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The impact of financial education for youth

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Abstract

This paper evaluates whether the excitement about school-based financial education 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 complements existing studies by focusing on the potentially negative unintended effects of these programs. Relying on data from a large-scale randomized controlled trial in Peru, the paper investigates whether financial education programs have spillover effects on academic outcomes or if they widen initial inequalities due to heterogeneous treatment impacts. While delivery models that incorporate a mandatory course requirement yield large and robust impacts on financial literacy, voluntary after-school programs yield meager effects. These gains do not come at the cost of pervasive effects on the probability to pass a grade. Moreover, the impact of school-based financial education seems to be very inclusive, as treatment effects are uniform across different sub-samples.

Keywords: Financial education, Youth, Randomized controlled trials, Treatment effects, Heterogeneous impacts

JEL Classification: C93, D14, J24, O16

1 Introduction

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). The introduction of financial eduction lessons in schools is a recent and ongoing effort. 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.

This paper tries to present a timely and complete picture of the impact of school-based financial education programs. In addition to taking stock of the experimental evidence produced on programs aimed at reaching children and youth, it complements existing studies with novel results focusing on the potentially negative unintended effects of these programs. Relying on data from a large-scale randomized controlled trial (RCT) conducted in Peru, this paper extends the literature by looking into the unintended effects of financial education programs such as encouraging labor force participation or widening initial inequalities due to heterogeneous treatment impacts. This effort is particularly relevant given the increasing amount of resources devoted, at the national and global levels, to promoting the inclusion of personal finance in school curricula.

In sum, the evidence portrays school-based financial education programs as a very effective policy tool to increase financial knowledge among children and youth. The measured learning gains are impressive, especially when compared to those delivered by successful educational interventions trying to improve math and language performance in school. Although behavioral changes are limited by the still-incipient financial lives of the beneficiaries, some modest positive impacts are also identified in terms of savings and shopping behavior. A handful of promising studies additionally show that personal finance courses are able to increase self-control and patience, which are both intrinsic traits related to healthy financial behavior.

The evidence further shows that the large and robust effect sizes identified for financial programs for the youth are derived from delivery models that incorporate personal finance material through a mandatory course requirement. Instead, voluntary after-school programs yield meager or null effects.

Further and novel analysis reveals that school-based financial education programs do not seem to have unintended pervasive effects. The results based on the Peruvian data show that the program neither incentivized youth to drop out from school nor widened initial inequalities in financial skills. Even though personal finance lessons have a small positive effect on the probability of working among older students, the likelihood to be promoted to the next grade stays unaffected.

Moreover, the delivery of financial education appears 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 stem in part from the introduction of the content in a high-stakes context. Additionally, these programs do not seem to have short-term negative "side effects" on academic performance and, unlike educational interventions aimed at improving math or language achievement, they yield very inclusive effects. These are very promising findings that further underscore the benefits of fostering the delivery of financial education in schools.

2 Taking Stock of the Evidence

By 2017, over 70 countries were 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 the increasing number of school-based pilot programs around the world, rigorous empirical evidence on the impact of financial education interventions targeting children and youth is still scarce.

Fortunately, the availability of experimental studies, both for adults and youth, has been on the rise in recent years (Miller, Reichelstein, Salas and Zia, 2014, Kaiser and Menkhoff, 2017). The evidence generated by RCTs estimates substantial gains from financial education programs among school-age children and youth. Within a sample of experimental studies covering the period 2012-2018, Kaiser and Menkhoff (2019) estimate the average effect size of school-based education programs on financial knowledge at 0.19 SD.[1]

To put them in context, it is valuable to compare the average gains in knowledge from financial education programs to those obtained from educational interventions aimed at improving academic performance. Relying on a large sample of RCTs in developing countries, McEwan

[1] There is also a recent meta-analysis of financial education programs for children and adolescents but only seven of the 36 studies included in their sample include RCTs. See Amagir, Groot, Maassen van den Brink and Wilschut (2018).

