

The Impact of Financial Education for Youth

Veronica Frisancho*

October 2018

Abstract

Based on rigorous empirical evidence, this paper evaluates if the excitement about school-based financial education programs is warranted. First, relying on recent experimental evidence, the paper takes stock of the impact of financial education programs aimed at reaching children and youth. Second, it takes a look at the spillover effects of these programs in terms of their impact on both child labor and grade progression. Finally, the paper goes beyond average treatment effects and studies the distribution of gains across different population groups. The evidence uncovers large and robust impacts on financial skills under delivery models that incorporate a mandatory course requirement. In turn, voluntary after-school programs yield meager or null effects. These gains in financial literacy among youth do not come at the cost of pervasive effects on academic outcomes. Moreover, the impact of school-based financial education for the most part seems to be very inclusive, as treatment effects tend to be uniform across different sub-samples.

Keywords: Financial Education, Youth, Randomized Controlled Trials, Meta-analysis, Treatment Effects, Heterogeneous Impacts

JEL Codes: C12, D14, J24, O16

*Inter-American Development Bank, Research Department. 1300 New York Ave. NW, Washington, DC 20577. E-mail: vfrisancho@iadb.org.

1 Introduction

Financial inclusion efforts have tremendously improved access to financial products and services. However, take-up and usage rates of formal financial services remain quite low [Karlan et al., 2016], especially in the developing world. The limited demand for financial products can be partly explained by individuals' low levels of financial knowledge and capabilities. If consumers do not really understand the workings of the financial system, exclusion from formal financial markets will persist.

Despite initial disappointment with these interventions [Fernades et al., 2014], more recent and rigorous evidence has shown that financial education programs are able to modify financial behavior and increase financial literacy among adults [Miller et al., 2014; Kaiser and Menkhoff, 2017]. However, the magnitude of the impact seems modest. Changing adults' financial habits is hard, due to low participation rates in training programs [Bruhn et al., 2013] as well as reduced malleability due to aging [Casey et al., 2005; Blakemore and Choudhury, 2006]. More recently, several countries have specifically focused on youth, leveraging the potential advantages this group provides in terms of participation rates and cost. Nevertheless, rigorous empirical evidence on the effect of financial education programs for youth is still scarce [Miller et al., 2014].

This paper takes stock of the experimental evidence produced on the impact of financial education programs aimed at reaching children and youth. This effort is particularly timely and important given the increasing amount of resources devoted, at the national and global levels, to promote the inclusion of personal finances in school curricula. More importantly, this paper complements an evaluation of the magnitude of the impact across different settings with an analysis of the spillover and heterogeneous effects of these interventions. On one hand, it looks at the impact of financial education for youth on child labor and grade progression. On the other hand, it explores the distribution of gains across different population groups, which is extremely relevant to informing the design and tailoring of these policy interventions.

To evaluate the effectiveness of school-based financial education programs, I conduct a meta-analysis carefully targeted and limited in scope to experimental studies. Given the limited amount of evidence provided around spillover and/or heterogeneous effects, the second part of the paper takes advantage of the data available for one of the studies included in the meta-analysis to dig deeper into these issues.

The meta-analysis reveals that the impact of school-based financial education interventions on financial knowledge is promising. The evidence uncovers large and robust effect sizes under delivery models that incorporate personal finances material through a manda-

tory course requirement while revealing that voluntary after-school programs yield meager or null effects. Interestingly, financial education programs are much more effective in developed rather than less developed economies, which goes against the hypothesis that worse initial conditions are conducive to greater impacts in this case. This finding suggests that financial education programs in more developed countries may benefit from greater synergies due to higher quality of education, access to resources to implement experiential innovative approaches, and greater experience with money. Despite the lack of long-term follow-up data in the studies analyzed, preliminary evidence on the impact of financial education programs on intrinsic traits related to financial behavior suggests that an early start may yield long-lasting effects on behavior.

The meta-analysis also exposes the current limitations of this line of research. First, there is no consensus on the relevant outcomes that should be measured, which reflects our poor understanding of the relevant channels through which financial education is supposed to generate an impact. The analysis uncovers the need to organize an agenda that looks at final outcomes as well as intermediate outcomes (such as time preferences and self-control) in a comparable and organized way. Second, long-term evidence on the persistence of effects and their translation into healthy financial habits as adults is still not available. Most experimental studies rely on phase-in designs, and the rest focus only on short-term results. Finally, there is very scarce evidence on the potential unintended effects of financial education programs such as encouraging labor force participation and heterogeneous impacts that widen initial inequalities.

Further and novel analysis relying on experimental data for Peru reveals that school-based financial education programs neither incentivize youth to drop out from school nor widen initial inequalities in financial skills. On one hand, despite a small effect on the probability of working among older students, I fail to identify negative impacts of the personal finances lessons on the probability of being promoted to the next grade. On the other hand, these interventions appear to have very inclusive impacts on the stock of financial skills. The heterogeneity analysis of the treatment identifies uniform effects along several dimensions, including baseline levels of financial skills and math performance. The only background variable that seems to matter is socioeconomic status: students from households with a higher asset index tend to derive larger gains from the program.

All in all, the analysis conducted here provides interesting insights about the effectiveness of financial education for youth. The success of these programs seems to partly stem from the introduction of the content in a high-stakes context. In general, these programs do not have short-term negative “side-effects” on academic performance. Moreover, unlike educational interventions aimed at improving math or language achievement, financial ed-

ucation programs have very inclusive effects. This is a very promising finding that further underscores the benefits of fostering the delivery of financial education in schools.

2 Taking Stock of the Evidence

Financial competencies are becoming increasingly relevant as economies transform. Technology has improved the quality and timeliness of access to financial services all over the developing and developed world. As supply-side access barriers are bridged, demand-side factors such as lack of trust or limited financial literacy become more stringent deterrents to take-up and usage of formal financial products and services.

At the highest global policy level, youth have been identified as one of the priority targets of governments' efforts in the arena of financial education [OECD, 2014]. Several arguments justify the attention placed on children and young adults. First, they are still developing habits and are thus more malleable than adults. Second, tomorrow's adults will face increasingly sophisticated financial markets that will be hard to navigate without the right set of skills. Third, from a cost-efficiency standpoint, school-age populations are easily reached through schools and youth organizations, which reduces the costs and difficulties of implementation and increases participation rates.

By 2015, over 50 countries reported to be in the process of developing or implementing a national strategy on financial education. These strategies tend to include a focus on young segments of population and support the introduction of the content in schools, often promoting a cross-curricular approach that minimizes overloading of the curricula [OECD, 2017]. Despite rising interest in youth and the increasing implementation rate of school-based financial education programs, rigorous empirical evidence on their impact is still scarce.

Fortunately, the availability of experimental studies, both for adults and youth, has been on the rise in recent years [Miller et al., 2014; Kaiser and Menkhoff, 2017]. This allows us to take stock of the effectiveness of financial education on financial literacy and behavior among younger populations.

