

Experimental Evaluation of a Financial Education Program in Elementary and Middle School Grades

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Abstract

This paper investigates whether providing financial education in elementary and middle school grades improves students' financial proficiency and actual behavior. It uses a cluster randomized control trial to evaluate a pilot program implemented in 101 Brazilian municipal schools in 2015. The findings show positive impacts on financial proficiency,

mainly among middle school students, and suggestive evidence of improvements in short-term behavioral outcomes. However, the analysis indicates that the program did not impact students' school achievements in both the short and longer terms, which suggests that the program's effects were not strong enough to shift students' behavior decisions.

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Experimental Evaluation of a Financial Education Program in Elementary and Middle School Grades*

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1 Introduction

Financial literacy is at the center of the education debate in various developed and developing countries. For instance, the Organization for Economic Cooperation and Development (OECD) advocates that financial education should be integrated into basic school curricula (Lusardi and Mitchell, 2014).¹ As individuals are being increasingly exposed to financial decisions at a young age, the sooner they learn to incorporate the costs of their choices in their decision-making process the better. Good financial habits at an early age are likely to benefit schooling, employment, and the standard of living through adulthood (Bruhn et al. (2016); Bruhn et al. (2022)). In fact, developed and developing countries worldwide have been implementing financial education interventions in schools aiming to develop financial skills that could be conducive to better decision-making throughout individuals' life-cycle (Bover et al. (2018), Frisanco (2020), Gill and Bhattacharya (2019), Luhrmann et al. (2018)), Bruhn et al. (2016), Bhattacharya et al. (2016), De Beckker et al. (2021), Berry et al. (2018), Batty et al. (2020)).

Financial education may improve the quality of intertemporal decision-making by increasing individuals' knowledge about saving and borrowing instruments (Luhrmann et al. (2018)). Subjects with higher financial knowledge are more likely to make patient inter-temporal choices (Oberrauch and Kaiser (2022)). Also, financial literacy can be a factor in avoiding financial risk and taking advantage of economic opportunities (Miller et al. (2015)). In a recent meta-analysis, Kaiser et al. (2022) find that financial education interventions have, on average, a significant impact on financial knowledge (0.15-0.2 of a standard deviation) and on financial behaviors, such as borrowing, saving and investing, budgeting and planning, insurance, and remittances (0.06–0.1 sd).²

Effective financial education programs that impact children's socio-emotional skills such as patience and self-control could potentially improve outcomes other than the financial-related ones. Research in psychology and economics literature shows that more impatient children and adolescents have lower human capital accumulation and are more likely to consume alcohol,

¹The OECD defines financial literacy as a combination of awareness, knowledge, skills, attitudes, and behaviors necessary to make sound financial decisions and ultimately achieve individual financial well-being. In this study, we use financial education and financial literacy interchangeably.

²The literature review includes 76 randomized experiments.

develop obesity, get pregnant during adolescence, and commit a crime (Castillo et al. 2011; Moffitt et al. 2011; Sutter et al. 2013; Golsteyn et al. 2014; Kautz et al. (2014)). Socioemotional skills influence labor market earnings, participation in the labor market, probability of holding a job, school decisions, and a range of educational outcomes (Acosta et al. (2018); Santos et al. (2021); Alan et al. (2019); Kautz et al. (2014)). From a theoretical standpoint, programs aimed at developing the personality traits mentioned above should be prioritized in childhood in the face of the expected higher returns per dollar invested (Heckman et al. 2006; Cunha and Heckman 2007).

There is increasing evidence that financial education programs targeting high school students are effective (Bruhn et al. (2016), Gill and Bhattacharya (2019); Frisanco (2022)). The available literature also suggests that in-school programs not only improve students' financial knowledge but also change their behavior (Bover et al. (2018), Luhrmann et al. (2018), Frisanco (2022), Jamison et al. (2014), Bruhn et al. (2016), Stoddard and Urban (2020), Urban et al. (2020), and Harvey (2019)). Recent evidence suggests that these programs can have long-lasting effects on students' human capital accumulation and on financial decisions and entrepreneurship (Frisanco (2020);Frisanco (2022); Bruhn et al. (2022)).

There is also growing interest and evidence on the impacts of financial literacy interventions on elementary and middle school grades. Bhattacharya et al. (2016) find evidence of a 12 percentage points increase in the financial knowledge of eighth-graders in the United States. De Beckker et al. (2021) suggest a 0.46 sd increase in the financial knowledge as well as better financial behavior of eighth and ninth-graders in an experiment in Belgium. Batty et al. (2020) finds evidence of an increase in the financial knowledge of fourth-graders equivalent to 0.25 of a standard deviation in a pilot run in 20 schools in the United States. In an RCT with Turkish elementary schools, Alan and Ertac (2018) find that the program persistently reduces the incidence of behavioral problems in schools and increases students' patience. Berry et al. (2018), on the other hand, do not find impacts of a financial literacy intervention implemented in Ghanaian elementary and junior high schools.

In this paper, we use a cluster randomized trial to investigate the impacts of a financial literacy pilot implemented in 2015 in elementary and middle school grades in two Brazilian municipalities (Manaus and Joinville). We randomly assigned 101 municipal schools to receive the program,

and 100 to control. The intervention aimed to help young students to become more conscious of the trade-offs embedded in their daily decisions and more forward-looking. The evaluation focused on grades three, five, seven, and nine for reasons discussed later.

We find positive effects on students' financial knowledge of 0.07 of a standard deviation, on average. The effects are driven by middle school grades (0.1 SD) and are consistent with a recent summary of the financial education literature (Kaiser et al. (2022)). We also find suggestive evidence that the program helped students become more conscious about their consumption habits - i.e., more patient and risk-averse. We find suggestive evidence of changes in some contemporary behavioral outcomes such as the use of piggy banks, suggesting some linkages between actual change in behavior in the short-term. However, we do not detect impacts on both contemporary learning outcomes and human capital accumulation. We use a mediation causal analysis to investigate the potential causal link between gains in financial knowledge and change in behavioral outcomes. Our results do not point to a compelling causal linkage between formal knowledge and change in behavior, a result consistent with De Beckker et al. (2021).

Our paper has four main contributions. First, we document positive impacts on financial proficiency, attitudes, and some behavioral outcomes of a large-scale pilot intervention implemented in elementary and middle school grades. Second, we show that financial education programs can potentially impact different skills according to students' life cycles. Third, we test the overlooked hypothesis that increasing financial proficiency is a necessary condition to change individuals' behavior. Finally, we use student-level data from the Brazilian national standardized exams to assess the program impacts on students' contemporary and longer-term school progression and learning outcomes.

Apart from this introduction, this paper is organized as follows. Section 2 describes the pilot program. Section 3 describes the data collection. Section 4 describes program's implementation. Section 5 introduces the empirical strategy. Section 6 presents the main results. We then conclude in Section 7.

2 Financial Education Pilot in Elementary and Middle Schools

To disseminate financial education in schools and empower the population to make better financial decisions, the National Strategy for Financial Education (ENEF) was launched in 2010 by the Brazilian Federal Government.³ In 2015, ENEF developed a financial educational pilot targeting elementary and middle school students. The Brazilian municipalities of Joinville and Manaus volunteered to participate and the intervention was implemented at the beginning of that school year on a sample of K-9 public schools under the management of the respective municipal governments. The initiative followed a successful financial literacy program that was tested in almost 900 public high schools in six Brazilian states. An experimental evaluation of this program shows significant improvements in students' financial knowledge, intention to save, and financial autonomy, as well as greater participation in their household finances (Bruhn et al., 2016).

The municipalities of Manaus and Joinville are very distinct from one another. Manaus, the capital of Amazonas state, is located in the north of the country, the second poorest region, whereas Joinville is a municipality of Santa Catarina, which belongs to the more affluent south region. In the year of the intervention, in comparison to Manaus, Joinville registered a 30% higher per capita income, a 10% higher human development index, and a difference of at least 30% in the Education Development Index (IDEB), the most important educational indicator in Brazil, for both primary and secondary education.⁴ Even though such differences might lead to regional variations in the quality of programs' implementation, our setting increases the likelihood that our results can be informative to other Brazilian municipalities.

ENEF has four financial education textbooks for elementary and middle school students. The first one is for first to fourth graders, the second one for fifth and sixth graders, the third one for seventh and eighth graders, and the fourth one for ninth graders. Each textbook is tailored to be adequate for students' age groups and grades. Table B.2 shows the skills the intervention

³ENEF stands for *Estratégia Nacional de Educação Financeira*.

⁴IDEB stands for *Índice de Desenvolvimento da Educação Básica* and is used to evaluate the quality of primary and secondary education schools. The National Institute of Education and Research (INEP), an agency under the Ministry of Education, is in charge of calculating the index. For elementary education, for example, IDEB is calculated by multiplying the standardized fifth graders' proficiency in Portuguese and Math (on a scale from 0 to 10) with the grade promotion from first to fifth grades (on a scale from 0 to 1). The index was created in 2005 and became the most important educational outcome for Brazilian educational policies, setting targets for schools, municipalities, and states.

aimed to develop. The curriculum is conceived to introduce the role of financial education in students' daily life by developing financial concepts such as savings, consumption, and waste; making students able to identify situations related to financially responsible attitudes, estimate the budget necessary for financial projects, and find relevant information in the press media for decision-making in finance. With the development of these skills, the pilot is expected to increase students' preference for future prospects and decrease present bias (Becker and Mulligan (1997); Luhrmann et al. (2018)). The textbooks' content is then transversally introduced into each grade's standard curriculum.

2.1 Sample Selection

Due to budgetary limitations, we agreed with the implementing partner to identify approximately 200 schools that could participate in the pilot. We leverage existing administrative data to define the sampling frame of the experiment.

According to the 2015 Census of Education, Joinville has 72 schools that offer elementary or middle school grades. We include them all in the experiment sampling frame.⁵ In Manaus has 302 schools and we randomly draw 129 to be part of the experiment sampling frame (Table B.1).⁶ For budgetary reasons, the pilot could not include all K-9 grades. In agreement with ENEF, we select grades 3, 5, 7, and 9 to generate evidence on the effects of each of the four textbooks developed for the pilot. This strategy allows us to assess whether the effect of the program varies by school grade and students' life-cycle. It is important to emphasize that we are not testing the impact of the same material in different school grades. Instead, we are testing the impacts of school materials tailored to each specific grade.

Within each treated school, not all the classes offering third, fifth, seventh, and ninth grade participate in the financial literacy intervention. At the beginning of the 2015 school year, the school principals from both treatment and control schools picked only one class of each grade to be included in the pilot. This strategy is adopted to minimize costs with data collection.

In the end, our sampling frame includes 201 eligible schools for the pilot. To account for

⁵Public schools that the municipal government manages.

⁶The total of 302 schools does not include 53 schools in riverside communities in Manaus.

differences in both municipalities' socioeconomic standards, and schools' infrastructure, we stratify the sample by the municipality and three school types: schools that only offer the elementary school grades (first to fifth grades in Brazil), schools that only offer the middle school grades (sixth to ninth grades in Brazil), and schools that offer all elementary school grades, totaling six strata (Table B.1).

3 Data and Measurement

Our research uses both administrative and survey data. We use administrative data to draw our sampling frame, to check the balance after randomization, and to track students in the Brazilian education system. To measure the impacts of the program on contemporary outcomes, we use survey data collected in the field at the end of the 2015 school year, right after the program implementation finished, in line with other financial education programs targeting elementary and middle school students (De Beckker et al. (2021), Alan and Ertac (2018), Berry et al. (2018)).

3.1 Survey Data

The Center of Public Policy and Education Evaluation (CAEd), a Brazilian survey firm specializing in standardized proficiency tests and data collection, surveyed teachers and students included in the pilot. CAEd printed and handed out teachers' and students' questionnaires on the last school days of the 2015 school calendar. Students' participation rate in the survey was very close to the average observed on a regular school day (around 80%).⁷

Teachers' questionnaire investigates their wage level, teaching experience, and issues related to the incorporation of financial literacy textbooks in the curriculum, among other questions. Overall, there are no significant differences between teachers in treatment and control groups (Table B.6).

⁷Table B.5 in section 4 shows the students' participation rates. One may wonder whether there could be less student participation with the survey data being collected at the end of the school year as some students might have already gone on vacation or dropped out. On the one hand, the participation rate was close to the one observed on a regular school day. On the other hand, it is unclear if the absent students are the best ones, who had already succeeded in being promoted to the next grade even without final tests, or the worst students who had already dropped out or did not achieve the expected performance for grade-promotion.

Students had two hours to answer three questionnaires with multiple-choice questions suitable to each grade level and learning goal. The first one is based on the skills introduced in the financial literacy textbooks, as shown in [Table B.2](#), and aims to assess students' financial knowledge. The second questionnaire checks students' attitudes towards savings and consumption, such as the use of piggy banks, their willingness to buy new things or conversations about financial themes with parents or friends. [Table B.3](#) shows examples of questions. The last questionnaire asks about students' socioeconomic background, such as the educational attainment of their mothers and whether they are beneficiaries of the national conditional cash transfer program, *Bolsa Família*.⁸ As expected, [Table B.7](#) shows that there are no significant differences between the socioeconomic characteristics of treated and control students.

Based on the student's answers to the financial knowledge questionnaire, CAEd uses the Item Response Theory (IRT) to create a financial proficiency index. According to the IRT, proficiency is a latent trait (i.e., unobserved characteristic or attribute), and a set of questions (items), that is, observed performance, is the instrument used to measure students' proficiency. Each question in an exam that uses IRT is accounted for based on its level of difficulty. This procedure allows the generation of an invariant measurement scale of the latent trait that is comparable across grades and over time. The financial proficiency index is normalized so that the treatment effect could be measured in terms of standard deviations (SD). The use of the standardized measure prevents the analysis from being scale-sensitive and allows for comparability between grades and with other studies.

As in [Bruhn et al. \(2016\)](#), we use psychology-based indices computed by CAEd to capture students' intertemporal consumption and saving choices in hypothetical scenarios. [Table B.3](#) shows a subset of questions used by CAEd to develop the indices. The questions have four possible answers (I totally agree, I agree, I disagree, I totally disagree), classified on a 1 to 4 scale in which 4 represents the most forward-looking financial behavior. The consumption index

⁸Fifth, seventh and ninth-graders answered all questionnaires in the school. For the financial knowledge exam, fifth, seventh, and ninth-graders answered 30, 32, and 36 questions, respectively. For the questionnaire on attitudes toward savings and consumption, fifth, seventh and ninth-graders answered 35, 41, and 41 questions, respectively. For all these grades, students answer a socioeconomic questionnaire with 24 questions. Third-graders answer the financial knowledge questionnaire in the school with the help of an enumerator, who read out the questions. Since third-graders are still acquiring reading and writing abilities, this strategy is intended to make the test easier for all students, regardless of their reading and writing skills. Still, for third-graders, the socioeconomic questionnaire and one of the students' attitudes towards savings and consumption were sent to their homes so their legal guardians could fill out and return it the following day. Legal guardians were supposed to answer it based on how he/she believed his/her child would behave in a given situation. Schools prepared the legal guardians to answer these questionnaires by sending them a note prior to the test day.

captures the students' preferences for planned expenditure (self-control) versus impulsive ones (impatience), whereas the savings index captures both risk-aversion. Both indices are computed using the principal component analysis and then standardized.