(2015) finds that the largest mean effect sizes on math and language learning are estimated at 0.15 SD for treatments that include computers or instructional technology. Other successful educational interventions such as teacher training (0.12 SD), hiring contract or volunteer teachers (0.10 SD), or providing student and teacher performance incentives (0.09 SD), yield less than half the impact derived from financial education programs.

Interestingly, the large positive effects identified on financial knowledge seem to be driven by school-based programs with a course requirement. Three recent studies in Peru, Spain, and Brazil identify large and comparable knowledge gains between 0.15 and 0.21 SD among high school students who received financial education lessons that were introduced during the regular school day (Frisancho, 2018, Bruhn, de Souza Leão, Legovini, Marchetti and Zia, 2016, Bover, Hospido and Villanueva, 2018). Even larger (0.32 SD) but noisier gains are identified by Becchetti and Pisani (2012) among Italian students from the last year of high school. Primary students who were provided with personal finance material in a mandatory way, either through lectures (Batty, Collins and Odders-White, 2015) or experiential approaches (Batty, Collins, O'Rourke and Elizabeth, 2017, Hinojosa, Miller, Swanlund, Hallberg, Brown and O'Brien, 2009) in the United States, also improved their levels of financial literacy quite considerably.

In turn, the delivery of similar content through voluntary programs implemented after or outside the school setting has a very modest or null impact on financial knowledge (Jamison, Karlan and Zinman, 2014, Berry, Karlan and Pradhan, 2018).[2] Since participation is endogenous in these programs, data on attendance could be quite useful in understanding this result. Unfortunately, only Berry et al. (2018) collected data on attendance, but they are incomplete and do not permit the estimation of an average treatment effect on the treated.[3]

Financial education programs for youth are often questioned due to the lack of evidence supporting their long-run effectiveness once the intended beneficiaries become active economic agents. A few studies have been able to exploit natural variations in graduation requirements across cohorts in the United States to study the long-term consequences of mandated personal finance courses in high school or college.[4] Notably, quasi-experimental evidence provided by Brown et al.

[2] Kaiser and Menkhoff (2017) identify a smaller effect of mandatory programs relative to voluntary ones. This apparent disconnect is due to the sample of studies included in their meta-analysis, which includes evaluations of financial education programs regardless of the target age group. The negative coefficient on mandatory programs they find is thus likely to be driven by studies targeting adults.

[3] The 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 involve unobservable characteristics that could be correlated with treatment impacts in ways we have not yet been able to determine.

[4] See Brown, Grigsby, van der Klaauw, Wen and Zafar (2016), Cole, Paulson and Kartini Shastry (2016), and Brown, Collins, Schmeiser and Urban (2014), among others.

(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. Unfortunately, experimental evidence has not been able to confirm this finding.

In any case, the short-term experimental evidence on behavior and other personality traits and preferences that are likely to mediate behavior is promising. Despite the limited range of transactions at young ages, financial education programs seem able to change behavior among youth: Kaiser and Menkhoff (2019) identify that these interventions yield an average effect size of 0.08 SD on financial behavior.

Recent studies also show that financial education programs can be effective in altering preferences and personality traits that may channel changes in future consumption and saving patterns.[5] 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 have analyzed the role of financial education on related traits among youth. For instance, Alan and Ertac (2018) show that a training program on financial awareness and savings aimed at improving the ability to imagine future selves fostered greater levels of patience among 3rd and 4th graders in Turkey. Their result is quite impressive, especially since it persists up to three years after the intervention.

Along the same lines, Luhrmann, Serra-Garcia and Winter (2018) find that German high school students make more time-consistent choices after receiving financial education lessons on shopping, planning, and saving at school. Similarly, Frisancho (2018) identifies a sizeable positive effect on self-control (0.03 SD) in a large-scale experiment in Peru targeting 9th, 10th, and 11th graders. The ability of these two programs to alter self-control and intertemporal choices is even more impressive once we take into account that the curriculum was not specifically designed to alter these traits as in the case of Alan and Ertac (2018).