After a thorough review of the literature, I identified fourteen studies that rely on randomized controlled trials (RCTs) to measure the impact of financial education programs on school-age youth and provide all relevant information on their estimates to be included in the meta-analysis.¹ These studies come from diverse settings in the developed world (Germany,

¹See Alan and Ertac [2017], Batty et al. [2015], Batty et al. [2017], Becchetti and Pisani [2012], Berry et al. [2018], Bover et al. [2018], Bruhn et al. [2016], Frisancho [2018], Furtado et al. [2017], Hinojosa et al. [2009], Jamison et al. [2014], Luhrmann et al. [2017], Eissa et al. [2014], and Supanantarook et al. [2016]. Becchetti et al. [2013] also evaluates a program in Italy, but the report of their results does not allow us to obtain a comparable effect size. Instead of reporting the change in exam scores, they focus on the progress

Italy, Spain, and the United States) as well as from developing economies (Brazil, Ghana, Kenya, Peru, Turkey, and Uganda). The target population in all studies included in the meta-analysis are school-age students from elementary, middle school, and/or high school.²

In the sample, the outcome measure that is most common among all studies considered is financial literacy: 71% of the sample reports impacts on a standardized test that measures financial knowledge.³ Almost 40% of them focus on comparable savings outcomes while the report of other behavioral, preference, or attitudinal outcomes is more sparse and less comparable across studies. Most of the studies in the sample evaluated a school-based course but varied in terms of their degree of exposure to the educational materials, ranging between 1.5 and 18 months.

Figure 1 presents the results from a random effects meta-analysis conducted with the sub-sample of 10 studies with comparable treatment impacts on financial knowledge. This sample, which amounts to 12 effect sizes, yields an average effect size of 0.17 SD, significant at the 95% confidence interval. In fact, only 2 of the 12 evaluations are unable to reject the null hypothesis.

These promising results suggest that financial education programs aimed at children and adolescents have great potential. One key advantage of targeting this segment of the population is the possibility of reaching children while they are still in school and imparting financial literacy content as a stand-alone course or embedded within other courses in the official curriculum. Reaching this captive audience offers several advantages in terms of logistics and delivery cost, but it also tackles problems of participation and attendance, which are often severe when working with adults. Even though most of the interventions in the sample evaluated in-school programs with delivery through a specific course requirement, Berry et al. [2018] and Jamison et al. [2014] implemented voluntary programs after or outside the school setting, through an existing network of youth clubs. This variation allows us to compare the average effect size by the mandatory nature of the intervention and qualify the lack of impact identified in 2 out of the 12 effect sizes analyzed.

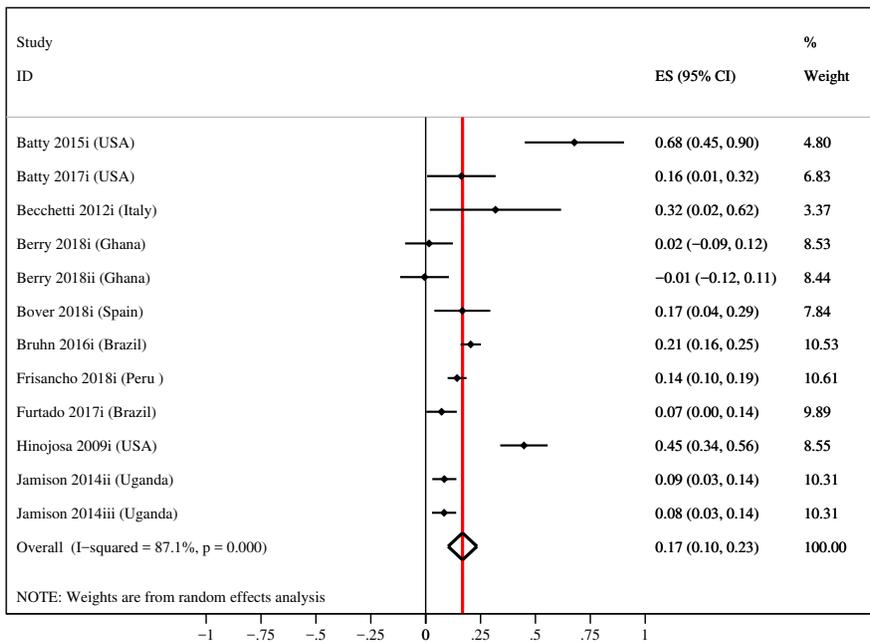
Panel (a) in Figure 2 shows that, when the analysis is limited to school-based programs with a course requirement, the average effect size on financial knowledge goes up to 0.24

made in treatment and control groups and do not provide sufficient statistics to remain in the final sample. It is noteworthy that the study does not find any impact of the financial education program among high school students. This may be due to the class-level randomization conducted, which gave room to spillover effects within the school.

²A recent meta-analysis of financial education programs includes a more extensive set of studies with diverse research designs but only 7 of the 36 studies included correspond to RCTs. See Amagir et al. [2018].

³Effect sizes were included if they were measured in a continuous scale (score or index). Whenever the outcome was not standardized to the mean and standard deviation of the control at baseline, I calculate Cohen's *d* (see Ringquist [2013]). As a result, Eissa et al. [2014]'s study had to be dropped since the authors only provide estimates of the impact on a handful of financial literacy questions separately.

Figure 1: Effect Sizes on Financial Knowledge

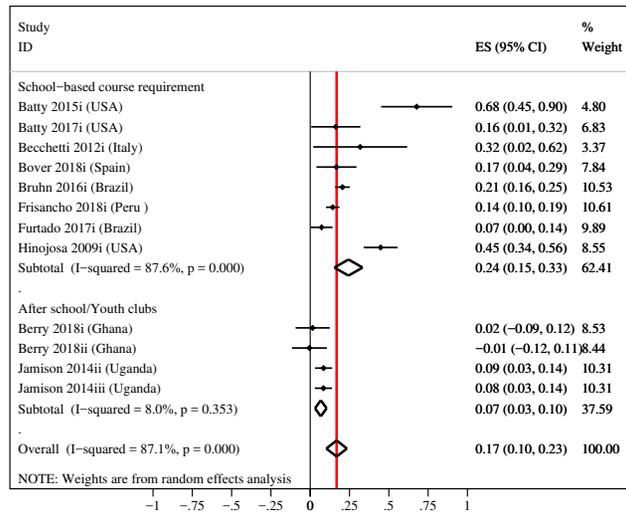


SD. This is a very large learning impact, especially when compared to educational interventions aimed at improving academic performance in math and language in developing countries [McEwan, 2015]. In turn, voluntary interventions implemented outside the school and without a course requirement have a very modest impact of 0.07 SD. Even though data on attendance are limited, the null effect in these studies seems to be driven by very low take-up rates. Unfortunately, only Berry et al. [2018] has data on attendance, but they are incomplete and do not permit the estimation of an average treatment effect on the treated.⁴