Overall, our analysis has eight dependent variables from the survey data collected in the field. Three are the standardized indexes developed by CAEd, which are (i) financial proficiency, (ii) consumption (a proxy for patience and self-control), and (iii) savings (a proxy for risk-aversion). The other five are behavioral ones such as (iv) a dummy indicating whether a student talks to parents about financial subjects, (v) a dummy indicating whether a student talks to friends about the same subject, (vi) students' use piggy banks (a proxy for saving), (vii) students' access to financial services, and (viii) a dummy indicating whether a student receives an allowance from their parents.

3.2 Administrative Data

Due to the limited budget, and the richness of publicly available administrative data, we did not collect baseline survey data. Prior to the program's implementation, we use administrative data at the school level to check for balance between treatment and control schools.

Since 1995, all private and public K-12 schools have participated in the annual Education Census. The Census is implemented by the National Institute of Educational Studies and Research (INEP), a research agency under the Brazilian Ministry of Education. The Census collects information on school facilities, school infrastructure, social services, teachers, and students. The data is collected at the student level, allowing us to track their sex, ethnicity, age, grade level, instruction time per day, class size, and student outcomes, such as grade promotion, retention, and dropout status.

In 1990, INEP created the primary and secondary Education Assessment System (SAEB) aiming to assess students' proficiency in Math and Portuguese.⁹ In 2005, the national standardized exam known as *Prova Brasil* was introduced within the scope of SAEB, which expanded the proficiency assessments to all public schools.¹⁰ The exam is applied every two years to fifth

⁹SAEB stands for *Sistema de Avaliação da Educação Básica*.

¹⁰Schools with at least 20 students enrolled in each of the evaluated grades. Students take the test at the end of the school year (between October and November).

and ninth-graders, and students in the last grade of high school. The exam assesses students' proficiency in Portuguese and math.

Since 1998, INEP has annually applied the National High School Proficiency Test (ENEM).¹¹ ENEM is not mandatory and the students are the ones in charge of registering for the exam. ENEM participants are the students enrolled in high school, mostly in the last grade, and the ones that have already finished this level of education. Since 2009, the exam started being used by several Brazilian universities as one of their criteria to select their students. As a consequence, the number of participants significantly increased over time, from 115,000 in 1998 to 8.5 million in 2015. The exam aims to assess students' learning levels in reading, math, human sciences, and natural sciences.

All aforementioned administrative surveys are publicly available. INEP discloses identified data at the school level, allowing us to merge the pilot schools with Education Census, *Prova Brasil*, and ENEM. Table B.10 shows that, overall, treated and control schools do not have significant differences in average students' proficiency in Portuguese and Math, grade promotion, dropout, retention rates, and age-grade distortion. Unidentified microdata at the student level is also publicly available and identified data only upon researcher request to access INEP's facilities.¹²

As presented in section 2, principals' choice of which classes would receive the intervention or would serve as a control is not necessarily random. In this sense, one may wonder whether school principals from treatment and control schools face different incentives to select the classes they did. In treated schools, principals could either select low-performer classes hoping to help their students with the intervention, or high-performer classes if they believe these students would benefit most from the program. In control schools, principals could select low performers in order to show that their schools should also receive the treatment in the future, or high performer classes if they intend to show that their schools do not need the program. In this sense, using administrative data at the school level to check the pre-intervention balance of students' performance has one caveat since not all the students in these schools are included in the pilot.

¹¹ENEM stands for *Exame Nacional do Ensino Medio*.

¹²We were not able to request access to students' identified microdata by the beginning of 2015 when the pilot was implemented, and then check the balance between treated and control students. First, because we did not have the list of pilot students, and second because the request usually takes months to be processed and it was very restrictive at that time.

To check the balance between treated and control students, in 2019 we requested INEP to merge our survey data collected in the field with their administrative datasets. This task has to be performed by the agency since researchers are not allowed to access identified administrative data at the student level. The INEP technical team performs the merge using students' names and the schools they are enrolled in. [Table B.8](#) and [Table B.9](#) show that there are no significant differences in the percentage of treated and control students found by the INEP technical team in its administrative datasets.¹³

[Table B.4](#) shows the variables collected at the student level by INEP administrative surveys and we use them for two main tasks. First, for seventh and ninth graders included in the pilot, we compare their pre-intervention performance in Portuguese and math. The information is available for when these students were enrolled in fifth grade and, therefore, did the national proficiency exam (*Prova Brasil*).¹⁴ For third and fifth graders, we do not have any administrative data on their pre-treatment performance in reading and math on standardized national exams. Hence, for these grades, we could not compare students' proficiency between treatment and control classes.¹⁵ Second, the merged dataset allows us to investigate the impact of the financial literacy pilot on student outcomes only available in Education Census, *Prova Brasil*, and *ENEM*.

As shown in [Table B.4](#), we use the administrative data to assess the effects of the financial literacy pilot on (i) retention and dropout rates in the year of the pilot or up to three years later (between 2015-2018); on (ii) standardized proficiency test in math and Portuguese in the year of the pilot (for those enrolled in fifth and ninth grades in 2015) and two years after (those enrolled in third and seventh grades in 2015);¹⁶ and (iii) ENEM scores and high school completion rates for those enrolled in the ninth grade in the year of the pilot.¹⁷ [Table B.9](#) shows that, for seventh-grade classes, there are no significant differences between treatment and control classes with regard to pre-treatment students' performance. Nonetheless, for ninth-grade classes, the data show that students in control schools had a significantly higher pre-treatment performance in

¹³INEP only authorizes access to the merged survey and administrative datasets using the computers in its facilities in Brasília. Therefore, all the analyses that include administrative data at the student level are run in INEP facilities. The agency only allows the extraction of the Stata do-files and the final outputs (tables or figures) as long as they do not contain sensitive information at the student level. No microdata can be extracted. INEP technical team masks students' names so we work on an unidentified dataset.

¹⁴For seventh graders who did not repeat any grade between the fifth and seventh grades, their fifth-grade proficiency is available in 2013. For ninth-graders who did not repeat any grade between the fifth and ninth grades, their fifth-grade proficiency is available in 2011.

¹⁵No standardized proficiency test is applied by INEP before fifth grade.

¹⁶For those who did not repeat between third and fifth grades and between seven and ninth grades, respectively.

¹⁷For those who did not repeat between ninth grade and the last year of high school.

reading, which might indicate that the principals from control schools selected high-performer classes to be in the pilot evaluation. If this was the case, and if higher reading scores are correlated with better financial proficiency skills, our results would be biased downwards.

4 Program Implementation

ENEF provided training on how to incorporate financial literacy textbooks into the school curriculum of the 2015 school year (that started in February and ended at the beginning of December). In Joinville, the training was held in February 2015 for the teaching supervisors of each school. In Manaus, supervisors of the regional education boards were trained at the end of March of the same year. Teachers in the schools that implemented the intervention were trained by those who attended the ENEF training. The pilot schools had the autonomy to decide when to introduce the textbooks into their classes.

The programs' supervisors designed by the Departments of Education of Joinville and Manaus were in charge of monitoring the pilot implementation. During the 2015 school year, the supervisors filled out questionnaires aimed to identify the major bottlenecks and keep track of the use of financial literacy textbooks. ENEF used the findings of the first two questionnaires applied during the first semester of the school year to improve the program's implementation. At the beginning of the second semester, ENEF organized a meeting with teachers in charge of incorporating the pilot textbooks into their classes. This meeting sought to stimulate the use of the textbooks and to encourage teachers who were already using them to share their experiences with those who had had little contact with the material at that point.

Insights into the programs' implementation can also be obtained from the questionnaires applied to teachers and students at the end of the 2015 school year. [Table B.5](#) shows that around 80% of pilot students answered the financial literacy assessment. With the exception of third graders, the socioeconomic questionnaire was answered by at least 97% of those that did the financial literacy test. We observe that there are no significant differences in response rates of treatment and control groups.

[Table B.5](#) shows that almost half of the third-grade teachers introduced financial literacy

textbooks during the whole school year. However, middle school teachers only introduced the textbooks in the second semester. Also, according to questionnaires applied to students, more than half of middle-school students received the financial literacy textbooks in the second semester. Slightly more than 20% of middle-school students had at least 80% of the financial literacy content covered. The late introduction of the textbooks is reflected in the percentage of the curricula actually covered. One can infer from the data on the program's implementation that the treatment was not very intense, and its intensity differed across schools and grades.

5 Identification Strategy

To estimate the causal impacts of the program on the outcomes of interest, we estimate the following reduced-form regression:

$$Y_{iksm} = \alpha + \delta T_{iksm} + \sum_{n=1}^6 \gamma_n + \epsilon_{iksm} \quad (1)$$

in which Y is the outcome variable (e.g., financial proficiency) of student i in grade k at school s in municipality m , T is a binary variable that is equal to 1 if the student belongs to a school assigned to the program (treatment) and 0 otherwise, γ_n are strata fixed effects, and ϵ is the idiosyncratic error.¹⁸

The parameter of interest, δ , measures the intention-to-treat (ITT), the treatment effect on students of schools randomly assigned to receive the treatment. The standard error is clustered at the school level, the randomization unit. It is worth noticing that this regression does not distinguish the effect between grades. To assess the program’s effect for only elementary, only middle school, and for each grade included in the pilot, we separately re-estimate [Equation 1](#) for each one of these samples.¹⁹ In addition to that, we follow [Firpo et al. \(2009\)](#) and estimate unconditional quantile intention-to-treat (UQITT) effects to check whether the program has distinct impacts across the financial proficiency distribution.²⁰

¹⁸[Table B.1](#) shows that the cluster-randomized trial has six clusters.

¹⁹We also estimate standard error clustering at the class-school level. The results are very similar and are available upon request.

²⁰We estimate the unconditional UQITT in two steps. We first run a regression of Y on constant and strata dummies and save the residuals. We then use the residuals as a dependent variable to estimate the UQITT.

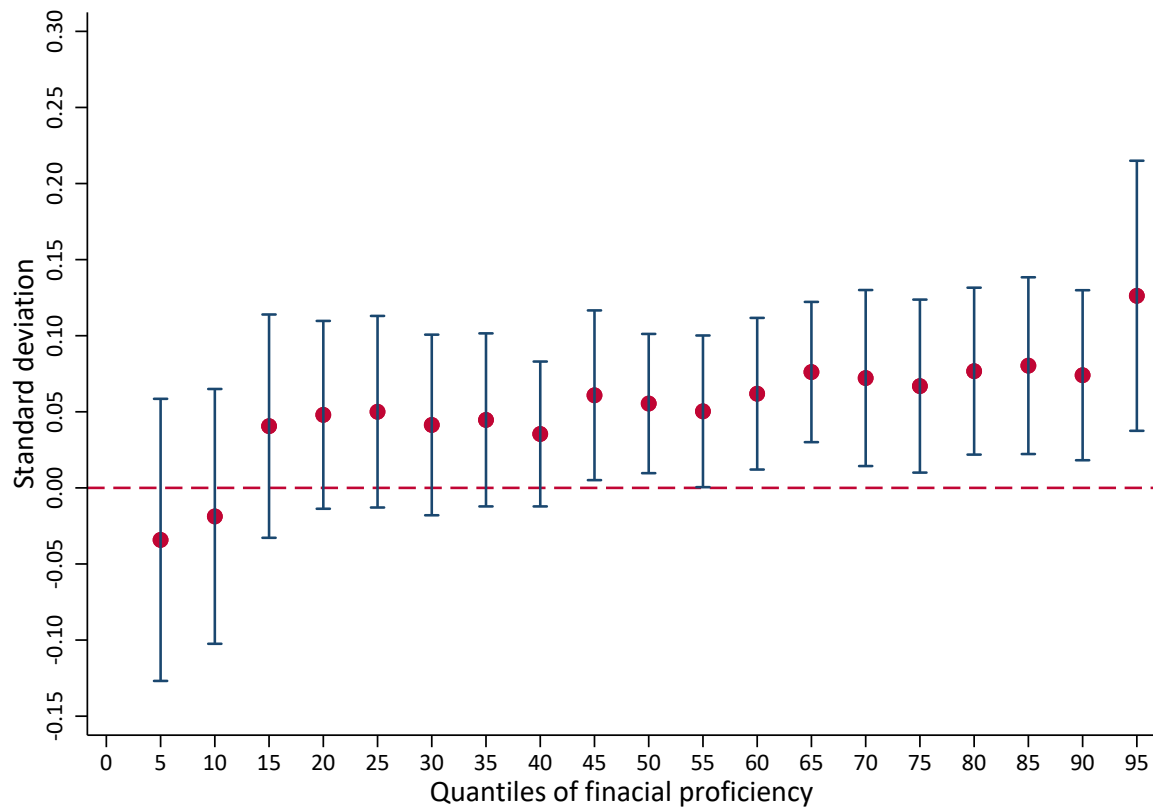
6 Results

6.1 Financial Proficiency, Savings and Consumption Attitudes, and Behavioral Outcomes

Table 1 shows that the intervention has a positive and statistically significant impact of 0.07 of a standard deviation on students' financial proficiency, with the effect driven by the middle school grades. Larger impacts on students of more advanced grades are consistent with the hypothesis that financial education programs are more effective to increase the financial proficiency of the students more likely to experience financial decisions in daily life (Frisancho (2020), Bruhn et al. (2016)), and Zia (2023). Our results are in line with Jamison et al. (2014) as the authors find an impact of 0.08 of a standard deviation of a financial literacy pilot implemented among Ugandan youth groups, but are considerably smaller when compared to the ones reported by De Beckker et al. (2021) and Batty et al. (2020) who find an increase in the financial literacy of middle and elementary grade students of 0.46 and 0.25 of a standard deviation, respectively.

To investigate whether students with better academic performance benefited from the intervention, we estimate the effect of the program at different points of the financial proficiency distribution. Figure 1 displays the effect of the pilot on elementary school students at 20 different quantiles of this distribution. The UQITT estimates show a positive and statistically significant of about 0.05 of an SD starting in the 45 percentile of the financial proficiency distribution. The results suggest that the program benefited a subset of elementary school students, but the effect on the subset was almost fully counterbalanced by no effects for the bottom 40 percentile. For middle-school students, the UQITT and ITT estimates are similar, pointing to a more homogeneous effect across the distribution in more advanced grades (see Figure C.2 in the appendix).