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.

2.1 Do Financial Education Programs for Youth Have a Downside?

The evidence described above portrays financial education programs targeting youth as a very effective strategy not only for conveying financial knowledge but also for improving financial skills as measured by changes in financial behavior and related preferences and personality traits. One

[5] Strömbäck, Lind, Skagerlund, Västfjäll and Tinghög (2018) show 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.

key advantage of targeting this age group is the possibility of reaching subjects 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.

But, is there a downside to these efforts? Few studies have tried to explore if financial education programs have any unintended negative consequences. On one hand, these programs may provide students with new inputs to evaluate the competing incentives they face to choose between focusing on school or dedicating their time to other activities with higher short-run returns. On the other hand, the distributional effects of these programs may exacerbate initial inequalities if those who learn the most are students with baseline advantages in terms of socioeconomic status or financial or academic performance. As more countries are trying to develop financial education strategies with a focus on youth, the measurement of their spillover effects on academic outcomes and their distributional effects becomes a relevant input for policy makers.

The development of financial skills is closely tied to economic concepts that percolate individuals' choices beyond those purely financial such as getting a loan or choosing an optimal savings product. Financial education programs may also improve the ability to think about opportunity costs and marginal returns when making investment choices, both within and outside the financial system. At younger ages, financial literacy has the potential to have long-lasting effects on human capital investment choices, as financially savvier students will tend to be better judges of the pros and cons of investing in additional years of schooling.

Nevertheless, most of the studies available to date ignore potential spillover effects into academic and labor market participation outcomes. Financial education programs encourage long-term planning and could foster patience, 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. However, 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.

For instance, Pesando (2018) finds that, on average, higher financial literacy increases students' perceived value of schooling in Italy. Berry et al. (2018) also provide suggestive evidence for Ghana. The authors identify a small but weakly significant effect of a financial education program on labor market participation, 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. 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 Berry et al. (2018)'s result on labor market participation 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 percent of children report having worked for money in the last four months. More importantly, enrollment in the financial education program was endogenous in this study. Since few observables seem to explain take-up, we cannot rule out that unobservables that explain interest in the after-school program are correlated with the unobservables linked to a greater propensity to work.

Novel evidence from Brazil provided by Bruhn et al. (2016) shows that high school financial education led to a sizable 9 percent 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 improved by 1.2 percentage points and failure rates went down by 0.8 percentage points.[6] However, we cannot fully attribute the negative effects on labor market participation to financial education. In fact, it is not clear if these side-effects should be ascribed to the personal finance component, as the curriculum implemented in Brazil incorporated lessons aimed at fostering entrepreneurship and providing students with the necessary skills to find a job.

Another potential drawback of financial education programs is that their positive effect could be concentrated among a few advantaged students, widening initial inequalities. Indeed, uniform impacts along the distribution of initial skills tend to be rare in studies that assess the effect of interventions aimed at improving academic performance in the economics of education literature. For instance, Glewwe, Kremer and Moulin (2009) find 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, Levitt and List (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.

Most of the studies evaluating the impact of financial education for youth fail to explore (or report) heterogeneous treatment effects. Evaluating the distributional effects of financial education interventions is key to inform the design and tailoring of interventions. These estimates allow us to understand whether the average impact estimated is driven by a segment of the beneficiaries, to

[6] These 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.

identify the trajectory of initial inequalities and monitor the gap across groups, and to infer whether the intervention will work with a different population.

Although limited, the evidence suggests that there are differential impacts in some settings but, in general, disparities in learning and changes in behavior are not very salient. This is in line with Kaiser and Menkhoff (2017)' results, who do not find heterogeneous effects by gender, age, context, or intervention channel in their meta analysis.

Indeed, Berry et al. (2018) fail to identify differential treatment effects by gender, baseline work index, or predicted take-up on the probability of saving. However, being an older student (i.e., junior high school) and having savings at baseline led to smaller impacts of financial education on savings. Similarly, Bover et al. (2018) show that the program implemented in Spanish high schools led to uniform average impacts 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. However, 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 effects, especially in view of the large and robust learning gains derived from school-based financial education.