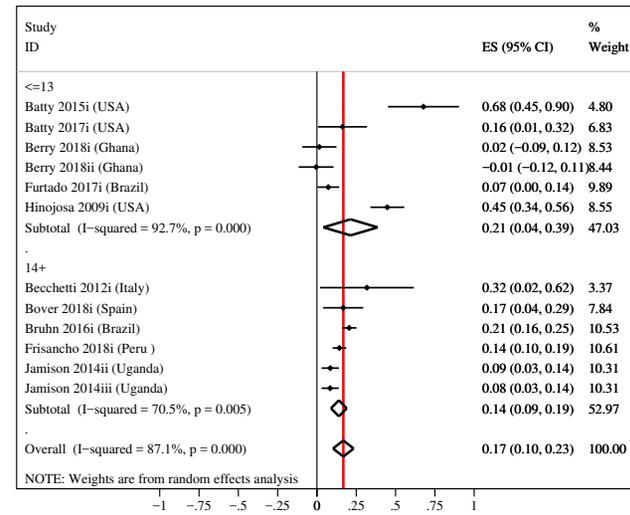
The weak adoption of financial education programs is understandable, especially at young ages. Since these are introductory programs, it is not surprising that students ignore or discount the benefits of adequate financial skills. Thus, it is plausible that the accrued (future) benefits of financial literacy are not well understood, while the current opportunity costs of attending a session impose a strong binding constraint. Lack of clear knowledge and limited exposure to financial choices that might expose their poor financial competencies hamper the success of voluntary programs.

⁴The data available in [Berry et al., 2018] cover only 17 out of 90 treatment schools. Nevertheless, the authors show that only a few demographic and academic variables have predictive power in a regression in which take-up is the dependent variable. Females and more financially literate students as well as those with prior experience with money (either saving or spending) tend to be more interested in financial literacy programs. This result suggests that the nature of self-selection may respond to unobservable characteristics that could be correlated with treatment impacts in ways we have not yet been able to determine.

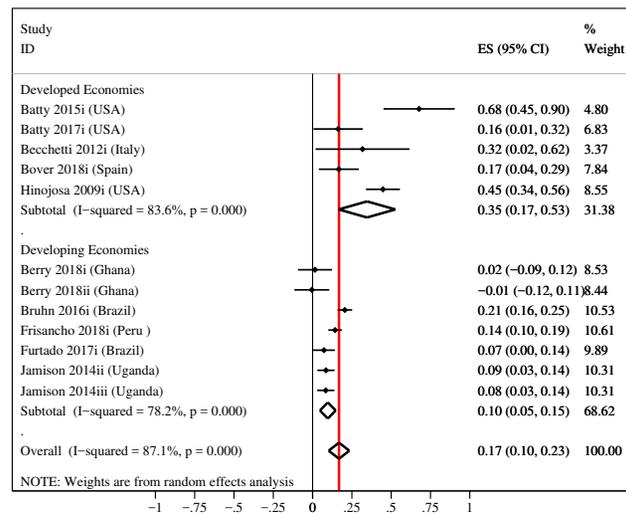
Figure 2: Effect Sizes on Financial Knowledge, by Characteristics of the Delivery, Beneficiaries, and Setting



(a) By the Mandatory Nature



(b) By Age



(c) By Countries' Degree of Development

The meta-analysis also suggests that larger average impacts are identified among the youngest (under 14) when compared to their older counterparts (see panel (b) in Figure 2). However, estimates in the youngest sample are quite noisy. The effect size estimated for older children is more precise and still high at 0.14 SD. Interestingly, financial education programs seem to be much more effective in developed rather than less developed economies. Panel (c) in Figure 2 exhibits that the average effect size of these interventions among countries such as Italy, Spain, and the United States is more than three times as large as the one identified for Brazil, Peru, Ghana, and Uganda (0.35 SD vs. 0.10 SD). This goes against the hypothesis that worse initial conditions are conducive to greater impacts in this particular case and suggests that financial education programs in more developed countries may benefit from greater synergies due to higher quality of education, access to resources to implement experiential innovative approaches [Hinojosa et al., 2009; Batty et al., 2017], and greater experience with money.

2.1 Current Gaps in the Literature

The meta-analysis conducted for school-based financial education programs allows us to take stock of the current evidence. But it also exposes the limitations of this line of research. First, there is lack of consensus on the relevant outcomes and how they should be measured, limiting the scope of what we can learn from rigorous evaluations. It is hard to gauge the magnitude of the impact of financial education programs beyond learning when it is not possible to reconcile the different outcomes measured and reported in the sample of studies collected. This lack of consensus in the literature and the diverse ad hoc measures of attitudes and behaviors relied upon expose the fact that we do not fully grasp the channels that facilitate the transmission of financial knowledge into financial behavior, especially among youth.

Along these lines, it is surprising that only a few studies focused on financial education for youth have paid attention to preferences and personality traits that may channel changes in future consumption and saving patterns due to their link to financial choices.⁵ For instance, despite the potential to have an impact on self-regulation due to higher malleability at young ages [Henrichs and Van den Bergh, 2015], only three studies in the sample measured the effect of financial education on this construct or a related measure. Batty et al. [2015] use one scale to measure the impact on the difficulty the child has in spending money immediately but find no statistically significant effect. Jamison et al. [2014] measured this outcome through three

⁵Strömbäck et al. [2018] shows that people with good self-control are more likely to save and exhibit better financial behavior. Similarly, Gathergood [2012] provides evidence on the positive association between lack of self-control and over-indebtedness levels in the United Kingdom. In fact, the author finds that the role of self-control in poor credit outcomes is stronger than that of financial literacy.

qualitative questions on procrastination and spending money too quickly or without thinking and two measures of time-inconsistency and was not able to identify any significant impact. However, part of the lack of impact in the latter may be explained by a higher average age (24.5) of participants in this study. More promising evidence is provided by Frisancho [2018]. Using the Tangney et al. [2004]’s scale, the study reports a modest positive impact of personal finance lessons on self-control. This result is particularly important since the intervention was not directly designed to affect this trait.

Two recent papers have focused on the impact of financial education programs on time preferences through incentivized measures that are extensively used in the literature. Luhrmann et al. [2017] identify that a school-based financial education program in Germany led to reductions in time inconsistency, increases in the allocation of payment to a single date, and greater consistency of choices with the law of demand among high schoolers. Similarly, Alan and Ertac [2017] evaluate the impact of an intervention specifically designed to improve 3rd and 4th graders’ ability to picture their future selves and encourage forward-looking behavior. They find that the treatment led to more patient intertemporal choices and that this effect is persistent almost three years after the intervention.

Due to the young age of the target population, it is hard to infer how altering preferences and personality traits related to financial choices is going to affect behavior down the road. But the persistence and the robustness exhibited in some of these novel results is promising and encourages future studies to include more intermediate outcomes in the set of outcomes considered.