Figure 1: Quantile ITT estimates for financial proficiency, elementary students - 95%CI



Source: The financial proficiency is computed by CAEd based on students' answers on a standardized exam that used the Item Response Theory (IRT). The index is normalized so that the treatment effect could be measured in terms of standard deviations (SD). We first run this financial proficiency score on the treatment dummy, the six strata dummies, and on a constant. We then take the residual of this estimation and run a simultaneous quantile regression, for each one of the quantiles shown in the Figure, in which the dependent variable is the residual of the first regression and the independent variable is the treatment dummy. 1000 bootstrap replications.

Table 1: ITT estimates for financial proficiency and hypothetical attitudes towards savings and consumption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pooled	Elementary	Middle school	3 rd grade	5 th grade	7 th grade	9 th grade
Financial Proficiency							
Treatment	0.072** (0.033)	0.045 (0.043)	0.096** (0.043)	0.049 (0.072)	0.041 (0.043)	0.090* (0.048)	0.107* (0.056)
pvalue	0.030	0.292	0.025	0.495	0.350	0.061	0.057
pvalue of RI	0.040	0.307	0.025	0.510	0.339	0.074	0.066
Obs.	14,655	7,641	7,014	3,635	4,006	3,640	3,374
Number of clusters	201	172	145	170	168	144	144
R2	0.154	0.149	0.182	0.127	0.173	0.208	0.168
Strata F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Consumption index							
self-control							
Treatment	0.094*** (0.026)	0.122*** (0.042)	0.082*** (0.031)	-	0.122*** (0.042)	0.080* (0.041)	0.084** (0.037)
pvalue	0.000	0.004	0.010	-	0.004	0.054	0.025
pvalue of RI	0.001	0.001	0.015	-	0.001	0.064	0.024
Obs.	10,220	3,648	6,572	-	3,648	3,409	3,163
Number of clusters	200	167	145	-	167	144	142
R2	0.089	0.119	0.076	-	0.119	0.100	0.055
Strata F.E.	Yes	Yes	Yes	-	Yes	Yes	Yes
Saving index							
risk-aversion							
Treatment	0.055** (0.025)	0.087** (0.041)	0.044 (0.029)	-	0.087** (0.041)	0.066 (0.040)	0.018 (0.038)
pvalue	0.031	0.036	0.138	-	0.036	0.102	0.644
pvalue of RI	0.036	0.046	0.153	-	0.048	0.108	0.686
Obs.	10,022	3,549	6,473	-	3,549	3,368	3,105
Number of clusters	200	166	145	-	166	144	142
R2	0.046	0.096	0.025	-	0.096	0.032	0.019
Strata F.E.	Yes	Yes	Yes	-	Yes	Yes	Yes

Note: Clustered standard errors at school level in parentheses. RI stands for Randomized Inference. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. The financial proficiency is computed by CAEd based on student's answers on a standardized exam that used the Item Response Theory (IRT). The consumption and saving indices are based on students' choices in questions containing four possible answers (I totally agree, I agree, I disagree, I totally disagree) and they are aimed to measure students' self-control and risk-aversion, respectively. The financial proficiency, savings, and consumption indices are normalized so that the treatment effect can be interpreted in terms of standard deviations (SD).

Our estimates also point to positive impacts on consumption and saving indices, the ones measuring students' attitudes, particularly among fifth-graders (Table 1).²¹ These estimates should be interpreted as children becoming more conscious, self-controlled and forward-looking. Interestingly, the magnitude of the impact on saving attitudes declines steadily with school grades. This pattern suggests that older students are less risk-averse and potentially self-controlled.

The larger point estimates for self-control and risk aversion among fifth graders might be associated with a few factors. Younger students might be less overconfident than teenagers and this can make them more responsive to interventions aimed to develop risk-aversion behavior. At the same token, it might be easier to change the behavior of younger students since their financial habits are not consolidated yet.

We further investigate whether the program affected students' behavioral outcomes by looking at more objective measures of change in behavior such as the use of piggy banks, and investments in human capital. We expect that more patient students would be more likely to invest in human capital whose returns happen later in life.

Table 2 shows impacts on students' likelihood to discuss financial subjects with their parents and friends, their likelihood to use a piggy bank (a proxy for actual savings), and their likelihood to receive a monthly allowance from parents (a proxy for students' access to informal sources of credit and parents' engagement). Finally, we test whether the treatment increases children's access to financial services, such as debit and credit cards.²² ITT estimates show that fifth graders are 5.7 pp (or 11.6 percent) and 5.6 pp (or 28 percent) more likely to talk to parents and friends about financial subjects respectively, and 2.7 pp. more likely to use piggy banks (a proxy for actual savings). Overall, these results point to positive effects on awareness and saving outcomes. For middle school students, we find some indication that they become more likely to talk to friends about financial subjects. Unlike Bruhn et al. (2016), we do not find any impact of the program on students' access to financial services. This is unsurprising in our context given that most students are young and do not deal with financial transactions in their

²¹Due to characteristics of the research instruments for the third graders, the variables employed to set up the savings and consumption index are unavailable for this grade. Thus, column (2) estimates correspond to only fifth-graders.

²²To measure students' access to financial services, we use a dummy variable that is one if a student has access to at least one service and zero otherwise.

daily lives.

Our estimates show that the program had larger impacts on financial proficiency in later grades and larger effects on attitudes and behavior in earlier grades. The results then suggest that the association between financial proficiency and behavioral change might not be straightforward. Individuals might have formal knowledge about different subjects, such as financial proficiency, but the application of the knowledge in real life can be discouraged by the institutional environment they are inserted (Carpena and Zia (2018)). To formally test the hypothesis that learning mediates change in behavior, we follow Imai et al. (2011) and decompose the treatment effect estimates into the average causal mediation effect (ACME), and the average causal direct effect (ADE).²³ The goal of this exercise is to assess the share of the change in behavioral outcomes that could be attributed to improvements in financial proficiency (ACME) and the share that comes directly from the program (ADE). The decomposition of ITT effects on ACME and ADE relies on the sequential ignorability assumption. The first part of the assumption assumes that conditioned on pre-treatment confounders the treatment assignment is orthogonal to the potential outcomes and the mediator outcome (financial proficiency). The second part of the assumption implies that the ‘observed mediator is ignorable given the actual treatment status and pre-treatment confounders (Imai et al., 2011). This second part of the assumption is the strongest, even in the presence of random assignment. It poses that conditional on the actual treatment (not treatment assignment) and a vector of pre-treatment confounders, the outcome is independent of the mediator factor. Note that, in our case, this implies an assumption that attitudinal and behavioral outcomes are orthogonal to financial proficiency once we control for the actual treatment and a vector of school characteristics. Since we did not design the experiment to obtain clean estimates of the ACME and ADE, we interpret our results as suggestive evidence.

According to the estimates in Table B.13 and Figure C.5, while we find some evidence that financial proficiency mediates the improvement of middle students’ hypothetical attitudes in scenarios involving savings and consumption, it does not mediate increases in their behavior. For elementary school students, all of the effects seem to be direct, i.e., not mediated by changes in financial proficiency (Table B.13 and Figure C.4). In other words, the ADE and ACME estimates suggest that financial education programs affect students’ attitudes and behavior

²³See in the Appendix A a formal discussion of Casual Mediation Effects.

Table 2: ITT estimates for behavioral outcomes

	Pooled	Elementary students	Middle students		Pooled	Elementary students	Middle students
Talk to parents				Talk to friends			
Treatment	0.012 (0.010)	0.057*** (0.019)	-0.012 (0.012)	Treatment	0.035*** (0.009)	0.056*** (0.014)	0.023** (0.011)
pvalue	0.216	0.003	0.306	pvalue	0.000	0.000	0.044
pvalue of RI	0.222	0.004	0.345	pvalue of RI	0.000	0.000	0.058
Obs.	10,748	3,875	6,873	Obs.	10,725	3,864	6,861
Number of clusters	200	167	145	Number of clusters	200	167	145
R2	0.006	0.003	0.001	R2	0.008	0.012	0.005
Strata F.E.	Yes	Yes	Yes	Strata F.E.	Yes	Yes	Yes
Piggy's bank use				Use of financial services			
Treatment	0.022** (0.011)	0.027* (0.015)	0.017 (0.013)	Treatment	0.002 (0.009)	-0.002 (0.012)	0.006 (0.013)
pvalue	0.042	0.067	0.205	pvalue	0.783	0.860	0.662
pvalue of RI	0.046	0.063	0.236	pvalue of RI	0.773	0.872	0.638
Obs.	12,739	5,917	6,822	Obs.	12,538	5,718	6,820
Number of clusters	201	172	145	Number of clusters	201	172	145
R2	0.028	0.038	0.010	R2	0.005	0.004	0.006
Strata F.E.	Yes	Yes	Yes	Strata F.E.	Yes	Yes	Yes
Allowance							
Treatment	0.013 (0.008)	0.017 (0.014)	0.01 (0.010)				
pvalue	0.120	0.222	0.303				
pvalue of RI	0.111	0.245	0.305				
Obs.	10,699	3,862	6,837				
Number of clusters	200	167	145				
R2	0.009	0.012	0.007				
Strata F.E.	Yes	Yes	Yes				

Note: Clustered standard errors at school level in parentheses. RI stands for Randomized Inference. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. The dependent variables are equal to 1 if students talk to parents or friends about financial subjects, if they use a piggy bank, financial services, or receive an allowance from their parents, and 0 otherwise.

through pathways other than the accumulation of formal knowledge. Overall, the estimates do not support the hypothesis that changes in financial proficiency are a necessary condition to change individuals' behavioral outcomes, a finding consistent with [Carpena and Zia \(2018\)](#), and [De Beckker et al. \(2021\)](#).

To assess whether the results on both financial proficiency, attitudes, and behavioral outcomes are picking up some heterogeneity in the data, we carried out a series of subgroup analyses. First, we compared the effects on boys and girls. The point estimates are larger for boys, but the difference in estimates between boys and girls is not statistically significant in most cases. Second, we tested whether the impacts varied by poverty status. We aimed to assess whether poorer kids - those participating in the Brazilian conditional cash transfer program - would respond less to an intervention intended to help kids become more forward-looking. In fact, the estimates on financial proficiency and consumption attitudes are larger in absolute terms

for the poor, but the differences in coefficients between poor and non-poor are not statistically significant for the most part. The heterogeneous effect analyses are available in the online appendix.

6.2 Robustness Check

Back in 2015, we did not have access to administrative student-level data to check the balance between treatment and control groups and investigate the impacts of the program on students' performance in Portuguese and math. As described in [section 3](#), in 2020 and 2021 INEP granted the research team access to its facilities to complement our analyses using student-level data. These data allow us to rerun the balance tables at the student level and, more importantly, look at the program's impacts on both contemporary and longer-term human capital outcomes.

As discussed in [section 2](#), school principals' choice of the classrooms to participate in the pilot might not have been random. Consequently, if school principals strategically picked the best classrooms aiming to show the benefits of the program, or the worst classrooms betting on a potential complementarity between financial education and other school subjects, our estimates would be biased as we could be comparing treated and control students with a different pre-treatment level of skills. To assess students' pre-treatment level of proficiency in Portuguese and math, we look at their scores in the Brazilian standardized exam when in grade 5. Indeed, the average test scores in grade 5 for students attending the seventh and ninth grades in 2015 were higher in the control group ([Table B.9](#)). To check whether this imbalance in pre-treatment skill level affects our results, we re-estimate [Equation 1](#) for seventh and ninth graders controlling for their pre-treatment math and reading test scores.²⁴

Controlling for past performance in math and reading leads to a substantial gain in precision. Among seventh graders, we observe a slight increase in the point estimate for financial proficiency scores (from 0.09 SD to 0.098 SD). For ninth-graders, we find a meaningful increase in financial proficiency scores, with the point estimate jumping from 0.11 SD to 0.15 SD ([Table B.14](#)), though the difference is not statistically significant. The updated estimates

²⁴Seventh and ninth-graders are the ones for which the pre-treatment performance in reading and math is available. For seventh-graders, we have their fifth-grade performance in reading and math in 2013. For ninth-graders, we have their fifth-grade performance in 2011.

indicate that we would underestimate the impacts of the pilot on financial proficiency if we did not control for an imbalance in pre-treatment proficiency in math and reading at the student level, particularly for ninth graders. Interestingly, controlling for past performance in math and reading scores does not change the point estimates for consumption and saving attitudes.

6.3 Implementation and IV Results

The following analysis seeks to shed some light upon the role played by the quality of the program's implementation on its impacts. This exercise is useful in that it avoids hasty conclusions that a given intervention did not have the expected effect when in fact the program was not carried out as planned. We use a variable that informs the percentage of the syllabus (use of the teaching material) covered during the school year. As discussed earlier, the material was delivered somewhat late at the treated schools, and that eventually hindered the exposure to the program and consequently impacted the intensity of treatment. Approximately one-third of the teachers claimed they covered up to 60% of the syllabus. We first carry out a correlation analysis testing whether the effects are associated with the quality of the program's implementation. We do so by splitting the treatment group into two groups: schools with up to 60% of the syllabus covered, and schools with more than 60% of the syllabus covered.

Since the quality of the program's implementation is endogenous, we follow [Frisancho \(2020\)](#) and use the random assignment to treatment as an instrumental variable for the program's implementation. The IV estimates provide the local average treatment effect (LATE) of the program by comparing the subgroup of treated schools that received the treatment (supervisor/teacher training and teachers who used the textbooks) with the control schools. We create a binary variable, Z , that is 1 for schools with at least 60% of the syllabus covered during the academic year, and 0 otherwise leveraging information gathered from teachers and students on whether the textbooks were incorporated into the classroom during the school year. Since the data show that some students and teachers from control schools apparently received and used the textbooks, we use a two-stage least squares to estimate the LATE:

First-Stage:

$$Z_{iksm} = \gamma_1 + \gamma_2 T_{hksm} + \Sigma C_j + \omega_{1iksm}, h = 1, 2. \quad (2)$$

Second-Stage:

$$Y_{iksm} = \lambda_1 + \lambda_2 \widehat{Z}_{iksm} + \Sigma C_j + \omega_{2iksm} \quad (3)$$

The parameter of interest, λ_2 , is the LATE.

The IV estimates are shown in Table 3. The estimates are slightly larger and less precise than ITT ones, suggesting that the program did not have large effects even when better implemented.

