflatoun = HMB	0.798	0.370	0.546
Control mean	0.000	4.493	0.016
R-squared	0.048	0.016	0.078
Observations	5291	4720	5291
Panel B: Pooled Treatment Effect			
Aflatoun or HMB	−0.040	−0.067	−0.012
	(0.058)	(0.058)	(0.059)
		[0.497]	[0.840]

Each column in Panel A presents the results of an OLS regression of the outcome variable on Aflatoun and HMB treatment dummies. Each column in Panel B presents the results of an OLS regression of the outcome variable on a dummy for the pooled treatment. The outcome variable in Column (3) takes the value of the student's standardized aptitude test score for either the primary or junior high school version of the aptitude test. The score distribution for each aptitude test was standardized within the relevant test-taking population and survey round, and these two sets of standardized scores were then combined to form one composite variable. Regressions control for stratification dummies (region and standardized average class size). Missing values of baseline variables are coded as zero, and additional dummy variables are included to indicate missing values. Indices are aggregated ignoring missing values in the individual variables. Standard errors clustered at the school level, in parentheses; FDR-corrected *q*-values in square brackets using procedure described in Benjamini and Hochberg (1995). For calculation of *q*-values, coefficients are grouped by specification (Panel A or Panel B). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Appendix B. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.worlddev.2017.09.011.

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