

# **THE IMPACT OF HIGH SCHOOL FINANCIAL EDUCATION: EVIDENCE FROM A LARGE-SCALE EVALUATION IN BRAZIL**

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## **Abstract**

We study the impact of a comprehensive high school financial education program spanning 6 states, 868 schools, and approximately 20,000 students in Brazil through a randomized control trial. The program increased student scores on an independently administered financial proficiency test by a quarter of a standard deviation over the control group and shifted the entire score distribution to the right. Administrative data on academic performance shows significant reduction in grade-level failing rates as well. Self-reported behaviors were measured through multiple elicitation and recall methods and show statistically significant improvements in saving up for purchases rather than buying on installments, better likelihood of financial planning, and greater participation in household financial decisions by students. “Trickle up” impacts on parents were also significant, with improvements in parent financial knowledge, savings, and spending behavior.

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## 1. Introduction

The fast rate of financial development around the world has made financial products and services widely available, yet such proliferation has consistently outpaced the capacity of individuals and households to make informed financial choices (Lusardi and Mitchell, 2007; Lusardi et al., 2010). Personal financial decisions are further complicated by the rapid infusion of cleverly marketed consumer products that are often coupled with expensive credit and installment plan offers. These advancements have heightened the risk of misplaced or misinformed spending decisions, especially in an environment where individuals have trouble understanding even basic financial concepts (Lusardi and Mitchell, 2011a; Xu and Zia, 2012). Indeed, the personal bankruptcy rates even in developed countries such as the US have skyrocketed, increasing by as much as 20 percent annually during the recent financial crisis.<sup>1</sup>

The policy response to these troubling trends has been to introduce proactive measures on both the supply and demand side. On the supply side, many countries now have Consumer Protection Bureaus that are tasked with ensuring financial providers adopt and adhere to transparent consumer disclosure laws. On the demand side, there has been a significant push to focus on basic financial concepts and educate the public through various financial education programs. Many of these programs take the form of relatively short workshops that are geared towards adults. However, rigorous evidence on the impact of these types of courses shows only marginal improvements in financial behavior (Cole et al., 2011) and these effects tend to dissipate over time (Fernandes et al., 2013). Also, interest and participation in adult financial education workshops tends to be low, so they do not appear to be an effective way of reaching broad audiences (Bruhn et al., 2013).

An alternative approach to financial education is to introduce it early, in formative schooling years. Calls for such school based programs are widespread: the U.S. Consumer Financial Protection Bureau now officially recommends introducing and building key financial education concepts throughout the K-12 school years (CFPB, 2013).<sup>2</sup> The UK government has mandated financial education to become part of the national secondary school curriculum since September 2014, and the Australian government has voted for the same. Many developing countries including Brazil, Colombia, India, Indonesia, and Uganda are introducing financial education in their school systems as well.

The focus on youth is attractive and relevant for a number of reasons. First, good financial habits formed at an early age are likely to benefit schooling, employment, and standards of living throughout adulthood. The ability to control temptation and delay gratification among youth has been shown in the literature to be an important determinant of lifetime academic, economic, and social outcomes (Mischel and Rodriguez, 1989; Duckworth and Seligman, 2005; Sutter et al.,

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<sup>1</sup> US Bankruptcy Abuse Prevention and Consumer Protection Act Report, 2011.

<sup>2</sup> Likewise, the US Treasury Department recently launched a financial learning website that offers teachers lessons appropriate for instruction in math and English classes: <http://www.moneyasyoulearn.org>

2013; Mullainathan and Shafir, 2013). Second, the focus on youth leverages their learning capacity as students who are primed to absorb, recall, and apply learning on a regular basis. Related literature in psychology identifies willpower and self-control as a muscle that requires time and resources to replenish and becomes stronger with repeated practice (Baumeister and Heatherton, 1996; Baumeister et al. 1998; Muraven and Baumeister, 2000; Baumeister et al. 2007). School based interventions provide the opportunity for repeated instruction and exercises that allow for sustained learning. Finally, well-informed students have the opportunity to modify not only their own financial choices, but also to act as agents of change in their households' financial decisions. Yet, despite the potential benefits of financial education for youth we simply do not know what works and the few existing empirical studies show either conflicting results, are too narrowly focused, or suffer from important identification concerns.<sup>3</sup>

This paper addresses these shortcomings by using a randomized control trial to study the impact of a comprehensive financial education program for public high school students in Brazil. The program spanned 17 months and was integrated in classroom curricula of Mathematics, Science, History, and Portuguese. The instruction used new textbooks with interactive and repeated classroom exercises on financial education themes, take-home exercises such as creating household budgets with parents, and role playing assignments. The curriculum was complemented by teacher training, web learning tools, and instructor handbooks. As such, the intensity of treatment of this program was much stronger than typical one-off financial education workshops. To date, our study is the largest randomized evaluation in the financial education literature, covering 868 public high schools in six Brazilian states and approximately 20,000 students. The schools in our sample are also representative of public schools in Brazil in terms of school quality.

As part of our study design, schools were first stratified by state, pair-wise matched by school and community characteristics, and then randomly assigned to treatment and control. We collected data in schools through three survey rounds consisting of baseline (August 2010), follow-up 1 (December 2010), and follow-up 2 (December 2011). Tests and questionnaires at each survey phase were administered independently without prior teacher input and were monitored by our proctors. Teachers and principals were also interviewed for feedback on the program.

Follow-up survey results show that the program caused a quarter of a standard deviation improvement in student test scores on a SAT-like financial proficiency test. In fact, the entire distribution of scores shifted to the right with students at all levels of capability showing marked improvements in test scores. Further, we use administrative data on school performance and find a statistically significant 11 percent reduction in failure rates and significantly higher passing

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<sup>3</sup> See section 2 of this paper for a detailed discussion of the existing literature.

rates in treated schools compared to control schools. These results confirm that the financial education curriculum complemented rather than hindered regular academic learning.