Table 3: IV estimates

	Pooled		Elementary		Middle school	
Financial Proficiency	ITT	LATE	ITT	LATE	ITT	LATE
Estimate	0.073**	0.085**	0.047	0.055	0.099**	0.115**
N. obs	(0.034)	(0.039)	(0.046)	(0.054)	(0.042)	(0.049)
R2	14,655	14,655	7,641	7,641	7,014	7,014
	0.167	0.166	0.15	0.149	0.188	0.189
Consumption Index						
Estimate	0.094***	0.110***	0.122***	0.146***	0.082***	0.095***
N. obs	(0.026)	(0.031)	(0.042)	(0.050)	(0.031)	(0.036)
R2	10,220	10,220	3,648	3,648	6,572	6,572
	0.089	0.087	0.119	0.117	0.076	0.076
Savings Index						
Estimate	0.055**	0.064**	0.087**	0.104**	0.044	0.051
N. obs	(0.025)	(0.029)	(0.041)	(0.049)	(0.029)	(0.034)
R2	10,022	10,022	3,549	3,549	6,473	6,473
	0.046	0.046	0.096	0.095	0.025	0.025

Note: Clustered standard errors at school level in parentheses. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. Students are considered treated if their teachers answered that at least part of the content of financial education was covered in class. For 8.5% of the treated students and 7.5% of the control students, we do not have a teacher assigned. In these cases, we cannot infer actual treatment using teachers' answers on the usage of the material. We then consider a student as treated if at least 50% of her peers in the classroom state they received the financial literacy textbook.

6.4 Longer-term Effects on Behavioral Outcomes: Investment in Human Capital

In this section, we assess whether the pilot impacts students' human capital investment decisions. The hypothesis is that if students understand the importance of education for their future earnings and become more patient and forward-looking following the pilot, they would be more likely to study harder, potentially improve their academic performance in Portuguese and math, and be less likely to drop out of school (Bruhn et al. (2016)). This has a direct policy implication as it would indicate whether offering financial education to elementary and middle school students could improve individuals' outcomes other than their financial proficiency with potential benefits to their financial health and labor market outcomes in the longer term.

We start by checking if the program has an immediate impact on the performance of fifth and ninth-graders in math and reading in 2015, the year the financial education program was piloted. Fifth and ninth grades are the ones for which the performance in math and reading is available in 2015 due to their participation in *Prova Brasil*. See Table B.4. Figure C.1 shows a significant correlation between students' financial proficiency score and their reading and math performance. We then investigate whether there is any causal relationship in place. Our results do not point to a contemporary effect of financial education on either math or reading skills for both grades (Table 4). Although the nil effects on math and reading proficiency of fifth graders could be explained by the fact that the intervention had a small effect on a subset of the students as suggested by the UQITT estimates, the lack of treatment effects for grade 9 is less expected.

These results seem to suggest that teachers involved in this pilot evaluation did not prioritize financial education at the expense of other school subjects (e.g., teach to the test), a concern the research team and some school principals had back in the day. Overall, our estimates are in line with Batty et al. (2020) that also finds evidence of no substitution from the core school curriculum.

Table 4: ITT estimates for Human Capital Accumulation Outcomes

	3rd grade		5th grade		Only strata	7th grade		Only strata	9th grade	
	Only strata	Strata FE Financial proficiency	Only strata	Strata FE Financial proficiency		Strata FE Financial proficiency	Strata FE + Performance 5th grade		Strata FE Financial proficiency	Strata FE + Performance 5th grade
Repetition	0.017 (0.017)	0.010 (0.019)	0.029** (0.014)	0.025* (0.015)	-0.007 (0.014)	-0.002 (0.015)	-0.008 (0.016)	0.016 (0.016)	0.031* (0.017)	0.018 (0.018)
Dropout	0.005 (0.006)	0.007 (0.006)	0.011 (0.010)	0.000 (0.008)	0.006 (0.018)	0.002 (0.014)	0.002 (0.012)	0.033 (0.020)	0.028 (0.018)	0.020 (0.019)
Portuguese Prova Brasil	-0.029 (0.047)	-0.053 (0.051)	-0.017 (0.046)	-0.032 (0.031)	-0.004 (0.047)	-0.057 (0.041)	-0.005 (0.034)	-0.015 (0.042)	-0.063* (0.036)	0.028 (0.036)
Math Prova Brasil	-0.066 (0.053)	-0.096* (0.055)	-0.033 (0.049)	-0.045 (0.039)	-0.005 (0.051)	-0.060 (0.048)	-0.009 (0.038)	-0.077* (0.042)	-0.094** (0.037)	-0.020 (0.039)
Finish high school								-0.035 (0.025)	-0.035 (0.024)	-0.019 (0.023)
Participation in ENEM								-0.025 (0.024)	-0.016 (0.022)	-0.012 (0.023)
Portuguese ENEM								-0.046 (0.036)	-0.004 (0.05)	-0.025 (0.031)
Math ENEM								-0.028 (0.047)	-0.035 (0.063)	0.002 (0.045)
Obs.	4650	3635	4755	4006	4697	3640	3137	4455	3374	2851

Note: Clustered standard errors at school level in parentheses. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. Grade retention assumes a value of 1 if the student is retained in the same grade at the end of the school year, and 0 otherwise. Dropout is equal to 1 if the student drops out at the end of the school year, and 0 otherwise. Finish high school is equal to 1 if the student finishes high school, and 0 otherwise. Participating in ENEM is equal to 1 if the students participate in the ENEM assessment, and 0 otherwise. Portuguese and Math are the proficiency scores in *Prova Brasil* on SAEB scale.

Besides the contemporary effects on learning outcomes, the data allow us to test whether the program impacted students' human capital accumulation. We first assess whether the pilot affected students' probability of being retained or dropping out of school between 2015 and 2018. Second, for third and seventh graders, we assess their performance in math and reading two years after the intervention (2017) when they reached fifth and ninth grades, respectively.²⁵ Finally, for ninth-graders, we assess whether the intervention affects their probability of finishing high school, taking the ENEM test, and the test takers' ENEM proficiency score.

We do not find any indication that the financial education program affects students' academic achievements – test scores and school progression – in the longer term (Table 4). We interpret these findings as evidence that the program does not make students become more forward-looking with regard to their human capital accumulation decisions, which might be associated with poor program implementation as described in section 4.

7 Conclusion

In this paper, we use a cluster randomized controlled trial to evaluate the impacts of a financial literacy pilot program in Brazilian elementary schools during the academic year of 2015. The pilot was implemented in 101 municipal schools and involved approximately 9,000 students. Our main findings showed that the program improved students' financial proficiency, consumption (self-control) and saving (risk-aversion) attitudes, and some behavioral outcomes, such as the use of piggy banks. We find strong indications of heterogeneous effects though. While proficiency gains were stronger among middle school students, changes in attitudes and behavioral outcomes stood out among elementary education students.

We tested the overlooked hypothesis in this literature that poses that change in formal knowledge precedes changes in actual behavior. We use a causal mediation effect analysis to test this hypothesis. Overall, our results seem to reject the hypothesis that claims that changes in knowledge are a necessary condition to change individuals' habits.

Finally, we used student test score data in math and reading in different school grades to

²⁵For those who did not repeat between third and fifth grades and between seventh and ninth grades, respectively.

investigate the program's impacts on contemporary learning outcomes and on human capital accumulation. We do not find evidence that the program impacted grade progression, retention, dropout rates, or learning outcomes. Our reading of the results is that the program did not affect students' intertemporal decision-making, confirming the preliminary results used by the implementing partner who decided to scale the program down in its current format.

References

- ACOSTA, P. M. ET AL. (2018): “The role of cognitive and socio-emotional skills in labor markets,” *IZA World of Labor*.
- ALAN, S., T. BONEVA, AND S. ERTAC (2019): “Ever failed, try again, succeed better: Results from a randomized educational intervention on grit,” *The Quarterly Journal of Economics*, 134, 1121–1162.
- ALAN, S. AND S. ERTAC (2018): “Fostering patience in the classroom: Results from randomized educational intervention,” *Journal of Political Economy*, 126, 1865–1911.
- BATTY, M., J. M. COLLINS, C. O’ROURKE, AND E. ODDERS-WHITE (2020): “Experiential financial education: A field study of my classroom economy in elementary schools,” *Economics of Education Review*, 78, 102014.
- BECKER, G. S. AND C. B. MULLIGAN (1997): “The endogenous determination of time preference,” *The Quarterly Journal of Economics*, 112, 729–758.
- BERRY, J., D. KARLAN, AND M. PRADHAN (2018): “The impact of financial education for youth in Ghana,” *World Development*, 102, 71–89.
- BHATTACHARYA, R., A. GILL, AND D. STANLEY (2016): “The effectiveness of financial literacy instruction: The role of individual development accounts participation and the intensity of instruction,” *Journal of Financial Counseling and Planning*, 27, 20–35.
- BOVER, O., L. HOSPIDO, AND E. VILLANUEVA (2018): “The impact of high school financial education on financial knowledge and choices: Evidence from a randomized trial in Spain,” .
- BRUHN, M., G. GARBER, S. KOYAMA, AND B. ZIA (2022): “The Long-Term Impact of High School Financial Education,” .
- BRUHN, M., L. D. S. LEÃO, A. LEGOVINI, R. MARCHETTI, AND B. ZIA (2016): “The Impact of High School Financial Education: Evidence from a Large-Scale Evaluation in Brazil,” *American Economic Journal: Applied Economics*, 8, 256–295.
- CARPENA, F. AND B. ZIA (2018): *The Causal Mechanism of Financial Education: Evidence from Mediation Analysis*, World Bank Policy Research Working Paper no. 8619.

- CASTILLO, M., P. J. FERRARO, J. L. JORDAN, AND R. PETRIE (2011): “The today and tomorrow of kids: Time preferences and educational outcomes of children,” *Journal of Public Economics*, 95, 1377–1385.
- CUNHA, F. AND J. HECKMAN (2007): “The technology of skill formation,” *American Economic Review*, 97, 31–47.
- DE BECKKER, K., K. DE WITTE, AND G. VAN CAMPENHOUT (2021): “The effect of financial education on students’ consumer choices: Evidence from a randomized experiment,” *Journal of Economic Behavior & Organization*, 188, 962–976.
- FERNANDES, D., J. LYNCH, AND R. G. NETEMEYER (2014): “Financial Literacy, Financial Education, and Downstream Financial Behaviors,” .
- FIRPO, S., N. M. FORTIN, AND T. LEMIEUX (2009): “Unconditional quantile regressions,” *Econometrica*, 77, 953–973.
- FRISANCHO, V. (2020): “The impact of financial education for youth,” *Economics of Education Review*, 78, 101918.
- (2022): “Is School-Based Financial Education Effective? Immediate and Long-Lasting Impacts on High School Students,” *The Economic Journal*.
- GILL, A. AND R. BHATTACHARYA (2019): “The effects of a financial literacy intervention on the financial and economic knowledge of high school students,” *The Journal of Economic Education*, 50, 215–229.
- GOLSTEYN, B. H., H. GRÖNQVIST, AND L. LINDAHL (2014): “Adolescent time preferences predict lifetime outcomes,” *The Economic Journal*, 124, F739–F761.
- HARVEY, M. (2019): “Impact of financial education mandates on younger consumers’ use of alternative financial services,” *Journal of Consumer Affairs*, 53, 731–769.
- HECKMAN, J. J., J. STIXRUD, AND S. URZUA (2006): “The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior,” *Journal of Labor economics*, 24, 411–482.

- IMAI, K., L. KEELE, D. TINGLEY, AND T. YAMAMOTO (2011): “Unpacking the black box of causality: Learning about causal mechanisms from experimental and observational studies,” *American Political Science Review*, 105, 765–789.
- JAMISON, J. C., D. KARLAN, AND J. ZINMAN (2014): “Financial education and access to savings accounts: Complements or substitutes? Evidence from Ugandan youth clubs,” Tech. rep., National Bureau of Economic Research.
- KAISER, T., A. LUSARDI, L. MENKHOFF, AND C. URBAN (2022): “Financial education affects financial knowledge and downstream behaviors,” *Journal of Financial Economics*, 145, 255–272.
- KAUTZ, T., J. J. HECKMAN, R. DIRIS, B. TER WEEL, AND L. BORGHANS (2014): “Fostering and measuring skills: Improving cognitive and non-cognitive skills to promote lifetime success,” .
- LUHRMANN, M., M. SERRA-GARCIA, AND J. WINTER (2018): “The Impact of Financial Education on Adolescents’ Intertemporal Choices,” *American Economic Journal: Economic Policy*, 10, 309–32.
- LUSARDI, A. AND O. S. MITCHELL (2014): “The Economic Importance of Financial Literacy: Theory and Evidence,” *Journal of Economic Literature*, 52, 5–44.
- MILLER, M., J. REICHELSTEIN, C. SALAS, AND B. ZIA (2015): “Can You Help Someone Become Financially Capable? A Meta-Analysis of the Literature,” *The World Bank Research Observer*, 30, 220–246.
- MOFFITT, T. E., L. ARSENAULT, D. BELSKY, N. DICKSON, R. J. HANCOX, H. HARRINGTON, R. HOUTS, R. POULTON, B. W. ROBERTS, S. ROSS, ET AL. (2011): “A gradient of childhood self-control predicts health, wealth, and public safety,” *Proceedings of the National Academy of Sciences*, 108, 2693–2698.
- OBERRAUCH, L. AND T. KAISER (2022): “Cognitive ability, financial literacy, and narrow bracketing in time-preference elicitation,” *Journal of Behavioral and Experimental Economics*, 98, 101844.
- SANTOS, I., V. PETROSKA-BESKA, P. CARNEIRO, L. ESKREIS-WINKLER, A. M. MUNOZ BOUDET, I. BERNIELL, C. KREKEL, O. ARIAS, AND A. DUCKWORTH (2021):

“Can Grit Be Taught? Lessons from a Nationwide Field Experiment with Middle-School Students,” .

STODDARD, C. AND C. URBAN (2020): “The effects of state-mandated financial education on college financing behaviors,” *Journal of Money, Credit and Banking*, 52, 747–776.

SUTTER, M., M. G. KOCHER, D. GLÄTZLE-RÜTZLER, AND S. T. TRAUTMANN (2013): “Impatience and uncertainty: Experimental decisions predict adolescents’ field behavior,” *American Economic Review*, 103, 510–31.

URBAN, C., M. SCHMEISER, J. M. COLLINS, AND A. BROWN (2020): “The effects of high school personal financial education policies on financial behavior,” *Economics of Education Review*, 78, 101786.

ZIA, B. (2023): “When is financial education successful? Taking stock of the new wave of field evidence,” *Handbook of Microfinance, Financial Inclusion and Development*, 119–133.

Appendix

A Mediation analysis

The literature on financial education works with an implicit theory of change that poses that improvements in individuals' financial proficiency should mediate changes in financial decision-making (Fernandes et al. 2014; Lusardi and Mitchell 2014). We use mediation causal effects to empirically test the hypothesis embedded in the theory of change. Carpena and Zia (2018) tested this relationship with microfinance borrowers in Gujarat, India. They find mixed results concerning the role of financial literacy as a mediator factor for behavioral change.