Another limitation exposed by the meta-analysis is the lack of studies that look at the long-term impacts of financial education for the youth on posterior behavior. In a minority of countries (e.g., some states in the United States), there is a long tradition of mandated personal finance courses in high school. Natural variations in graduation requirements across cohorts have provided the opportunity to study the long-term consequences of well-established financial education courses on beneficiaries’ financial outcomes as adults.⁶ Notably, quasi-experimental evidence provided by Brown et al. [2014] shows that young people who are exposed to state-mandated financial education courses while in school have relatively higher credit scores and lower delinquency rates when compared to people who went to school in states without these requirements. However, experimental evidence has not been able to confirm this important finding, as most studies rely on phase-in designs. The few studies that have had the chance to keep an experimental design over time focused only on short-term (or very short-term) results on attitudes and behavior.

Finally, most of the studies analyzed fail to look at the bigger picture and ignore potential

⁶See Brown et al. [2016], Cole et al. [2016], and Brown et al. [2014] to name a few.

spillover effects into academic and labor participation outcomes as well as heterogeneous impacts that could widen initial inequalities. The current body of empirical literature on the impact of financial education for the youth is almost silent on the potential negative unintended effects of financial education programs. Depending on the content delivered, these programs may provide competing incentives for students to focus on school. On one hand, they encourage long-term planning, which may lead children to prioritize education over work and leisure. The new and novel material may also activate motivational channels among students and teachers, leading to improved academic performance. On the other hand, since the material makes financial matters more salient and emphasizes the importance of accumulating wealth and savings, children may be motivated to engage in paid work and/or increase the share of time allocated to work.

Berry et al. [2018] is one of the few papers that provides suggestive evidence in Ghana on these issues. In their study, financial education was provided through two different treatments. The first, developed by Aflatoun,⁷ delivered financial and social education, while the second provided only the financial component from the first treatment. The authors identify a small but weakly significant effect of the financial education treatment on child labor as measured by an index that combines incidence and intensity of work as well as earnings. In a more in-depth analysis, they identify changes in both labor force participation and the number of days worked per month. Moreover, they show that, in both treatment arms, the impact on the incidence and intensity of labor force participation was larger among junior high school students when compared to primary students. Nevertheless, this shift in the usage of time did not have an impact on either school attendance or test scores in Math and English.

Although the result on child labor calls for caution, one should keep in mind that it may be context-specific. Survey data for the control group reveals high labor market participation rates in this age group to begin with: about 24% of children report having worked for money in the last four months. More importantly, one should keep in mind that enrollment into the program was endogenous in this study. Since few observables seemed to explain take-up, we cannot rule out that unobservables that explain interest in the after-school program are somehow related to unobservables that are linked to a greater propensity to work. Further research is needed to confirm the external validity of this unintended effect.

Another notable exception is Bruhn et al. [2016], who looks at the effect of financial education provided in Brazilian high schools. The authors find that financial literacy lessons

⁷Aflatoun International is a large and international NGO that offers social and financial education to children and youth. They work with local partners worldwide to adapt and deliver the curricula they have developed for different age groups. For more information, see <http://aflatoun.org>.

raised by 9% the probability of working outside the household or in a family business. However, they do not identify any impact on dropout rates. Instead, passing rates improved by 1.2 percentage points and failure rates went down by 0.8 percentage points.⁸ The effect on child labor seems to respond to the specific content of the lessons, which also focused on entrepreneurship (including visits to meet real entrepreneurs) and incorporated material about searching for and finding a job.

Most of the studies reviewed also fail to explore (or report) heterogeneous treatment effects. Understanding the distributional effects of financial education interventions is key as average treatment impacts often mask differential effects for specific groups. Evaluating them is helpful in understanding whether the impact estimated is driven by a segment of the beneficiaries, identifying the widening of initial inequalities, inferring whether the intervention will work with a different population, and informing the design and tailoring of interventions.

In the sample studied, only a third of the evaluations explore the existence of heterogeneous treatment effects. Although limited, the evidence available suggests that there are differential impacts in some settings but, in general, disparities in learning and changes in behavior are not very salient. For example, Berry et al. [2018] finds no evidence of heterogeneity by gender, baseline work index, or predicted take-up on the probability to save. However, being an older student (i.e., junior high school) and having savings at baseline led to smaller impacts on saving in the treatment group that only provided financial education.

Another exception comes from Bover et al. [2018], which showed that the financial education intervention implemented in Spanish high schools led to no differential average impact across types of schools. However, the distributional effects differed: while public (worse) schools in the treatment group saw the financial skills of low performers improve disproportionately more, the impact among private schools seems mostly driven by changes in the upper part of the initial distribution of scores.

In sum, evidence on the differential impact that financial education programs may have is still quite limited. It is not possible to discard the hypothesis that the absence of heterogeneity analysis in the studies reviewed responds to a reporting bias of non-effects. Regardless of the reasons for this gap in the literature, further research on the topic needs to incorporate this type of analysis to better understand the distribution of the treatment effect, especially in view of the large and robust learning gains derived from school-based financial education.

⁸These results are only suggestive since the authors could not get access to individual-level records on grade progression and are left with data at the grade-school level to estimate treatment effects.

3 Spillover and Heterogeneous Effects of Financial Education for Youth

The introduction of financial education lessons in schools is a very recent and ongoing effort [OECD, 2014]. The increasing availability of empirical literature on the topic has mostly focused on the direct average effects of financial lessons on financial knowledge, attitudes, and behavior. However, two important aspects are understudied: the spillover effects of these programs into academic and labor market participation outcomes and their distributional impacts on knowledge gains.

Relying on data from an experimental study in Peru, this section contributes to the existing body of work on financial education for youth by providing empirical evidence on these two issues. First, I document the impact of financial education lessons on the probability of working and the probability of being promoted to the next grade. Second, I explore the heterogeneous treatment impacts that the lessons may have on financial skills.

3.1 Context and Data

In 2015, the Peruvian Ministry of Education (MINEDU) partnered with the Superintendency of Banks and Insurance (SBS) and the Center of Studies (CEFI) from the Peruvian Association of Banks to develop a pilot program in providing financial education to high school students. Together, they developed grade-specific student workbooks and a teacher’s guide. They also designed and implemented a 20-hour teacher training plan on the financial literacy contents to enable teachers as the main facilitators of the material included in the students’ workbooks. Teachers were instructed to incorporate the content of the workbooks into the course “History, Geography, and Economics.”

Since the content was not incorporated as a stand-alone course in the official curriculum, teachers were not bound to teach the material. However, they were greatly encouraged by the Ministry to implement the lessons, and the compliance levels achieved were quite satisfactory [Frisancho, 2018]. Despite the non-mandatory nature of the program from the teachers’ perspective, once the lessons were introduced into the regular classes of the course targeted, the content delivered became subject to performance evaluation from the students’ point of view.