3 The Unintended Effects of Financial Education for Youth

The increasing availability of empirical literature on the impact of school-based financial lessons has mostly focused on the average effects on financial knowledge, attitudes, and behavior. Even though the evidence tends to agree on the effectiveness of financial education for youth, especially in terms of learning, the potentially unintended effects of these programs are understudied.

Relying on data from an experimental study in Peru, this section focuses on two important areas that provide a more complete picture of the global effects of school-based financial education: the spillover effects into academic and labor market participation outcomes and the distributional impacts on financial knowledge. First, this section documents the impact of financial education lessons on the probability to work and the probability to get promoted to the next grade. Second, the heterogeneous treatment impacts that these lessons may have on financial skills is explored.

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 financial education pilot program targeting 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 during the second half of the academic year 2016. From the students' perspective, the content delivered became subject to performance evaluation since the lessons were introduced into the regular classes of the course targeted.

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. Under this context, the compliance levels achieved where quite high: 73 percent of teachers in the treatment group attended at least one training session, and 43 percent of them had perfect attendance. Only a third of the teachers report that they had not taught any of the financial education lessons by the end of the year.

Compared to other programs aimed at improving financial skills among high school students (Bruhn et al., 2016, Bover et al., 2018), a key aspect of the pilot in Peru is the training provided to the teachers. This feature seemed to be crucial for the success of the program and it may have contributed to the engagement of the teachers with the new material and their relatively high levels of compliance with the treatment given the voluntary nature of their participation.

The Peruvian program presented well-defined and structured sessions in the workbooks to facilitate the delivery of the material. All lessons started with a case study or a reading, dedicated a portion to the analysis of the information, presented some motivating questions, and concluded with integrating activities. The material was intended to be delivered in a lecture format, distinguishing the Peruvian experience from other experiential approaches implemented in the United States with younger children. Broadly, 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).

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 implementation partners decided to focus on urban schools due to logistical reasons. 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. The treatment was randomized within each of these pairs.

Frisancho (2018) evaluates the impact of the intervention among students and the teachers in charge of the delivery of the content along several dimensions relying on survey data and administrative records. The exit survey and exam were applied to 19,735 students and 486 teach-

ers. 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 2016 school year, 6 months after the intervention was launched.[7] Administrative records on grades and graduation from the Peruvian Ministry of Education for 2016 and 2017 academic years allow Frisancho (2018) to look at the effects of the program on academic outcomes in the short and medium run. Follow-up administrative data from the largest private credit bureau in the country were also used to measure the medium-run impact of the intervention on students' and teachers' credit outcomes almost two years after the intervention was implemented.

The program in Peru was extremely effective in improving students' financial knowledge, with learning gains of 0.15 SD. 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). The 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 the content of these programs tend to encourage long-term planning and delayed gratification, they also try to 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 divergent effects on academic performance, passing rates, and labor market participation rates.

Young adults still in the process of developing their locus of control tend to be more impatient and exhibit marked present biases (Steinberg, Graham, O'Brien, Woolard, Cauffman and Banich, 2009). Thus, a curriculum that emphasizes topics such as investment, discounting, and deferred gratification may be able to dilute their bias towards the present and generate a change in perceived returns to education. 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, Cappelen, Helgesson Sekei, Sørensen and Tungodden (2015) and Bruhn et al. (2016), may overemphasize the need to accumulate wealth, driving students into higher levels of participation in paid work activities and curtailing time allocated to schooling.

Using data from the high school pilot program implemented in Peru, Table 1 provides additional evidence on the effects of financial education programs on labor market participation and school graduation. Results are presented by school grade since the impact on these outcomes is likely to differ by student's progress within the secondary level. This exercise is particularly rele-

[7] Self-control is measured by self-reported data using the Tangney, Baumeister and Boone (2004)'s scale. Time preferences are defined as in Ashraf, Karlan and Yin (2006).

vant to financial education programs since the Peruvian curriculum focused exclusively on developing financial skills and excluded any content that directly fostered income-generating capacity among youth.