Our set of estimates is the first attempt to isolate the effect of financial literacy on the attitudes and behavioral outcomes of elementary school students. We follow Imai et al. (2011) and decompose the treatment effect estimate into the average causal mediation effect (ACME), and the average causal direct effect (ADE). The goal of this exercise is to estimate the share of the treatment effect on attitudes and behavioral outcomes that are due to improvements in financial proficiency and the share that comes directly from the program. Since we do not design the experiment to obtain clean estimates of the ACME and ADE, our results should be seen as an attempt to shed light on this overlooked hypothesis.

To assess whether the increase in financial proficiency impacts attitudes and behavior down the line, we rely on the sequential ignorability assumption. The first part of the assumption assumes that conditioned on pre-treatment confounders the treatment assignment is orthogonal to the potential outcomes and the mediator outcome (financial proficiency). The second part of the assumption implies that the 'observed mediator is ignorable given the actual treatment status and pre-treatment confounders' (Imai et al., 2011). In formal terms, the conditions are the following:

$$\{Y_i(t', m), M_i(t)\} \perp\!\!\!\perp T_i | X_i = x, \quad (4)$$

$$Y_i(t', m) \perp\!\!\!\perp M_i(t) | T_i = t, X_i = x \quad (5)$$

This second part of the assumption is the strongest, even in the presence of random assignment. It poses that conditional on the actual treatment (not treatment assignment) and a vector of pre-treatment confounders, the outcome is independent of the mediator factor. Note that in our case this implies an assumption that attitudinal and behavioral outcomes are orthogonal to financial proficiency once we control for the actual treatment and a vector of observed school-level characteristics.

We estimate the ADE and ACME running the following regression equations:²⁶

$$Y_{iksm} = \alpha_1 + \alpha_2 T + \eta X_{sm} + \Sigma C_j + u_{iksm} \quad (6)$$

$$Y_{iksm} = \beta_1 + \beta_2 T + \gamma M_{iksm} + \zeta X_{sm} + \Sigma C_j + v_{iksm} \quad (7)$$

where M is the financial proficiency and Y is the attitudinal/behavioral outcome variable of student i in grade k at school s in municipality m , T and Z are defined as before, and X is a vector of school characteristics that includes information on school infrastructure - whether computer lab, science lab, sports facilities, garbage collection, garbage recycling, and sewage connection - and management complexity.²⁷ Coefficients α_2 and β_2 , correspond to the average total treatment effect (ITT) and the ADE respectively. [Imai et al. \(2011\)](#) shows that the ACME is given by the difference between α_2 and β_2 . We estimate the standard errors using bootstrap with 1,000 repetitions.

To test whether the sequential ignorability assumption is likely to hold in our context, we

²⁶We use Hicks and Tingley (2011)'s medeff command in Stata

²⁷Management complexity is measured by a categorical variable that ranges from 1 to 3 where 1 refers to schools that offer one or two shifts and have up to 300 students, 2 represents schools that offer 2 or 3 shifts, have 1,000 students, and offer vocational training in high school, and 3 is for schools with 3 shifts, at least 500 students, and the option of vocation training in high school.

undertake a sensitivity analysis that tests for the correlation between the residuals of equations (6) and (7) ([Figure C.3](#), [Figure C.4](#), and [Figure C.5](#)).

B Tables

Table B.1: Sample selected for the pilot study

Schools offering:	(A) Joinville				(B) Manaus				Total Manaus and Joinville		
	I Number of schools	II Randomization Sample	III Randomization Groups		IV Number of schools	V Randomization Sample	VI Randomization Groups		VII Number of randomized schools		
			Treatment	Control			Treatment	Control	Treatment	Control	
1st-5th grades	Stratum A.1 20	All	10	10	Stratum B.1 202	36 sampled based on 2013 IDEB 1st-5th grades	18	18	28	28	
6th-9th grades	Stratum A.2 2	All	1	1	Stratum B.2 35	28 sampled based on 2013 IDEB 6th-9th grades	14	14	15	15	
1st-9th grades	Stratum A.3 50	All	25	25	Stratum B.3 65	All	33	32	58	57	
Total	72		36	36	302		129	65	64	101	100

Notes: Number of schools managed by the municipal governments of Joinville and Manaus (Education Census, 2015). Following the guidelines of the Department of Education, 53 schools located in riverside communities in Manaus are not included in the pilot, due to difficulties in accessing some of these areas. In Joinville, all 72 schools are included in the randomization. In Manaus, 36 out of 202 schools offering first to fifth grade are randomized into treatment and control groups. The 36 schools are selected based on the distribution of the Educational Development Index for that grades in 2013. Also, in Manaus, 28 out of 35 schools offering sixth to ninth grade are randomized into treatment and control. The 28 schools are selected based on the distribution of the Educational Development Index of that grades in 2013. Finally, all schools offering first to ninth grade in Manaus are randomized into treatment and control. Overall, six strata are created in this randomization process (two municipalities and within the municipalities three types of schools).

Table B.2: Descriptors and skills on the financial knowledge test

		3 rd grade	5 th grade	7 th grade	9 th grade
D01	Being able to identify the subject of texts whose topic explores socially responsible attitudes towards the environment	yes	yes	yes	yes
D02	Being able to find information in texts about consumption – light, water, telephone bills, among others	yes	yes	no	no
D03	Being able to identify the purpose of texts and text formats that include expenses, consumption, spending	yes	yes	no	no
D04	Being able to recognize the purpose of text genres related to finances – receipts, checks, invoices	no	yes	yes	yes
D05	Being able to recognize situations in which concepts related to finances are present: savings, expenses, consumption, spending, waste, risk, return, financial planning, and investment, among others.	no	no	yes	yes
D06	Being able to identify situations related to financially responsible attitudes	no	yes	yes	yes
D07	Being able to find information in graphs and tables that contain data related to finances (purchases, sales, spending)	yes	no	no	no
D08	Being able to find information in texts that circulate in the financial world: classified ads, news features, among others	yes	yes	yes	yes
D09	Being able to estimate values and/or procedures necessary for financial projects	yes	yes	yes	yes
D10	Being able to distinguish remunerated from non-remunerated work.	yes	yes	no	no
D11	Being able to identify the origin and destination of varied products and/or those that can be recycled.	yes	no	no	no
D12	Being able to recognize socially responsible situations related to public and private spaces.	no	no	no	yes
D13	Being able to identify advantages, disadvantages, and risks of cash and credit sales.	no	yes	no	yes
D14	Being able to find implicit information in media texts that are relevant for decision-making in finances.	no	yes	yes	yes

Table B.3: Examples of questions on students' behavior towards savings and consumption

Statement	Answers' scale				Weight in index
	Totally agree	Agree	Disagree	Totally disagree	
<i>Consumption questions</i>					
I buy what I want, then I see how I can pay	1	2	3	4	0.45
I see no problem in owing money	1	2	3	4	0.44
If the brand is famous the product is of high quality	1	2	3	4	0.32
The best product is always the most expensive	1	2	3	4	0.33
I plan before spending my money.	4	3	2	1	0.1
It is worthless to plan because the money comes from luck.	1	2	3	4	0.43
Buy what I want is more important than have planning	1	2	3	4	0.45
<i>Saving questions</i>					
I think that saving money is important to avoid problems in the future.	4	3	2	1	0.41
I feel safer when I can save some money.	4	3	2	1	0.39
Saving some money is important to avoid debt	4	3	2	1	0.42
Buying everything I want is more important than putting the money together.	1	2	3	4	0.24
Avoiding waste is also a way to save money.	4	3	2	1	0.38
I try to use the products for longer.	4	3	2	1	0.35
Whenever I can, I save money.	4	3	2	1	0.37
I would rather spend the change on something I want than save the money for later.	1	2	3	4	0.19

Table B.4: Dependent variables collected in *Prova Brasil*, Education Census and ENEM.

Survey Data	Administrative Data		
	<i>We matched the pilot students with the administrative data</i>		
Pilot students in 2015	Proficiency in Math and Portuguese (<i>Prova Brasil</i>)	Grade-promotion/dropout (Education Census)	ENEM
3rd graders in 2015 →	Their 5th grade proficiency in 2017	If they ever repeated or dropped between 2015-2018	
5th graders in 2015 →	Their 5th grade proficiency in 2015 and their 7th grade proficiency in 2017	If ever repeated or dropped between 2015-2018	
7th graders in 2015 →	Their 5th grade proficiency in 2013 and their 9th grade proficiency in 2017	If ever repeated or dropped between 2015-2018	
9th graders in 2015 →	Their 5th grade proficiency in 2011	If ever repeated or dropped between 2015-2018 and if finished high school	ENEM average score in 2018

Note: Retention rates, dropout, ENEM scores, and high school completion rates are available annually (Education Census and ENEM disclosed by INEP). Performance in Portuguese and Math is only available every two years for fifth and ninth-graders (*Prova Brasil* disclosed by INEP).

Table B.5: Program implementation, 2015

	3rd grade			5th grade			7th grade			9th grade		
Students' participation rate												
	C	T	T-C	C	T	T-C	C	T	T-C	C	T	T-C
Mean	77.35	79.03	-1.68*	83.87	84.62	-0.75	76.68	78.33	-1.64	77.05	74.43	2.62*
Standard error	[0.86]	[0.85]		[0.75]	[0.74]		[0.87]	[0.86]		[0.89]	[0.92]	
Number of obs	2,380	2,270		2,375	2,380		2,376	2,321		2,222	2,233	
Response rate of socioeconomic and attitudinal questionnaires												
	C	T	T-C	C	T	T-C	C	T	T-C	C	T	T-C
Mean	65.32	65.60	-0.28	97.39	99.11	-1.72***	99.56	99.72	-0.16	97.72	99.33	-1.61***
Standard error	[1.12]	[1.13]		[0.36]	[0.21]		[0.15]	[0.12]		[0.36]	[0.20]	
Number of obs	1,808	1,756		1,992	2,014		1,822	1,818		1,712	1,638	
Deliver of the financial literacy textbooks according to students, in %												
Treated students												
	Mean	Sd		Mean	Sd		Mean	Sd		Mean	Sd	
Beginning of the year	-	-		25.3	43.5		16.8	37.4		22.5	41.8	
By the middle of the year	-	-		57.8	49.4		57.6	49.4		53.9	49.9	
In the end of the year	-	-		11.2	31.5		15.9	36.5		18.0	38.4	
Haven't received	-	-		5.7	23.2		9.7	29.6		5.6	23.0	
% of classes by the semester in which the teachers used the financial literacy textbooks												
Treated classes												
	Mean	sd		Mean	sd		Mean	sd		Mean	sd	
Only in 1st semester	24.7	43.4		17.7	38.4		17.9	38.6		20.3	40.6	
Only in 2nd semester	27.2	44.8		41.8	49.6		52.2	50.3		57.8	49.8	
All year	48.1	50.3		40.5	49.4		29.9	46.1		21.9	41.7	
% of classes by the percentage of the financial literacy textbook covered by the teachers												
Treated classes												
	Mean	Sd		Mean	Sd		Mean	Sd		Mean	Sd	
Less than 40%	6.1	24.1		0.0	0.0		6.0	23.9		7.7	26.9	
Between 40% and 60%	26.8	44.6		22.0	41.6		25.4	43.8		27.7	45.1	
Between 60% and 80%	40.2	49.3		40.2	49.3		44.8	50.1		36.9	48.6	
More than 80%	26.8	44.6		37.8	48.8		23.9	43.0		27.7	45.1	

Notes: ENEF questionnaires were applied to teachers and students at the end of the 2015 school year. T = treatment; C = control. The value displayed for t-tests is the differences in the means across the groups. The covariate variable strata are included in all estimation regressions. The second block (response rate of socioeconomic and attitudinal questionnaires) refers only to students that answered the financial proficiency test. ***, **, and * indicate significance at the 1, 5, and 10 percent critical levels.

Table B.6: Balance test for teachers' characteristics

		3rd			5th			7th			9th		
		C	T	T-C	C	T	T-C	C	T	T-C	C	T	T-C
Teachers characteristics, in %													
Gender: male	Mean	7.2	9.9	-2.6	10.0	20.9	-10.9*	48.5	33.6	14.8*	38.6	44.6	-6.0
	SE	[2.9]	[3.3]		[3.4]	[4.3]		[6.2]	[4.6]		[5.9]	[5.0]	
	Obs	83	81		80	91		66	107		70	101	
Age: less than 35 yers	Mean	27.7	26.8	0.9	26.3	30.4	-4.2	35.8	33.6	2.2	26.8	31.7	-4.9
	SE	[4.9]	[4.9]		[5.0]	[4.8]		[5.9]	[4.6]		[5.3]	[4.7]	
	Obs	83	82		80	92		67	107		71	101	
Age: 36 to 50 yers	Mean	50.6	59.8	-9.2	60.0	53.3	6.7	44.8	54.2	-9.4	53.5	50.5	3.0
	SE	[5.5]	[5.4]		[5.5]	[5.2]		[6.1]	[4.8]		[6.0]	[5.0]	
	Obs	83	82		80	92		67	107		71	101	
Age: older than 51 years	Mean	21.7	13.4	8.3	13.8	16.3	-2.6	17.9	11.2	6.7	19.7	16.8	2.9
	SE	[4.6]	[3.8]		[3.9]	[3.9]		[4.7]	[3.1]		[4.8]	[3.7]	
	Obs	83	82		80	92		67	107		71	101	
Color: white	Mean	45.8	42.7	3.1	48.8	38.0	10.7*	43.3	35.5	7.8*	46.5	38.6	7.9
	SE	[5.5]	[5.5]		[5.6]	[5.1]		[6.1]	[4.6]		[6.0]	[4.9]	
	Obs	83	82		80	92		67	107		71	101	
Experience: up to 5 years	Mean	19.3	17.1	2.2	11.3	19.6	-8.3	17.9	15.0	3.0	14.1	14.9	-0.8
	SE	[4.4]	[4.2]		[3.6]	[4.2]		[4.7]	[3.5]		[4.2]	[3.6]	
	Obs	83	82		80	92		67	107		71	101	
Experience: 6 to 15 years	Mean	41.0	46.3	-5.4	42.5	41.3	1.2	40.3	57.0	-16.7**	52.1	45.5	6.6
	SE	[5.4]	[5.5]		[5.6]	[5.2]		[6.0]	[4.8]		[6.0]	[5.0]	
	Obs	83	82		80	92		67	107		71	101	
Experience: more than 16 years	Mean	39.8	36.6	3.2	45.0	38.0	7.0	41.8	27.1	14.7**	33.8	39.6	-5.8
	SE	[5.4]	[5.4]		[5.6]	[5.1]		[6.1]	[4.3]		[5.7]	[4.9]	
	Obs	83	82		80	92		67	107		71	101	
Wage: 3 to 4 minimum wages	Mean	30.1	19.5	10.6	31.3	22.8	8.4	10.4	27.1	-16.7***	19.7	21.8	-2.1
	SE	[5.1]	[4.4]		[5.2]	[4.4]		[3.8]	[4.3]		[4.8]	[4.1]	
	Obs	83	82		80	92		67	107		71	101	
Wage: 4 to 5 minimum wages	Mean	31.3	25.6	5.7	33.8	38.0	-4.3	32.8	20.6	12.3*	21.1	28.7	-7.6
	SE	[5.1]	[4.8]		[5.3]	[5.1]		[5.8]	[3.9]		[4.9]	[4.5]	
	Obs	83	82		80	92		67	107		71	101	
Wage: 5 to 6 minimum wages	Mean	4.8	17.1	-12.3**	16.3	16.3	-0.1	19.4	23.4	-4.0	25.4	29.7	-4.4
	SE	[2.4]	[4.2]		[4.2]	[3.9]		[4.9]	[4.1]		[5.2]	[4.6]	
	Obs	83	82		80	92		67	107		71	101	
Wage: more than 6 minimum wages	Mean	6.0	7.3	-1.3	6.3	9.8	-3.5	16.4	11.2	5.2	15.5	5.9	9.6**
	SE	[2.6]	[2.9]		[2.7]	[3.1]		[4.6]	[3.1]		[4.3]	[2.4]	
	Obs	83	82		80	92		67	107		71	101	

Notes: T = treatment; C = control. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. We run the balance test controlling for strata.