The pilot intervention was randomized at the school level within a total sample of 300 full-day public schools in six regions of the country. The experimental sample was stratified by region, and schools were paired by their similarity in terms of observable characteristics within each of the six strata. The pairing procedure generates 150 matched pairs where each

school was randomly assigned to one of the treatment groups.

Frisancho [2018] evaluates the impact of the intervention among students and the teachers in charge of the delivery of the content along several dimensions. Both students and teachers were tested on their financial knowledge and surveyed on other outcomes such as time preferences, self-control, and shopping and saving habits at the end of the school year. The exit survey and exam were applied to 19,735 students and 486 teachers. Follow-up administrative data from the credit bureau were also used to measure the medium-run impact of the intervention on students' and teachers' credit outcomes.

Figure 1 above reported the average treatment impact on financial knowledge estimated by Frisancho [2018] at 0.14 SD. The program in Peru was extremely effective in improving students' financial knowledge, and its impact is very much in line with the results of similar programs implemented among high school students in Brazil [Bruhn et al., 2016] and Spain [Bover et al., 2018]. Average gains are also comparable to those identified in Batty et al. [2017], who implemented an experiential intervention among primary students in the United States.

3.2 Spillover Effects: Incentives to Invest in Education

Financial education lessons targeting young beneficiaries may provide them with competing incentives to invest in their own schooling. While these programs tend to encourage long-term planning and delayed gratification, they also make students more aware of money and ways to earn it and highlight the importance of accumulating savings. Depending on the selection of topics and the emphasis placed on each of them, different curricula may have diverging effects on academic performance, passing rates, and child labor rates. For example, a curriculum that emphasizes topics such as investment, discounting, and deferred gratification may be more likely to generate a change in perceived returns to education, as the present bias typically found among young adults is diluted. As a consequence, time allocated to doing homework or studying may increase and dropout decisions may be discouraged. In turn, lesson plans that incorporate entrepreneurial and job search components, as in Bjorvatn et al. [2015] and Bruhn et al. [2016], may overemphasize the need to accumulate wealth, driving students into greater levels of participation in paid work activities while curtailing time allocated to schooling.

Novel evidence from Brazil provided by Bruhn et al. [2016] shows that high school financial education led to a sizable 9% increase in the rate of participation in work outside the household or in a family business. Yet these collateral effects did not undermine students' academic success in the Brazilian case. In fact, passing rates modestly increased. Unfor-

Unfortunately, Bruhn et al. [2016] does not measure the impact on grades or any heterogeneity in the treatment effects that allows us to better understand these results. Moreover, we cannot attribute the negative effects on child labor to financial education. It is not clear if the effects identified in Brazil should be ascribed to the personal finance component, as the curriculum implemented specifically incorporated efforts to foster entrepreneurship and provide students with the necessary skills to find a job.

Using data from the high school pilot program implemented in Peru, Table 1 provides additional evidence on the extensive margin of labor market participation and school graduation by target school grade. This exercise is particularly relevant to financial education programs since the Peruvian curriculum focused exclusively on developing financial skills and excluded any content fostering youths' income-generating capacity.⁹ The results indicate that the likelihood of engaging in work (paid or unpaid) is only marginally impacted by the treatment among older students, in the last grade of high school. The effect amounts to a 5% increase in the probability of working relative to the control. However, the treatment did not change students' incentives to invest in education on the extensive margin: passing rates are not affected in any grade.

Table 1: Treatment Effects on Probability to Work and to Pass Grades

	Pr(Work)			Pr(Pass grade)		
	(1) 9th	(2) 10th	(3) 11th	(4) 9th	(5) 10th	(6) 11th
Treatment	-0.009 [0.012]	-0.007 [0.012]	0.023** [0.011]	0.015 [0.012]	-0.018 [0.012]	0.009 [0.010]
Mean Control	0.355	0.396	0.432	0.790	0.826	0.861
Number of Observations	6548	6441	6258	6136	6106	6071
R-squared	0.282	0.289	0.299	0.093	0.097	0.102
Number of Clusters	298	298	298	298	298	298

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%. OLS estimates, standard errors clustered at the school level are reported in brackets. All specifications include a set of dummy variables that correspond to the matched-pair of schools and the following set of controls: gender, currently working, received financial education lessons in the past, ratio of household members to bedrooms, asset index, high level of parental supervision, lives with both parents, and has dinner with parents all days of the week.

Even though these results are still context and curriculum specific, they provide novel evidence on the impact of financial education alone on students' incentives to stay in school. The good news is that carefully crafted curricula that focus on developing financial skills

⁹Broadly, the material included in the workbooks covered the differences between needs and resources and budgeting (9th grade), financial products and services (10th grade), and responsible financial consumer and access to information in financial markets (11th grade).

and shy away from income-generating capacity strategies have positive effects on financial capabilities without perverse effects on high school dropout. Even though older high school students see their probability of working slightly increased, this effect does not seem to jeopardize their chances of graduating from high school.

3.3 Can Everyone Learn Financial Skills?

Section 2 showed that financial education programs aimed at improving youth financial literacy levels are very effective, particularly when the content is delivered within regular classes at school. But, are the benefits of these interventions differential across individuals? The answer to this question is relevant to the design of these programs and to identifying ways of targeting more disadvantaged groups, if any.

As mentioned above, very few studies provide any sort of heterogeneity analysis of the treatment impacts but, in general, the impact of financial education seems to be quite equitable. Treatment impacts of financial education in the short term seem to be uniform [Bover et al., 2018] and, whenever tested, treatment heterogeneity by gender is rejected. Among those that identify some differential pattern, the evidence may be context-driven [Berry et al., 2018].

Relying on data from Frisancho [2018], I dig deeper into this issue and conduct an extensive analysis of heterogeneous treatment effects on financial knowledge across sub-samples of students with different characteristics and background. The main advantage of the data I use is the large set of individual and background characteristics measured at baseline. The rich survey and administrative data collected prior to the launch of the intervention allows me to go beyond other studies and explore the role of several potential mediating factors.

Table 2 shows that individual traits do not seem to mediate the impact of financial education. There is no evidence on differential gains by gender, works status at baseline, initial levels of patience, initial rating on a self-control scale, or previous exposure to financial education.

Table 3 explores the role of background characteristics as mediating factors of the impact of the intervention. It seems that most parental inputs do not play a role in determining children’s ability to learn about personal finances. Parental education plays no role in the learning production function induced by the treatment. Neither does the presence of both parents at home nor the amount of time spent with parents (measured as having dinner with parents every day of the week). Nevertheless, there is some evidence that the socioeconomic status of the household seems to matter: students from households with a higher asset index derive larger knowledge gains from the treatment. Relative to an average treatment effect

of 0.14 SD, a one standard deviation increase in the asset index raises financial skills by an additional 0.05 SD. Further decomposition of the index into its subcomponents suggests that technologically-oriented goods capture most of the positive marginal effect of assets on learning (see Table A.1). Even though the magnitude of the interaction is small, it may suggest that greater access to a computer or internet at home acts as a complement to financial education and enhances learning.