Table 1. Treatment Effects on Probability to Work and to Get Promoted to the Next Grade

Dependent Variable	Pr(Work)			Pr(Pass Grade)		
Sample	9th	10th	11th	9th	10th	11th
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.012	-0.009	0.019*	0.013	-0.018	0.014
	[0.012]	[0.011]	[0.011]	[0.012]	[0.012]	[0.010]
Mean Control	0.309	0.343	0.382	0.780	0.812	0.851
Number of Observations	6481	6376	6205	6238	6207	6131
R-squared	0.282	0.294	0.301	0.096	0.098	0.107
Number of Clusters	296	296	296	296	296	296

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.

The results in Table 1 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 percent increase in the probability of working relative to the control. However, the treatment did not change students' incentives to invest in education: passing rates are not affected in any grade.

Even though these results are context-specific, they allow us to isolate the impact of financial education on its own, whenever additional entrepreneurial or labor market skills are excluded from the curriculum. The evidence presented shows that carefully crafted curricula that focus on developing financial skills and shy away from income-generating capacity strategies have positive effects on financial capabilities without perverse effects on high school dropout levels. 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 Financial Literacy be Taught to Everyone?

Section 2 reviewed the experimental evidence on the impact of financial education programs aimed at improving youth financial literacy levels. In sum, these programs exhibit large and robust effect sizes on financial knowledge, particularly when the content is delivered within regular classes at school. But, are the benefits of these interventions differential across individuals?

Very few studies provide any sort of heterogeneity analysis of the treatment impacts. Coming back to the high school pilot program implemented in Peru and studied in Frisancho (2018), this section digs deeper into this issue and conducts 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 experimental data from the Peruvian project 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 the analysis to go beyond other studies and explore the role of several potential mediating factors (see Table A.1 for descriptive statistics on mediating variables).

First, individual characteristics and personality traits are explored. In addition to gender disparities, the focus is also placed on characteristics that may affect students propensity to learn. For instance, students who work or with greater levels of previous exposure to financial education could be more likely to value the lessons and put in more effort. Similarly, those with greater levels of patience or self-control may find the curriculum more appealing and be more able to absorb the content.

Surprisingly, Table 2 shows that individual traits do not seem to mediate the impact of financial education. There is no evidence of differential gains by gender, works status, patience, self-control, or previous exposure to financial education.[8]

Table 3 explores the role of background characteristics as mediating factors of the impact of the intervention. Once more, the results fail to identify important differences in the treatment impacts. 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 them (measured as having dinner with parents every day of the week).

Nevertheless, there is some evidence that the socioeconomic status of the household matters: students from households with a higher asset index derive larger knowledge gains from the treatment. Relative to an average treatment effect of 0.16 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 drive the positive marginal effect of assets on learning (see Table A.2). 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.

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

[8] The dummy for previous exposure to financial education is defined as 1 when the student self-reports that she had at least one financial education class or lesson, either at school or somewhere else, during her lifetime.

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

Dependent Variable	Financial literacy (standardized score)				
	(1)	(2)	(3)	(4)	(5)
Male	0.034				
	[0.026]				
Works		-0.043*			
		[0.023]			
Patient			0.171***		
			[0.023]		
High self-control				0.150***	
				[0.025]	
Previously exposed to Fin. Ed.					0.115***
					[0.022]
Treatment	0.174***	0.166***	0.159***	0.161***	0.153***
	[0.032]	[0.027]	[0.028]	[0.034]	[0.033]
Treatment X Sex	-0.006				
	[0.036]				
Treatment X Works		0.005			
		[0.033]			
Treatment X Patient			0.011		
			[0.032]		
Treatment X High self-control				0.008	
				[0.034]	
Treatment X Previous Fin. Ed.					0.027
					[0.032]
Mean Control	0.004	0.004	0.004	0.004	0.004
Number of Observations	19487	16795	17215	14048	15884
R-squared	0.122	0.122	0.129	0.122	0.123
Number of Clusters	296	296	296	296	296

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. Selected coefficients reported.