All the variables shown in the table were collected using the questionnaires CAEd applied to teachers of pilot schools.

Table B.7: Balance test for households and students' characteristics

		3rd			5th			7th			9th		
		C	T	T-C	C	T	T-C	C	T	T-C	C	T	T-C
Household characteristics, in %													
Access to paved street	Mean	68.7	66.8	1.9	67.6	67.4	0.2	71.5	69.4	2.1	73.7	75.1	-1.4
	SE	[1.4]	[1.5]		[1.1]	[1.1]		[1.1]	[1.1]		[1.1]	[1.1]	
	Obs	1087	1028		1914	1983		1804	1802		1662	1616	
Access to electricity	Mean	99.6	99.1	0.5	95.9	96.0	-0.1	97.6	97.6	-0.0	97.9	97.0	0.9
	SE	[0.2]	[0.3]		[0.5]	[0.4]		[0.4]	[0.4]		[0.4]	[0.4]	
	Obs	1041	1005		1914	1980		1800	1803		1668	1621	
Access to piped water	Mean	96.7	96.3	0.4	96.1	96.2	-0.2	96.5	96.7	-0.3	97.3	96.8	0.5
	SE	[0.5]	[0.6]		[0.4]	[0.4]		[0.4]	[0.4]		[0.4]	[0.4]	
	Obs	1060	1023		1925	1988		1806	1808		1667	1618	
Access to garbage collection	Mean	91.5	93.3	-1.8	85.7	84.3	1.4	85.2	88.7	-3.5***	90.2	91.2	-1.1
	SE	[0.9]	[0.8]		[0.8]	[0.8]		[0.8]	[0.7]		[0.7]	[0.7]	
	Obs	1050	1002		1907	1961		1794	1796		1668	1609	
Beneficiary of Bolsa Família	Mean	36.2	36.1	0.2	45.4	44.9	0.4	40.9	42.9	-1.9	38.3	35.8	2.6**
	SE	[1.5]	[1.5]		[1.1]	[1.1]		[1.2]	[1.2]		[1.2]	[1.2]	
	Obs	1082	1059		1905	1958		1790	1788		1648	1604	
Student characteristics, in %													
Adequate age for their grade	Mean	87.9	86.6	1.3	82.3	80.6	1.7	79.9	80.1	-0.2	81.2	81.1	0.0
	SE	[1.0]	[1.1]		[0.9]	[0.9]		[0.9]	[0.9]		[1.0]	[1.0]	
	Obs	1038	997		1902	1952		1781	1781		1636	1602	
Mother education/ Legal guardian: incomplete elementary school	Mean	26.1	28.2	-2.1	26.3	25.2	1.1	25.1	26.9	-1.8	24.1	22.8	1.3
	SE	[1.3]	[1.4]		[1.2]	[1.2]		[1.2]	[1.2]		[1.2]	[1.1]	
	Obs	1081	1050		1272	1333		1347	1317		1364	1335	
Mother education/ Legal guardian: incomplete high school	Mean	20.9	20.9	0.0	18.1	18.8	-0.7	22.3	18.4	3.9**	18.6	20.1	-1.5
	SE	[1.2]	[1.3]		[1.1]	[1.1]		[1.1]	[1.1]		[1.1]	[1.1]	
	Obs	1081	1050		1272	1333		1347	1317		1364	1335	
Mother education/ Legal guardian: at least high school degree	Mean	53.0	51.0	2.1	55.7	56.0	-0.4	52.6	54.7	-2.1	57.3	57.0	0.3
	SE	[1.5]	[1.5]		[1.4]	[1.4]		[1.4]	[1.4]		[1.3]	[1.4]	
	Obs	1081	1050		1272	1333		1347	1317		1364	1335	
Gender: male	Mean				51.3	50.1	1.2	48.0	48.1	-0.1	49.5	49.6	-0.1
	SE				[1.1]	[1.1]		[1.2]	[1.2]		[1.2]	[1.2]	
	Obs				1905	1964		1798	1799		1660	1614	
Color: white	Mean				40.6	37.3	3.2*	36.5	34.9	1.6	37.0	35.5	1.5
	SE				[1.1]	[1.1]		[1.1]	[1.1]		[1.2]	[1.2]	
	Obs				1888	1945		1771	1787		1634	1585	

Notes: T = treatment; C = control. ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. We run the balance test controlling for strata. All the variables shown in the table were collected using the questionnaires CAEd applied to students of pilot schools. For each grade, the number of observations in the treatment and control groups can change depending on the variable under evaluation. This happens when students did not answer that specific question. Table B.11 shows that there are no significant differences between the treatment and control groups regarding the percentage of these variables that are missing. Table B.12 shows the results of the multivariate test of means. Except for seventh grade, we do not reject the hypothesis that the means of students' characteristics are equal in the treatment and control groups.

Table B.8: Pre-treatment balance test for third and fifth graders

	(1)		(2)		T-Test
	N	Mean/SE	N	Mean/SE	Difference (1)-(2)
Third grade					
Beneficiary of Bolsa Família	1082	36.23 [3.10]	1059	36.07 [2.92]	0.16
Adequate age for their grade	1038	86.99 [1.49]	997	85.66 [1.76]	1.34
Gender: male	2071	53.84 [0.92]	2009	51.57 [1.22]	2.27
Color: white	1624	38.92 [3.80]	1582	36.47 [3.94]	2.44
Mother education/Legal guardian: at least high school degree	1081	53.01 [2.59]	1050	50.95 [2.26]	2.05
Student found in Education Census 2015-2018	2380	87.02 [1.60]	2270	88.50 [1.51]	-1.49
Student found in Prova Brasil 2017	2380	59.03 [1.84]	2270	59.16 [1.89]	-0.13
Prova Brasil reading score in 5th grade 2017	1405	232.76 [2.51]	1343	230.43 [2.45]	2.33
Prova Brasil math score in 5th grade 2017	1405	243.09 [2.92]	1343	238.55 [3.09]	4.54
Fifth grade					
Beneficiary of Bolsa Família	1905	45.35 [2.80]	1958	44.94 [2.65]	0.41
Adequate age for their grade	1902	78.39 [1.71]	1952	77.61 [1.58]	0.78
Gender: male	2302	51.87 [1.12]	2307	50.59 [1.10]	1.28
Color: white	1888	40.57 [2.52]	1945	37.33 [2.48]	3.25
Mother education/Legal guardian: at least high school degree	1272	55.66 [1.87]	1333	56.04 [2.00]	-0.38
Student found in Education Census 2015-2018	2375	89.94 [1.52]	2380	90.04 [1.08]	-0.11
Student found in Prova Brasil 2015	2375	79.33 [2.22]	2380	81.60 [1.77]	-2.27
Prova Brasil reading score in 5th grade 2017	1884	220.58 [2.92]	1942	218.95 [2.68]	1.62
Prova Brasil math score in 5th grade 2017	1884	231.83 [3.82]	1942	229.17 [3.33]	2.66

Notes: ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. We run the balance test controlling for strata. All the variables shown in the table are from *Prova Brasil*, and Census of Education.

Table B.9: Pre-treatment balance test for seventh and ninth graders

	(1)		(2)		T-Test
	Control		Treatment		Difference
	N	Mean/SE	N	Mean/SE	(1)-(2)
Seventh grade					
Beneficiary of Bolsa Família	1790	40.95 [2.92]	1788	42.90 [2.87]	-1.95
Adequate age for their grade	1781	77.20 [2.18]	1781	76.81 [1.85]	0.39
Gender: male	1798	48.00 [1.45]	1799	48.08 [1.04]	-0.08
Color: white	2226	31.63 [4.09]	2186	32.20 [3.89]	-0.58
Mother education/Legal guardian: at least high school degree	1347	52.64 [2.01]	1317	54.75 [2.05]	-2.11
Student found in Education Census 2015-2018	2376	91.20 [1.66]	2321	91.12 [1.11]	0.08
Student found in Prova Brasil 2013	2376	67.05 [2.25]	2321	66.52 [1.91]	0.52
Prova Brasil reading score in 5th grade 2013	1593	211.03 [3.16]	1544	209.28 [2.68]	1.75
Prova Brasil math score in 5th grade 2013	1593	226.11 [4.10]	1544	224.70 [3.66]	1.41
Student found in Prova Brasil 2017	2376	62.50 [2.04]	2321	61.83 [1.88]	0.67
Prova Brasil reading score in 9th grade 2017	1485	273.81 [2.58]	1435	274.74 [2.31]	-0.93
Prova Brasil math score in 9th grade 2017	1485	269.66 [3.48]	1435	271.07 [3.01]	-1.42
Ninth grade					
Beneficiary of Bolsa Família	1648	38.35 [3.07]	1604	35.79 [2.59]	2.56*
Adequate age for their grade	1636	76.96 [1.80]	1602	76.09 [2.30]	0.86
Gender: male	2161	49.56 [1.05]	2174	47.10 [1.08]	2.46*
Color: white	2074	32.64 [4.22]	2087	30.09 [3.95]	2.55
Mother education/Legal guardian: at least high school degree	1364	57.26 [1.75]	1335	57.00 [1.77]	0.25
Student found in Education Census 2015-2018	2222	92.26 [0.98]	2233	92.79 [0.84]	-0.53
Student found in Prova Brasil 2011	2222	63.77 [72] [2.24]	2233	64.22 [72] [2.06]	-0.45
Prova Brasil reading score in 5th grade 2011	1417	206.10 [71] [3.07]	1434	200.39 [72] [2.78]	5.71**
Prova Brasil math score in 5th grade 2011	1417	221.42 [71] [3.80]	1434	215.72 [72] [3.59]	5.69
Student found in Prova Brasil 2015	2222	82.36 [72] [1.31]	2233	81.10 [72] [1.45]	1.26
Prova Brasil reading score in 9th grade 2015	1830	265.01 [70] [2.27]	1811	264.14 [70] [1.92]	0.87
Prova Brasil math score in 9th grade 2015	1830	264.88 [70] [2.73]	1811	260.73 [70] [2.74]	4.15*
Graduate in High School students 9grade	2222	59.63 [72] [1.58]	2233	56.02 [72] [1.91]	3.61
Student in ENEM 2018 students 9grade	2222	46.17 [72] [1.54]	2233	43.62 [72] [1.83]	2.56
Nota padronizada média ENEM-2018	793	0.13 [71] [0.04]	723	0.12 [71] [0.05]	0.01

Notes: ***, **, * Statistically significant at 1, 5, and 10 percent, respectively. We run the balance test controlling for strata. All the variables shown in the table are from *Prova Brasil*, and Census of Education.

Table B.10: Pre-treatment balance test with administrative data at school level

	Joinville		Manaus	
	Beta	Obs	Beta	Obs
IDEB 9th grade (2013)	-2.87	51	1.81	82
Grade-promotion 9th grade (2013)	-2.33	66	0.72	79
IDEB 5th grade (2009)	-1.86*	68	0.01	79
Reading performance 5th grade (2011)	-0.14	62	0.26	97
Math performance 5th grade (2013)	-0.47	51	-0.68	86
Math performance 5th grade (2009)	-0.18	45	0.86	100
Math performance 5th grade (2011)	-6.52	51	1.40	69
Grade-promotion 3rd grade (2009)	0.49	62	-0.36	91
Reading performance 9th grade (2011)	-0.16	51	-0.69	77
Math performance 9th grade (2009)	-0.81	45	-0.71	85
Grade-promotion 7th grade (2009)	-0.53	51	-0.02	74
Grade-promotion 7th grade (2011)	-4.81	59	0.41	74
Grade-promotion 5th grade (2009)	0.93	60	-2.25	88
Grade-promotion 5th grade (2011)	-3.22	59	0.02	86
Grade-promotion 3rd grade (2011)	0.54	60	0.74	97
Age grade distortion- 7th grade (2013)	-0.48	51	3.31	89
Grade-promotion 7th grade (2013)	-7.53	45	0.00	86
Math performance 9th grade (2013)	-3.85	62	-2.83	97
Grade-promotion 5th grade (2013)	-0.08	59	-0.00	69
Grade-promotion 3rd grade (2013)	-3.41	51	-0.48	86
IDEB 9th grade (2011)	-2.12	45	1.19	86
IDEB 5th grade (2013)	0.65	61	-0.03	85
Reading performance 5th grade (2009)	0.37	59	-0.04	82
Math performance 9th grade (2011)	1.75	60	0.43	97
IDEB 9th grade (2009)	-0.00	70	-0.04	79
Grade-promotion 9th grade (2011)	-4.27	51	-2.55	85
% teachers in 1st to 5th grade with undergrad	-0.20	51	-2.88**	70
Grade-promotion 9th grade (2009)	-2.70	51	-0.92	90
IDEB 5th grade (2011)	-1.31	45	-0.02	88
Reading performance 9th grade (2009)	-0.12	59	-2.65	76
Reading performance 5th grade (2013)	-5.59	62	2.50	70
Age grade distortion 5th grade (2013)	-2.94	59	3.73	100
Age grade distortion 3rd grade (2013)	-3.04	59	-2.06**	100
% teachers in 1st to 5th grade with undergrad	-2.53	50	-0.03	97
Age grade distortion- 9th grade (2013)	-1.04	51	-2.00*	74
Reading performance 9th grade (2013)	-1.10	51	0.06	69

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ The table shows the coefficients of the dummy variable that identifies whether the selected schools are assigned to the treatment or control group. These coefficients are obtained from regressions of the above-listed covariates on the treatment dummy, the six strata dummies, and a constant. Clustered standard errors at the school level are in parentheses

Table B.11: Regression of the percentage of students' characteristics that are missing on treatment status

	Third-grade		Fifth-grade		Seventh-grade		Ninth-grade	
	Beta	Obs	Beta	Obs	Beta	Obs	Beta	Obs
Beneficiary of Bolsa Família	-0.01	4,650	-0.03	4,755	0.00	4,697	0.02	4,455
Access to electricity	-0.00	4,650	-0.03	4,755	-0.02	4,697	0.02	4,455
Mother education: at least high school degree	-0.01	4,650	-0.03	4,755	-0.02	4,697	0.02	4,455
Age grade distortion	-0.00	4,650	-0.03	4,755	-0.02	4,697	0.02	4,455
Mother education: incomplete elementary school	-0.01	4,650	-0.02	4,755	0.00	4,697	0.02	4,455
Lives on one paved street	0.00	4,650	-0.03	4,755	-0.02	4,697	0.01	4,455
Access to garbage collection	0.00	4,650	-0.03	4,755	-0.02	4,697	0.02	4,455
Mother education: incomplete high school	-0.01	4,650	-0.03	4,755	-0.02	4,697	0.03	4,455
Access to piped water	-0.00	4,650	-0.03	4,755	-0.02	4,697	0.01	4,455
Gender: male			-0.03	4,755	-0.02	4,697	0.01	4,455
Color: white			-0.03	4,755	0.00	4,697	0.02	4,455

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The table shows the coefficients of a dummy variable that identifies whether the students are in the treatment or control group. The dependent variables are the percentage of missing observations for each one of the above-mentioned variables. These variables are regressed on the treatment dummy, the six strata dummies, and a constant. Clustered standard errors at the school level are in parentheses.