Table 2: Heterogeneous Treatment Effects on Financial Literacy by Individual Traits

	(1)	(2)	(3)	(4)	(5)
	Sex	Works	Patient	Self-control	Fin. Ed.
Sex	0.012 [0.022]	0.012 [0.017]	0.018 [0.017]	0.019 [0.019]	0.018 [0.018]
Works	-0.027* [0.015]	-0.022 [0.021]	-0.030** [0.015]	-0.020 [0.016]	-0.040*** [0.015]
Patient			0.096*** [0.019]		
High self-control				0.083*** [0.021]	
Previously exposed to Fin. Ed.	0.088*** [0.014]	0.091*** [0.014]	0.086*** [0.014]	0.084*** [0.015]	0.076*** [0.018]
Treatment	0.145*** [0.028]	0.150*** [0.023]	0.136*** [0.024]	0.146*** [0.030]	0.141*** [0.030]
Treatment X Sex	-0.002 [0.031]				
Treatment X Works		-0.017 [0.031]			
Treatment X Patient			0.016 [0.028]		
Treatment X High self-control				-0.007 [0.030]	
Treatment X Previous Fin. Ed.					0.008 [0.028]
Mean Control	0.008	0.008	0.008	0.008	0.008
Number of Observations	19673	16268	16676	13650	15408
R-squared	0.225	0.251	0.253	0.249	0.253
Number of Clusters	298	297	297	297	297

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%. OLS estimates, standard errors clustered at the school level are reported in brackets. All specifications include a set of dummy variables that correspond to the matched-pair of schools and the following set of controls: gender, grade, currently working, score in literacy exam at baseline, received financial education lessons in the past, ratio of household members to bedrooms, asset index, high level of parental supervision, lives with both parents, and has dinner with parents all days of the week.

Table 3: Heterogeneous Treatment Effects on Financial Literacy by Background Characteristics

	(1)	(2)	(3)	(4)	(5)
	Father's Education	Mother's Education	Lives w/both	Dines w/parents	Asset index
Father w/higher education	0.025 [0.025]				
Mother w/higher education		0.030 [0.026]			
Lives w/both parents	0.023 [0.015]	0.023 [0.015]	0.018 [0.020]	0.021 [0.014]	0.022 [0.014]
Dines with parents every day	0.034** [0.016]	0.044*** [0.016]	0.038** [0.016]	0.026 [0.021]	0.033** [0.015]
Asset Index	0.042*** [0.010]	0.043*** [0.010]	0.048*** [0.010]	0.046*** [0.010]	0.025* [0.014]
Treatment	0.127*** [0.023]	0.136*** [0.023]	0.140*** [0.029]	0.137*** [0.025]	0.145*** [0.022]
Treatment X Father w/higher ed.	0.055 [0.035]				
Treatment X Mother w/higher ed.		0.029 [0.039]			
Treatment X Lives w/both parents			-0.002 [0.028]		
Treatment X Dines w/parents				0.018 [0.030]	
Treatment X Asset Index					0.049*** [0.019]
Mean Control	0.008	0.008	0.008	0.008	0.008
Number of Observations	14993	15565	16249	16385	16336
R-squared	0.246	0.247	0.252	0.251	0.252
Number of Clusters	297	297	297	297	297

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%. OLS estimates, standard errors clustered at the school level are reported in brackets. All specifications include a set of dummy variables that correspond to the matched-pair of schools and the following set of controls: gender, grade, currently working, score in literacy exam at baseline, received financial education lessons in the past, ratio of household members to bedrooms, asset index, high level of parental supervision, lives with both parents, and has dinner with parents all days of the week.

Even though individual and background characteristics do not seem to drive the impact of financial education on knowledge, it may still be the case that initial financial skills or baseline academic performance influence the learning gains accrued by students. Surprisingly, Table 4 shows that none of these seem to matter. Treatment effects are uniform along the distribution of the baseline score level in the financial literacy exam (column 1). Academic achievement in the previous year, as measured by the grade point average, does not intermediate the impact of the treatment either. Even when math grades alone are considered, heterogeneous treatment effects are rejected (column 3).

Table 4: Heterogeneous Treatment Effects on Financial Literacy by Initial Skills and Performance

	(1)	(2)	(3)
	Initial Score	GPA	Math GPA
Q1	-0.102 [0.112]	-0.536*** [0.061]	-0.474*** [0.057]
Q2	-0.176** [0.084]	-0.357*** [0.048]	-0.369*** [0.049]
Q3	-0.122* [0.064]	-0.294*** [0.046]	-0.307*** [0.044]
Q4	-0.059 [0.050]	-0.172*** [0.041]	-0.183*** [0.044]
Treatment	0.137*** [0.047]	0.183*** [0.055]	0.161*** [0.056]
Treatment X Q1	0.005 [0.067]	-0.088 [0.085]	-0.075 [0.081]
Treatment X Q2	-0.021 [0.062]	-0.074 [0.065]	0.011 [0.062]
Treatment X Q3	0.038 [0.056]	-0.023 [0.058]	0.006 [0.054]
Treatment X Q4	0.026 [0.048]	-0.063 [0.054]	-0.058 [0.063]
Mean Control	0.008	0.008	0.008
Number of Observations	16521	17683	17683
R-squared	0.359	0.344	0.343
Number of Clusters	297	298	298

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%. OLS estimates, standard errors clustered at the school level are reported in brackets. All specifications include a set of dummy variables that correspond to the matched-pair of schools and the following set of controls: gender, grade, currently working, score in literacy exam at baseline, received financial education lessons in the past, ratio of household members to bedrooms, asset index, high level of parental supervision, lives with both parents, and has dinner with parents all days of the week.

These novel results are encouraging since they highlight the large potential gains of reaching *everyone* in the classroom. In particular, the inability to reject the equality of coefficients of the treatment interacted with the baseline score in the financial literacy exam is a novel and promising finding, which challenges well-established models of skill formation with self-productivity, dynamic complementarity, and skills multipliers [Heckman and Cunha, 2007]. Uniform impacts along the distribution of initial skills tends to be a rare result in studies that assess the effect of diverse interventions aimed at improving academic performance. For instance, Glewwe et al. [2009] finds that textbooks provided in Kenya improved the scores of the best students but had minor effects along the rest of the initial performance distribution. Fryer et al. [2015] implement a “parent academy” in Chicago to provide parents with tools to foster the development of early childhood cognitive and executive function skills. They find that students who enter the program below the median on non-cognitive skills do not reap any gain from the intervention, while children above the median accrue large treatment effects in both cognitive and non-cognitive dimensions. Similarly, Fryer and Holden [2013] report substantial heterogeneity in the treatment impacts generated by an intervention providing financial incentives to students, parents, and their teachers: only initially high-achieving students saw their math test scores increase.