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).

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 treatment impacts

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

Dependent Variable	Financial literacy (standardized score)				
	(1)	(2)	(3)	(4)	(5)
Father with Higher Ed	0.055*				
	[0.030]				
Mother with Higher Ed		0.058*			
		[0.031]			
Lives with both parents			0.052**		
			[0.022]		
Dines with parents every day				0.074***	
				[0.024]	
Asset Index					0.043***
					[0.016]
Treatment	0.152***	0.160***	0.172***	0.164***	0.164***
	[0.027]	[0.026]	[0.033]	[0.029]	[0.025]
Treatment X Father with Higher Ed	0.036				
	[0.043]				
Treatment X Mother with Higher Ed		0.037			
		[0.045]			
Treatment X Lives with both parents			-0.020		
			[0.031]		
Treatment X Dines with parents				0.001	
				[0.034]	
Treatment X Asset Index					0.051**
					[0.021]
Mean Control	0.004	0.004	0.004	0.004	0.004
Number of Observations	15461	16059	16774	16914	16868
R-squared	0.125	0.122	0.124	0.123	0.122
Number of Clusters	296	296	296	296	296

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. Selected coefficients reported.

by the baseline financial literacy score 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. In fact, across different contexts and types of interventions, learning gains tend to be higher among initially higher-performing students. In contrast, financial education provision does not widen initial inequalities in terms of financial skills. Indeed, no matter where students start, their relative

Table 4. Heterogeneous Treatment Effects on Financial Literacy by Baseline Scores

Dependent Variable	Financial literacy (standardized score)		
Type of Baseline Score	FinLit exam	GPA	Math GPA
	(1)	(2)	(3)
Q1	-1.026***	-0.859***	-0.787***
	[0.050]	[0.058]	[0.055]
Q2	-0.783***	-0.575***	-0.524***
	[0.050]	[0.052]	[0.051]
Q3	-0.518***	-0.418***	-0.440***
	[0.044]	[0.043]	[0.043]
Q4	-0.301***	-0.288***	-0.265***
	[0.042]	[0.043]	[0.041]
Treatment	0.173***	0.247***	0.208***
	[0.057]	[0.050]	[0.051]
Treatment X Q1	-0.025	-0.120	-0.043
	[0.074]	[0.085]	[0.079]
Treatment X Q2	-0.050	-0.134*	-0.088
	[0.070]	[0.068]	[0.064]
Treatment X Q3	-0.004	-0.133**	-0.058
	[0.064]	[0.056]	[0.055]
Treatment X Q4	0.016	-0.103*	-0.071
	[0.056]	[0.055]	[0.053]
Mean Control	0.004	0.004	0.004
Number of Observations	17055	17722	17722
R-squared	0.251	0.185	0.182
Number of Clusters	296	296	296

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. Selected coefficients reported.

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.

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. The analysis of data from a school-based intervention with a course requirement identifies very uniform impacts in terms of several individual and background characteristics. This novel result strengthens the case for pursuing the universalization of these programs at schools.

4 Conclusion

Financial education always generates heated discussions in policy forums. Even though many are excited about the potential of improving society's financial skills through these programs, rigorous evidence supporting them was scarce until recently. Fortunately, the increasing rate of programs being implemented under national strategies on financial education has contributed to the availability of experimental studies. The development and implementation of these strategies has placed special emphasis on youth, often advocating for the introduction of financial lessons in schools.

This paper presents a timely and complete picture of the impact of school-based financial education programs. First, it looks at the experimental evidence produced on programs aimed at reaching children and youth. Second, it complements existing studies with novel results focusing on the potentially negative unintended effects of these programs, such as encouraging labor force participation or widening initial inequalities due to heterogeneous treatment impacts.