Table B.12: Multivariate test of means

	Test	Statistic	F	df1	df2	pvalue
Third-grade	Lawley	.006	1.32	8	1694	.224
Third-grade	Pillai	.006	1.32	8	1694	.224
Third-grade	Roy	.006	1.32	8	1694	.224
Third-grade	Wilks	.993	1.32	8	1694	.224
Fifth-grade	Lawley	.004	1.04	10	2330	.401
Fifth-grade	Pillai	.004	1.04	10	2330	.401
Fifth-grade	Roy	.004	1.04	10	2330	.401
Fifth-grade	Wilks	.995	1.04	10	2330	.401
Seventh-grade	Lawley	.007	1.84	10	2452	.047
Seventh-grade	Pillai	.007	1.84	10	2452	.047
Seventh-grade	Roy	.007	1.84	10	2452	.047
Seventh-grade	Wilks	.992	1.84	10	2452	.047
Ninth-grade	Lawley	.005	1.33	10	2479	.208
Ninth-grade	Pillai	.005	1.33	10	2479	.208
Ninth-grade	Roy	.005	1.33	10	2479	.208
Ninth-grade	Wilks	.994	1.33	10	2479	.208

Note: The table shows the results of multiple-sample multivariate tests on means. We test whether the means of several students' characteristics are the same between the treatment and control groups. For third-graders, we test the variables: lives on one paved street, access to electricity, access to piped water, a beneficiary of Bolsa Família, age-grade distortion, and mothers' education. For fifth, seventh, and ninth graders, we also include students' sex and the color of their skin.

Table B.13: Average casual mediation effects

POOLED																					
	Consumption			Saving			Talk to parents			Talk to friends			Piggy's bank use		Use of financial services			Allowance			
	Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI	Mean	95% CI		Mean	95% CI		
Total effect	.030	.014	.046	.019	.008	.030	.002	.000	.003	-.00	-.00	.000	.000	-.00	.001	-.00	-.00	-.00	-.00	.000	
ADE	.060	.025	.095	.028	-.00	.066	.012	-.00	.031	.036	.019	.054	.018	.000	.035	.007	-.00	.022	.017	.000	.033
ACME	.090	.051	.127	.047	.006	.086	.014	-.00	.033	.036	.019	.053	.018	.000	.035	.006	-.00	.020	.017	.000	.033
of total effect mediated	.336	.238	.591	.394	.211	1.78	.139	-.97	1.30	-.01	-.02	-.01	.023	.010	.123	-.18	-2.6	2.94	-.01	-.08	-.00
Elementary education students																					
	Consumption			Saving			Talk to parents			Talk to friends			Piggy's bank use		Use of financial services			Allowance			
	Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI	Mean	95% CI		Mean	95% CI		
Total effect	.020	-.00	.046	.014	-.00	.035	-.00	-.00	.000	-.00	-.00	.000	-.00	-.00	.000	.001	.000	.003	-.00	-.00	.000
ADE	.107	.047	.170	.071	.007	.137	.059	.028	.092	.058	.032	.085	.015	-.01	.042	.022	-.00	.047	.005	-.01	.024
ACME	.128	.064	.193	.085	.019	.153	.059	.028	.091	.055	.030	.082	.015	-.01	.042	.024	-.00	.049	.003	-.01	.023
of total effect mediated	.161	.107	.322	.165	.091	.649	-.00	-.01	-.00	-.04	-.07	-.02	-.00	-.01	.015	.070	-.29	.446	-.13	-2.5	2.37
Middle school students																					
	Consumption			Saving			Talk to parents			Talk to friends			Piggy's bank use		Use of financial services			Allowance			
	Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI	Mean	95% CI		Mean	95% CI		
Total effect	.037	.016	.058	.023	.009	.037	.003	.001	.005	.001	.000	.002	-.00	-.00	-.00	-.00	-.00	.000	.000	-.00	.002
ADE	.036	-.00	.081	.006	-.03	.056	-.01	-.03	.009	.008	-.01	.035	.011	-.00	.033	.020	.000	.043	.023	.001	.047
ACME	.074	.028	.119	.030	-.01	.078	-.01	-.03	.012	.009	-.01	.036	.009	-.01	.030	.020	-.00	.043	.024	.002	.048
of total effect mediated	.518	.314	1.33	.661	-5.3	9.88	-.20	-3.2	5.69	.078	-1.5	1.33	-.16	-3.2	2.58	-.01	-.12	.009	.032	.016	.232

Note: The dependent variables are equal to 1 if students talk to parents or friends about financial subjects, if they use a piggy bank, financial services, or receive an allowance from their parents, and 0 otherwise. Sensitive analysis run using the command *medeff* in *Stata*. Standard errors are estimated with bootstrap with 1000 repetitions. ACME: Average Casual Mediation Effect. ADE: Average Direct Effect.

Table B.14: ITT estimates on Proficiency and Attitudinal Outcomes

	7th grade				9th grade			
	Strata FE	Strata FE + gender	Strata FE + color of the skin	Strata FE + performance 5th grade	Strata FE	Strata FE + gender	Strata FE + color of the skin	Strata FE + performance 5th grade
Proficiency								
Treatment	0.090*	0.090*	0.092*	0.098**	0.107*	0.102*	0.106*	0.149***
	(0.048)	(0.047)	(0.048)	(0.042)	(0.056)	(0.055)	(0.055)	(0.055)
pvalue	0.061	0.057	0.055	0.022	0.057	0.066	0.056	0.008
Obs.	3640	3637	3622	2538	3374	3362	3346	2251
R2	0.208	0.224	0.209	0.505	0.168	0.183	0.170	0.399
Consumption index								
Treatment	0.080*	0.080**	0.078*	0.070*	0.084**	0.083**	0.084**	0.087*
	(0.041)	(0.040)	(0.041)	(0.042)	(0.037)	(0.037)	(0.037)	(0.044)
RI pvalue	0.054	0.046	0.060	0.098	0.025	0.027	0.025	0.050
Obs.	3409	3407	3394	2384	3163	3160	3149	2115
R2	0.1	0.119	0.1	0.187	0.055	0.061	0.054	0.128
Saving index								
Treatment	0.066	0.064	0.070*	0.033	0.018	0.017	0.017	0.030
	(0.040)	(0.040)	(0.040)	(0.044)	(0.038)	(0.038)	(0.038)	(0.045)
RI pvalue	0.102	0.112	0.081	0.456	0.644	0.660	0.663	0.508
Obs.	3368	3365	3352	2351	3,105	3,102	3,093	2080
R2	0.032	0.032	0.032	0.065	0.019	0.020	0.020	0.044

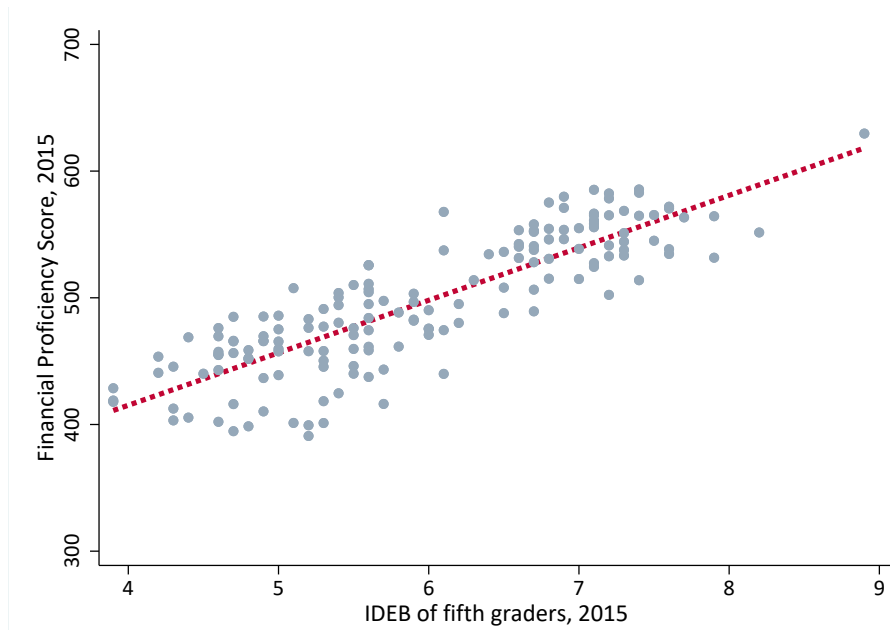
Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Clustered standard errors at the school level are in parentheses. RI stands for Randomized Inference.

The financial proficiency is computed by CAEd based on students' answers on a standardized exam that used the Item Response Theory (IRT). The consumption and saving indices are based on students' choices in questions containing four possible answers (I totally agree, I agree, I disagree, I totally disagree). The answers are classified on a 1 to 4 scale, where 4 represents the most forward-looking financial behavior. The financial proficiency, savings, and consumption indices are normalized so that the treatment effect could be measured in terms of standard deviations (SD).

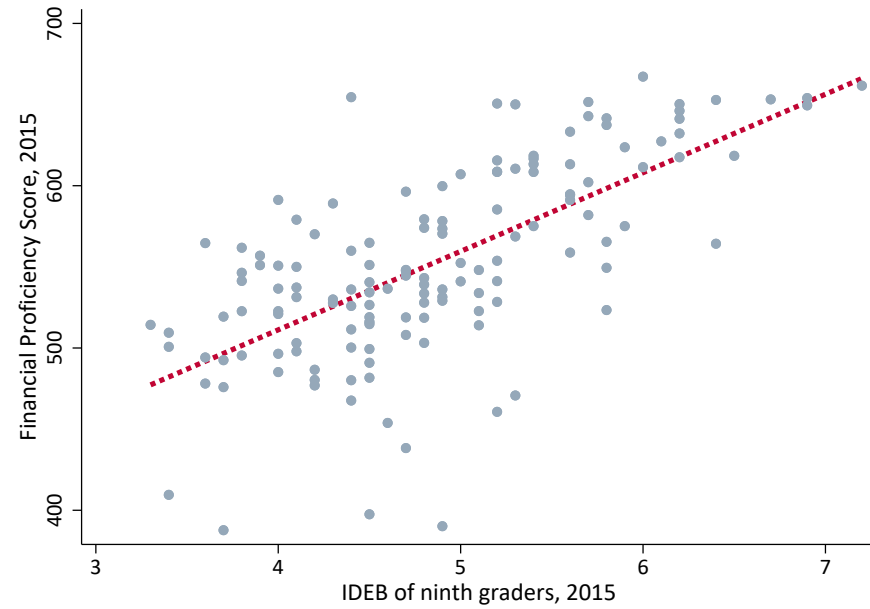
C Figures

Figure C.1: Financial Proficiency Score and IDEB

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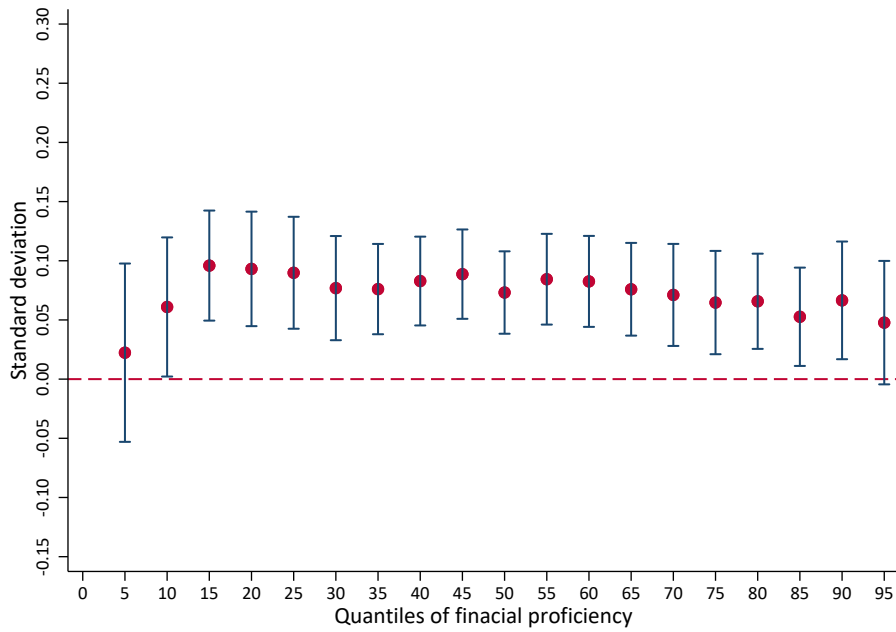
(a) Fifth graders



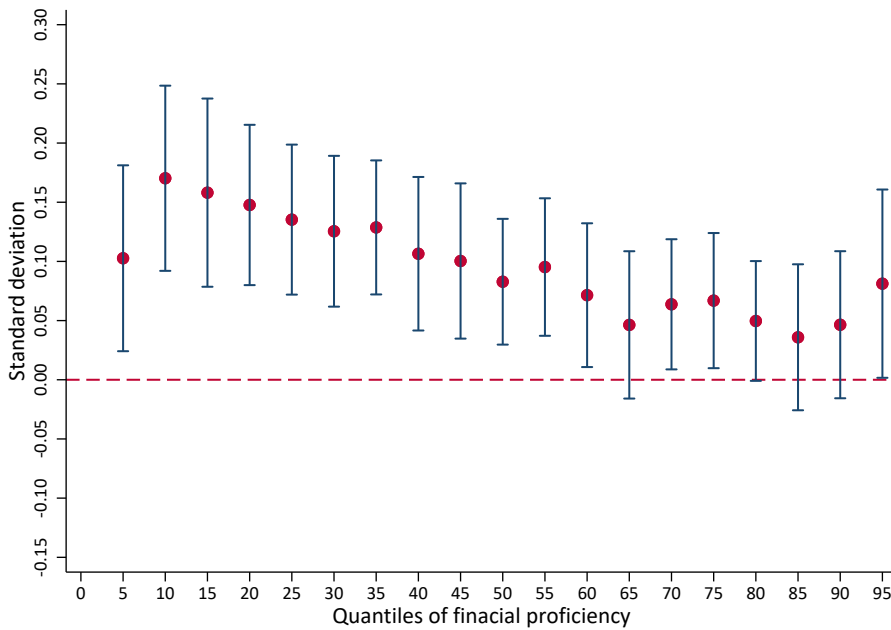
(b) Ninth graders

Note: The Figure shows on the y-axis the financial proficiency score calculated by CAEd for the sample of pilot schools and on the x-axis the Education Development Index (IDEB) calculated by the Brazilian National Institute of Education and Research. IDEB is the most important educational indicator in Brazil. The index is calculated by multiplying students' proficiency in Portuguese and Math (on a scale of 0 to 10) by grade promotion (on a scale of 0 to 1).