Contrary to other educational interventions aimed at promoting better academic achievement, financial education provision does not widen initial inequalities in terms of financial skills. Indeed, no matter where students start, their relative learning capability is not differential. Figure A.1 in the Appendix confirms that, relative to the control group, improvement in financial literacy skills in the treatment group is strikingly stable along the distribution of baseline scores. These encouraging results suggest that the production function of financial skills may differ from the classical production function of other cognitive and non-cognitive skills.

In sum, the evidence presented in this section confirms that the potential to teach financial skills to the youth is large and the results tend to be very inclusive. School-based interventions with a course requirement generate very uniform impacts in terms of several individual and background characteristics. This certainly strengthens the case for pursuing the universalization of these programs at schools.

4 Conclusion

Despite recent evidence highlighting the positive effects of financial education for the general population, teaching people good financial habits once they are adults is quite challenging. Adults have competing uses of their time, which drives down their participation rates.

Moreover, many of their habits, including financial ones, are hard to change at a later stage of their lives. Financial education programs targeting children and youth are able to bypass these limitations. First, by fostering school-based programs, participation issues can be circumvented. When the lessons are included as a stand-alone course or embedded in an existing one, youth become a captive audience. Second, an early start in reaching more malleable populations may be more effective in the longer run.

This paper shows that financial education programs for youth have sizeable and robust impacts on financial skills. The large average effect size obtained from the meta-analysis of experimental evidence is almost completely driven by delivery models that incorporate a mandatory course requirement. Students' perception of the lessons as high-stakes material seems to better foster learning when compared to voluntary programs. Interestingly, financial education programs are much more effective in developed countries than in developing economies, which suggests potential synergies with greater quality of education and teachers, greater availability of resources, and greater experience with money.

A second finding of the paper is that the financial literacy gains yielded by financial education programs do not come at the cost of pervasive effects on academic outcomes. Even though evidence from Peru and other settings presents a modest increase in labor market participation while in school, this effect does not seem to negatively impact the probability of passing a grade and/or graduating.

The heterogeneity analysis yielded a surprising but very promising result: everyone can learn. Financial education for youth seems to allow all students to improve their measured financial literacy levels, regardless of their initial financial skills. The uniform impact of the treatment also holds across different demographic and background characteristics, as well as initial academic performance in school. These inclusive effects are quite unique to financial education programs when compared to other educational interventions that aim to improve math and language scores, making a stronger case for the universalization of these programs at schools.

The evidence presented here is quite robust and supports the expectation of large gains during the transition to the universalization of school-based programs. However, it is worth highlighting that the results come from *introductory* programs. In all studies analyzed, the estimated experimental impacts are produced in a context where schools had no previous experience providing similar content. We cannot rule out that part of the effect is explained by motivational channels that are activated when students and teachers are exposed to new content and materials. The magnitude of the marginal impacts identified may vary once scaling-up efforts phase in and financial education content becomes integrated with the regular curricula.

A promising line of research underexplored to date are experiential approaches that deliver financial education for youth. A couple of studies in the meta-analysis sample have evaluated the impact of these strategies, mostly at the primary level, with successful results. There is still more to learn about alternative ways to deliver financial literacy lessons that move away from a lecture model and that can be effective in settings where teachers' human capital levels are low.

References

- Alan, S. and Ertac, S. [2017], Fostering Patience in the Classroom: Results from a Randomized Educational Intervention. Manuscript.
- Amagir, A., Groot, W., Maassen van den Brink, H. and Wilschut, A. [2018], ‘A review of financial-literacy education programs for children and adolescents’, *Citizenship, Social and Economics Education* **17**(1), 56–80.
- Batty, M., Collins, M. and Odders-White, E. [2015], ‘Experimental evidence on the effects of financial education on elementary school students’ knowledge, behavior, and attitudes’, *The Journal of Consumer Affairs* **49**(1), 69–96.
- Batty, M., Collins, M., O’Rourke, C. and Elizabeth, O. [2017], Experiential Financial Literacy: A Field Study of My Classroom Economy. Working paper.
- Becchetti, L., Caiazza, S. and Coviello, D. [2013], ‘Financial education and investment attitudes in high schools: Evidence from a randomized experiment’, *Applied Financial Economics* **23**(10), 817–836.
- Becchetti, L. and Pisani, F. [2012], Financial Education on Secondary School Students: The Randomized Experiment Revisited. Facolta di Economia di Forli, Working Paper No. 98.
- Berry, J., Karlan, D. and Pradhan, M. [2018], ‘The Impact of Financial Education for Youth in Ghana’, *World Development* **102**, 71–89.

- Bjorvatn, K., Cappelen, A., Helgesson Sekei, L., Sørensen, E. and Tungodden, B. [2015], Teaching through Television: Experimental evidence on entrepreneurship education in Tanzania. Norwegian School of Economics (NHH) Choice Lab Working Paper.
- Blakemore, S. and Choudhury, S. [2006], ‘Development of the adolescent brain: implications for executive function and social cognition’, *J Child Psychol Psychiatry* **47**(3-4), 296–312.
- Bover, O., Hospido, L. and Villanueva, E. [2018], The Impact of High School Financial Education on Financial Knowledge and Choices: Evidence from a Randomized Trial in Spain, Technical report, Documento de Trabajo N. 1801, Banco de España.
- Brown, A., Collins, M., Schmeiser, M. and Urban, C. [2014], State Mandated Financial Education and the Credit Behavior of Young Adults. FEDS Working Paper No. 2014-68.
- Brown, M., Grigsby, J., van der Klaauw, W., Wen, J. and Zafar, B. [2016], ‘Financial Education and the Debt Behavior of the Young’, *The Review of Financial Studies* **29**(9), 2490–2522.
- Bruhn, M., de Souza Leão, L., Legovini, A., Marchetti, R. and Zia, B. [2016], ‘The Impact of High School Financial Education: Evidence from a Large-Scale Evaluation in Brazil’, *American Economic Journal: Applied Economics* **8**(4), 256–295.
- Bruhn, M., Lara Ibarra, G. and McKenzie, D. [2013], Why Is Voluntary Financial Education So Unpopular? Experimental Evidence from Mexico. World Bank, Policy Research Working Paper 6439.
- Casey, B., Tottenham, N., Liston, C. and Durston, S. [2005], ‘Imaging the developing brain: what have we learned about cognitive development?’, *Trends Cogn Sci.* **9**(3), 104–110.