Financial education programs for youth have sizeable and robust impacts on financial knowledge and behavior, as well as on related preferences and personality traits associated with financial behavior. Their effect on financial literacy is impressive and tends to double the effect size of successful educational interventions aimed at improving academic performance. This large average effect size is almost completely driven by delivery models that incorporate a mandatory course requirement, which suggests that students' perception of the lessons as high-stakes material better fosters learning when compared to voluntary programs.

Relying on complementary data from an experimental study in Peruvian high schools (Frisancho, 2018), this paper sheds some light on the potentially unintended effects of financial education for youth. As more countries are trying to develop financial education strategies with a focus on youth, the measurement of their spillover effects on academic outcomes and their distributional effects becomes a relevant input for policy makers.

Financial literacy gains yielded by financial education programs do not seem to come at the cost of pervasive effects on academic outcomes. Even though evidence from Peru 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.

Moreover, the heterogeneity analysis based on the same data yielded a surprising and very promising result: financial education for youth allows all students to improve their measured financial literacy levels, regardless of their characteristics or baseline financial knowledge. The uniform impact of the treatment also holds across 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.

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A Additional Figures and Tables

Table A.1. Descriptive Statistics: Individual and Background Characteristics

	Mean	SD	N
Male	0.50	0.50	19487
Works	0.34	0.47	19487
Patient	0.26	0.44	17215
High self-control (above mean)	0.57	0.50	14048
Previously exposed to Fin. Ed.	0.52	0.50	19487
Father with higher Ed.	0.21	0.41	15461
Mother with higher Ed.	0.14	0.35	16059
Lives with both parents	0.52	0.50	19487
Dines with parents every day	0.28	0.45	19487
Asset index (standardized to control)	-0.02	0.93	19487

NOTE: Except for the asset index, all variables reported are dichotomic.

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

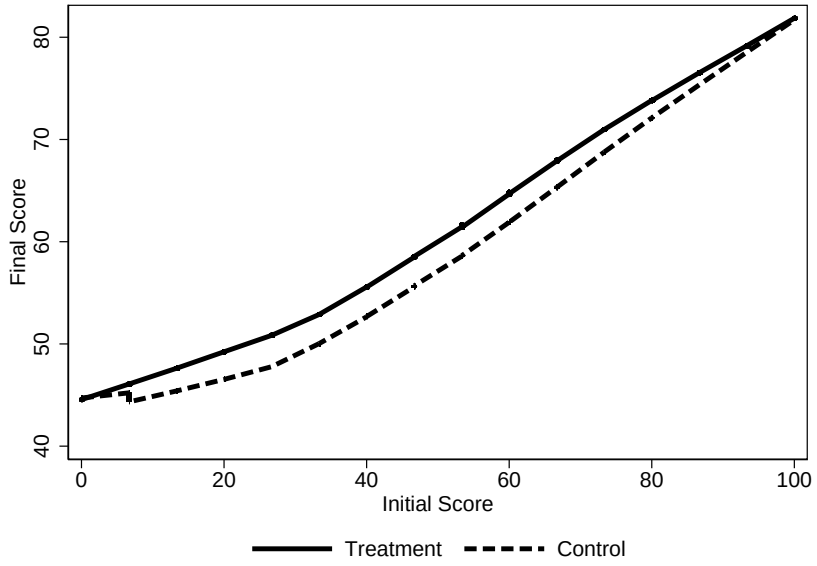

Table A.2. Heterogeneous Treatment Effects on Financial Literacy by Household Assets

Dependent Variable	Financial literacy (standardized score)	
	(1)	(2)
Treatment	0.164***	0.164***
	[0.025]	[0.025]
Treatment X Public Services		0.007
		[0.013]
Treatment X Durables		-0.001
		[0.018]
Treatment X Tech-oriented		0.054***
		[0.017]
Treatment X Transport		-0.013
		[0.012]
Treatment X Asset Index	0.051**	
	[0.021]	
Mean Control	0.004	0.004
Number of Observations	16868	16868
R-squared	0.122	0.123
Number of Clusters	296	296

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.