Figure C.2: Quantile ITT estimates for financial proficiency



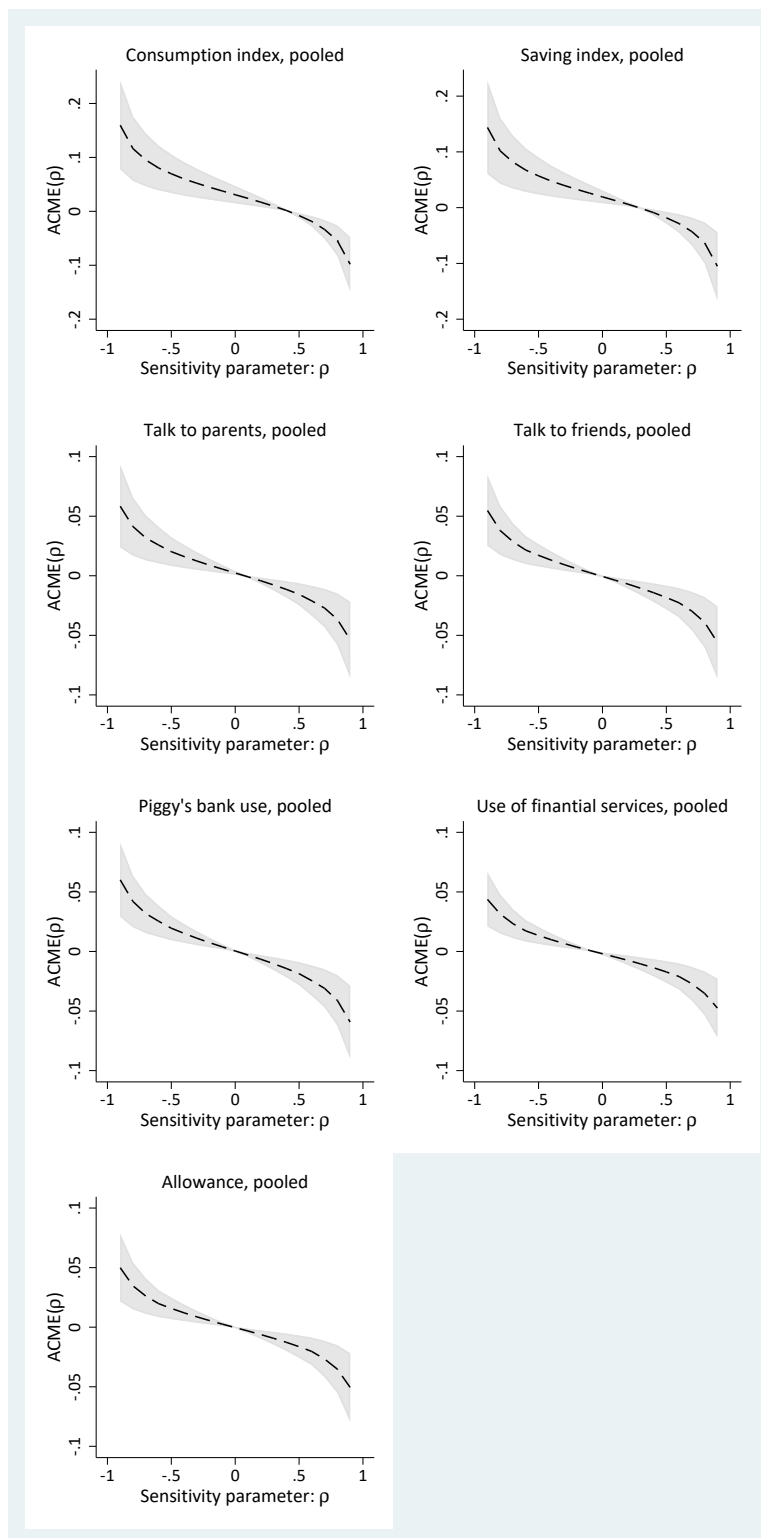
(a) Pooled, elementary and middle school



(b) Middle school

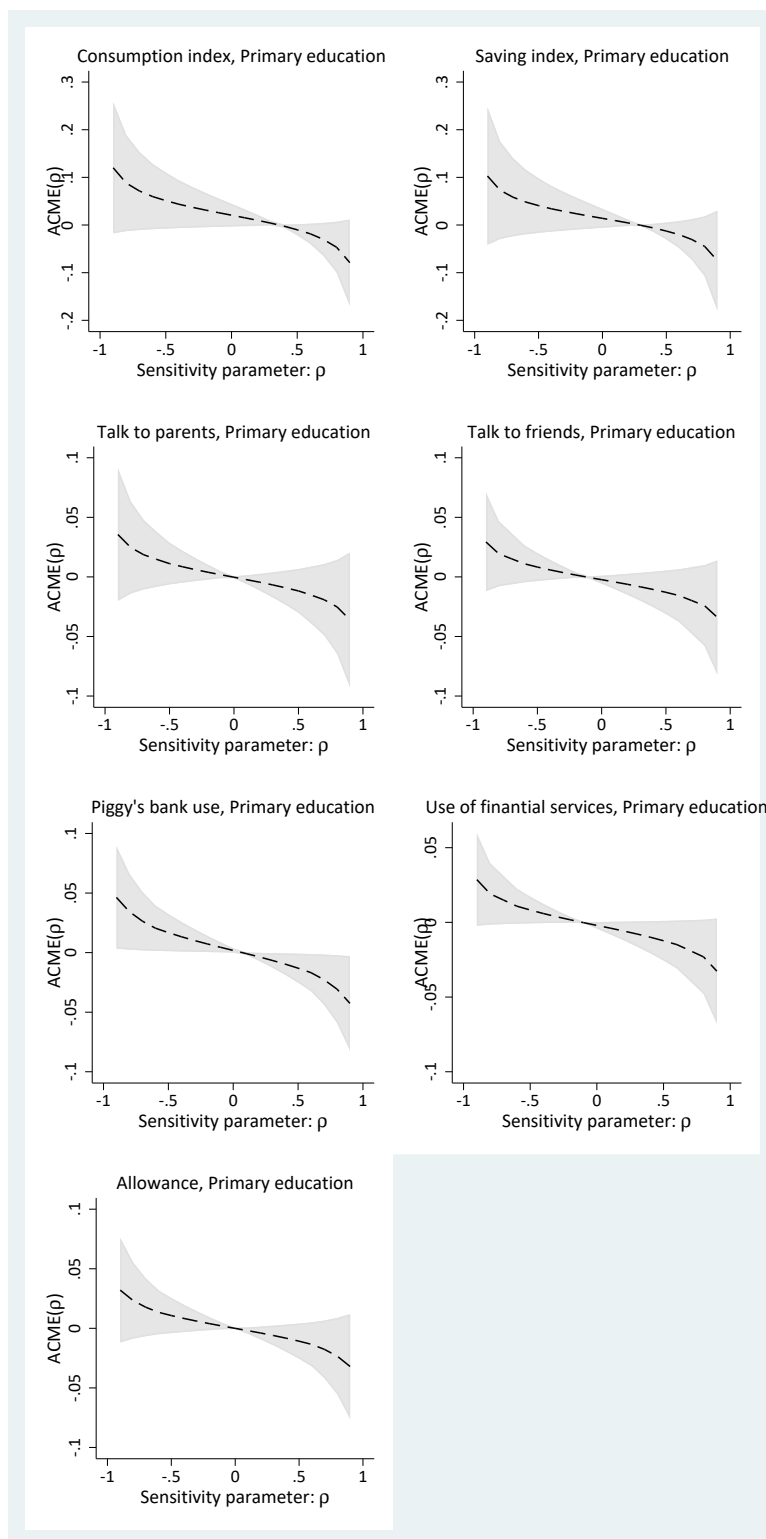
Source: The financial proficiency is computed by CAED based on student's answers on a standardized exam that used the Item Response Theory (IRT). The index is normalized so that the treatment effect could be measured in terms of standard deviations (SD). We first run this financial proficiency score on the treatment dummy, the six strata dummies, and on a constant. We then take the residual of this estimation and run a simultaneous quantile regression, for each one of the quantiles shown in the Figure, in which the dependent variable is the residual of the first regression and the independent variable is the treatment dummy. 1000 bootstrap replications.

Figure C.3: Sensitivity analysis: average causal mediation effect versus ρ , pooled (elementary and middle school)



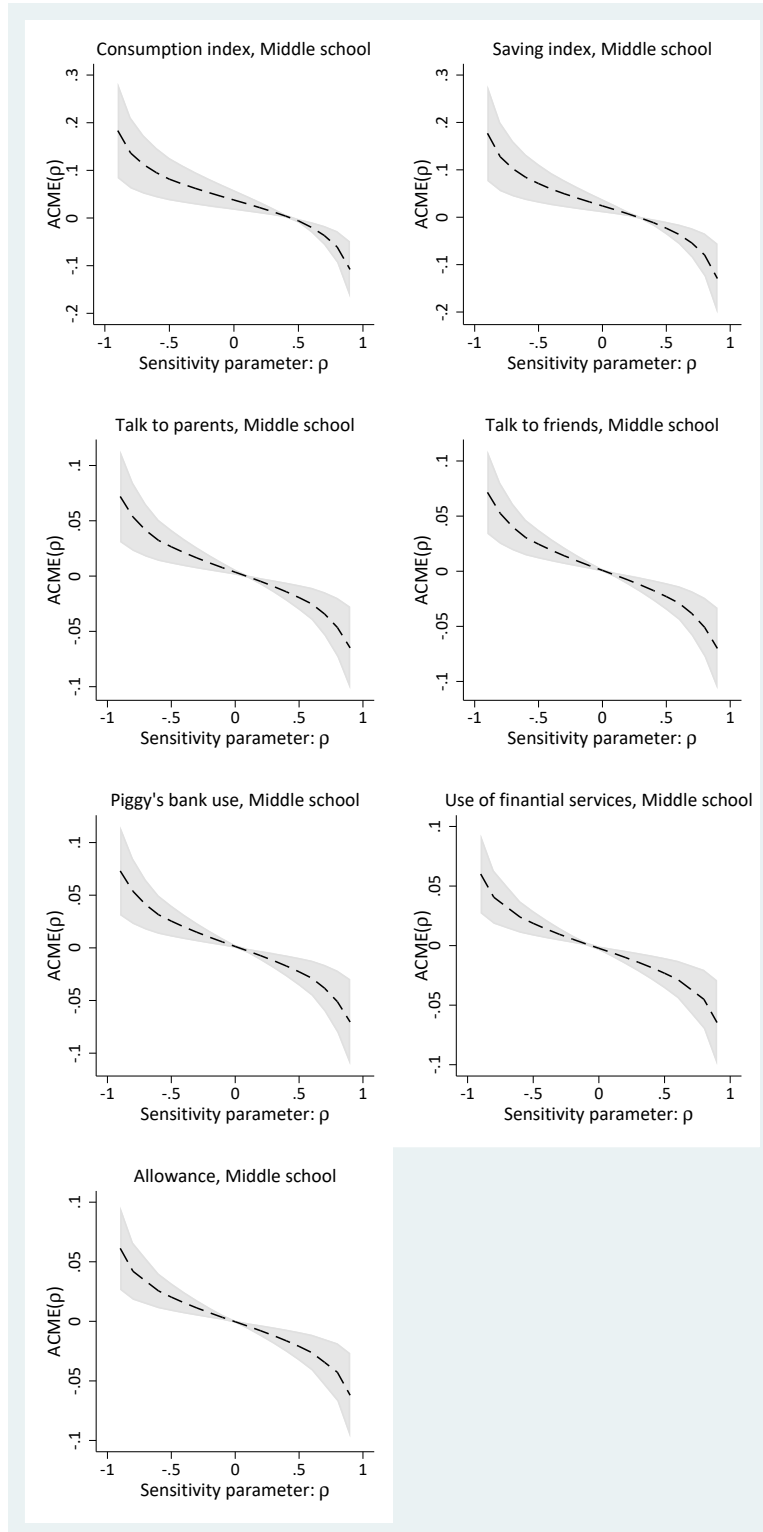
Source: The dependent variables are equal to 1 if students talk to parents or friends about financial subjects, if they use a piggy bank, financial services, or receive an allowance from their parents, and 0 otherwise. Sensitivity analysis run using the command *medeff* in *Stata*. Standard errors are estimated with bootstrap with 1000 repetitions. ACME: Average Casual Mediation Effect.

Figure C.4: Sensitivity analysis: average causal mediation effect versus ρ , elementary education



Source: The dependent variables are equal to 1 if students talk to parents or friends about financial subjects, if they use a piggy bank, financial services, or receive an allowance from their parents, and 0 otherwise. Sensitivity analysis run using the command *medeff* in *Stata*. Standard errors are estimated with bootstrap with 1000 repetitions. ACME: Average Casual Mediation Effect.

Figure C.5: Sensitivity analysis: average causal mediation effect versus ρ , middle school



Source: The dependent variables are equal to 1 if students talk to parents or friends about financial subjects, if they use a piggy bank, financial services, or receive an allowance from their parents, and 0 otherwise. Sensitivity analysis run using the command *medeff* in *Stata*. Standard errors are estimated with bootstrap with 1000 repetitions. ACME: Average Casual Mediation Effect.