- Cole, S., Paulson, A. and Kartini Shastry, G. [2016], ‘High School Curriculum and Financial Outcomes: The Impact of Mandated Personal Finance and Mathematics Courses’, *The Journal of Human Resources* **51**(3), 657–698.
- Eissa, N., Habyarimana, J. and William, J. [2014], Chapter 5: Can cartoons improve the effectiveness of financial education?, *in* M. Lundberg and F. Mulaj, eds, ‘Enhancing Financial Capability and Behavior’, The World Bank.
- Fernades, D., Lynch, J. and Netemeyer, R. [2014], ‘Financial literacy, financial education, and downstream financial behaviors’, *Management Science* **60**(8), 1861–1883.
- Frisancho, V. [2018], The Impact of School-Based Financial Education on High School Students and their Teachers: Experimental Evidence from Peru. IDB Working Paper Series NÂ° IDB-WP-871.
- Fryer, R. and Holden, R. [2013], Multitasking, Dynamic Complementarities, and Incentives: A Cautionary Tale. Working paper.
- Fryer, R., Levitt, S. and List, J. [2015], Parental Incentives and Early Childhood Achievement: A Field Experiment in Chicago Heights. NBER Working paper No. 21477.
- Furtado, I., Legovini, A. and Piza, C. [2017], How Early One Should Start Financial Education: Evidence from a Large Scale Experiment. World Bank, DIME Financial and PSD Program in Brief.
- Gathergood, J. [2012], ‘Self-control, financial literacy and consumer over-indebtedness’, *Journal of Economic Psychology* **33**, 590–602.

- Glewwe, P., Kremer, M. and Moulin, S. [2009], ‘Many Children Left Behind? Textbooks and Test Scores in Kenya’, *American Economic Journal: Applied Economics* **1**(1), 112–135.
- Heckman, J. and Cunha, F. [2007], ‘The technology of skill formation’, *American Economic Review* **97**(2), 31–47.
- Henrichs, J. and Van den Bergh, B. [2015], Perinatal developmental origins of self-regulation, *in* G. Gendolla, M. Tops and S. Koole, eds, ‘Handbook of Biobehavioral Approaches to Self-Regulation’, Springer.
- Hinojosa, T., Miller, S., Swanlund, A., Hallberg, K., Brown, M. and O’Brien, B. [2009], The Stock Market Game Study Final Report. Learning Point Associates.
- Jamison, J., Karlan, D. and Zinman, J. [2014], Financial Education and Access to Savings Accounts: Complements or Substitutes? Evidence from Ugandan Youth Clubs. NBER Working Paper No. 20135.
- Kaiser, T. and Menkhoff, L. [2017], ‘Does financial education impact financial literacy and financial behavior, and if so, when?’, *The World Bank Economic Review* **31**(3), 611–630.
- Karlan, D., Kendall, J., Mann, R., Pande, R., Suri, T. and Zinman, J. [2016], Research and Impacts of Digital Financial Services. Research Working Paper Series 16-037, Harvard Kennedy School.
- Luhrmann, M., Serra-Garcia, M. and Winter, J. [2017], The Impact of Financial Education on Adolescents’ Intertemporal Choices. IFS Working Paper, W14/18.

- McEwan, P. [2015], ‘Improving learning in primary schools of developing countries: A meta-analysis of randomized experiments’, *Review of Educational Research* **85**(3), 353–394.
- Miller, M., Reichelstein, J., Salas, C. and Zia, B. [2014], ‘Can you help someone become financially capable? a meta-analysis of the literature’, *World Bank Research Observer* **30**(2), 220–246.
- OECD [2014], *Financial Education for Youth: The Role of Schools*, Technical report, OECD Publishing.
- OECD [2017], *PISA 2015 Results (Volume IV)*.
- Ringquist, E. [2013], *Meta-Analysis for Public Management and Policy*, Wiley.
- Strömbäck, C., Lind, T., Skagerlund, K., Västfjäll, D. and Tinghög, G. [2018], ‘Does self-control predict financial behavior and financial well-being?’, *Journal of Behavioral and Experimental Finance* **14**, 30–38.
- Supanantaroeak, S., Lensink, R. and Hansen, N. [2016], ‘The impact of social and financial education on savings attitudes and behavior among primary school children in Uganda’, *Evaluation Review* **31**(1), 1–31.
- Tangney, J., Baumeister, R. and Boone, A. [2004], ‘High self-control predicts good adjustment, less pathology, better grades, and interpersonal success’, *Journal of Personality* pp. 271–324.

A Additional Figures and Tables

Figure A.1: Treatment Impacts on Financial Knowledge by Initial Level of Financial Literacy

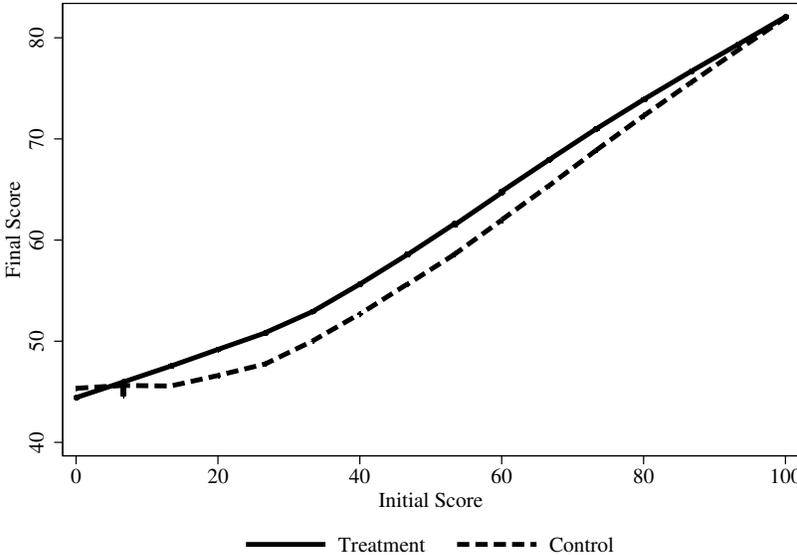


Table A.1: Heterogeneous Treatment Effects on Financial Literacy by Household Assets

	(1)	(2)
	SES	SES by components
Treatment	0.145*** [0.022]	0.145*** [0.022]
Treatment X Public Services		-0.006 [0.012]
Treatment X Durables		0.016 [0.016]
Treatment X Tech-oriented		0.042*** [0.015]
Treatment X Transport		-0.012 [0.010]
Treatment X Asset Index	0.049*** [0.019]	
Mean Control	0.008	0.008
Number of Observations	16336	16336
R-squared	0.252	0.253
Number of Clusters	297	297

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%. OLS estimates, standard errors clustered at the school level are reported in brackets. All specifications include a set of dummy variables that correspond to the matched-pair of schools and the following set of controls: gender, grade, currently working, score in literacy exam at baseline, received financial education lessons in the past, ratio of household members to bedrooms, asset index, high level of parental supervision, lives with both parents, and has dinner with parents all days of the week. The “public services” sub-index captures water and sanitation household connection. “Durables” includes washing machine, fridge, and microwave ownership. The sub-index “tech-oriented” measures ownership of a computer, tablet, or mobile and home access to internet and cable TV. Finally, the “transport” sub-index measures if the household owns motorcycles, mototaxis, or cars.