Financial behaviors in our surveys were self-reported but we used multiple elicitation and recall methods to measure treatment effects. One of the primary goals of the program was to change spending behavior, in particular saving up for purchases rather than buying items on expensive installments. We measured this behavior in several ways: (a) by direct elicitation of saving patterns, (b) by asking questions on attitudes towards saving and spending, and (c) by a psychology-based index on intentions to save that aggregated a series of questions that identified preferences over hypothetical savings and spending scenarios. We find statistically significant treatment effects on all three measures. Treated students were 5 percentage points more likely to save on the extensive margin compared to 40 percent savers in the control group, and to save significantly higher amounts than the control group (14.3 percent of income compared to 12.9 percent in the control group). In addition, treated students were significantly more likely to identify themselves as savers rather than spenders and to report higher willingness to save for future purchases. Finally, the intention to save index showed a 0.12 standard deviation improvement for treated students over the control group.

We study budgeting and purchasing behavior in several ways as well: (a) by asking about listing of monthly expenses, (b) by questions on negotiating prices for purchases and conducting market research before buying, and (c) by a psychology-based financial autonomy index that aggregated a series of questions that measured whether students felt empowered, confident, and capable of making independent financial decisions and influencing the financial decisions of their households. The results show significant treatment effects on all these margins – treated students were 3 percentage points more likely to list monthly expenses in a budget compared to 14 percent in the control group, 3 percentage points more likely to negotiate prices when buying consumer products compared to 44 percent in the control group, and 2 percentage points more likely to search for similar models and brands in the market compared to 47 percent in the control group. Finally, the financial autonomy index showed a 0.09 standard deviation improvement for treated students over the control group.

We also examine “trickle-up” effects of the program on parents to test whether students acted as agents of change in their households. Many of the take-home exercises involved interaction with parents such as making household budgets or researching and comparing interest rates. We surveyed parents and identify several findings. As proof of concept, parents in treated schools were significantly more likely to report that their children discussed financial matters with them at home and that they volunteered to help organize household budgets. In addition, we detect improvements in parental financial knowledge on standard financial literacy questions used in the literature. And finally, we find significant improvements in parental financial behaviors, with

an increase of 0.67 percentage points in the savings rate (from a control group mean of 12.2 percent) and improvements in the likelihood of keeping a household budget.

Finally, in order to reinforce the effect of school financial education, the U.S. Consumer Financial Protection Bureau recommends educating parents at the same time as students. Our intervention complemented the student program with a standard adult workshop on financial education for parents. This involved a DVD-based intervention where parents in treated schools were randomly assigned to either a financial education screening or a health education screening. Although the attendance at these workshops was low, we detect further improvements in the percentage of disposable money saved by students from families that attended the financial education workshops. Hence, these workshops helped parents reinforce the messages taught to the students.

Overall, our study shows that financial education can be an effective tool in improving financial outcomes of students when delivered in a comprehensive manner and over a significant period of time. Also, key complementary benefits can be derived by involving the entire household, students and parents, as indicated by the trickle-up and parents' workshop impacts. Further, the large sample size and baseline comparability to other public schools across Brazil provides strong support for the external validity of our findings.

This paper proceeds as follows. Section 2 summarizes the literature on financial education for youth and details the Brazilian context. Section 3 describes the financial education curriculum, and section 4 presents the research and sampling methodology including analysis of sample representativeness, as well as the study timeline. Section 5 describes program take-up and implementation, and section 6 presents summary statistics and survey participation analysis. Section 7 discusses the main results, and section 8 concludes.

## **2. Literature and Context**

### **2.1. Financial Education for Youth**

There is a growing literature on financial literacy and how it varies by age group. A consistent finding in this literature is that financial literacy tends to peak among adults in the middle of the life cycle and is significantly lower among youth. In the U.S., for example, those in the prime age group (25-65) tend to perform about five percent better on financial literacy questions than those under 25 (Lusardi and Mitchell, 2011b). Strikingly, Lusardi et al. (2009b) find that less than a third of American teenagers (ages 12-17) possess basic knowledge of interest rates, inflation, and risk diversification. Mandell (2006) notes that there is even evidence that youth financial literacy has been declining in the U.S. since the late 1990s. Similar evidence comes from Australia where Beal and Delpachitra (2003) identify low levels of financial literacy among youth.

Perhaps in response to such trends and combined with the aftermath of recent global financial crises, policymakers around the world have made financial education for youth a priority, with many school based initiatives now part of education reform. Yet, the impacts of such school programs on financial knowledge and behavior are still not well understood. Existing studies show contradictory results and many of them suffer from identification issues. For example, Bernheim et al. (2001) employ a difference-in-difference approach to analyze the impact of state high school financial education mandates on savings behavior in the U.S. and find that mandates appear to effectively increase exposure to financial education, and have a significant subsequent effect on future savings. However, Cole and Shastry (2009) replicate and extend the analysis using a much larger sample from U.S. census data and find, in contrast, no significant impact of high school financial education on future savings.

Other impact evaluations of financial literacy programs often study small samples, adding concerns about the external validity of their findings to concerns about internal validity of these studies. Carlin and Robinson (2010) examine a financial literacy course for high school students in the U.S. The course provided 19 hours of financial training that included credit card management, taxes, budgeting, and simple investments. Students' financial skills are measured in role-playing games of fictitious budget situations at visits to a "Finance Park". The authors find that training raised completion rates (successfully crafting a balanced budget) from 5 percent to over 50 percent and savings increased four-fold. However, the identification strategy relies on comparing outcomes of 125 students before and after the financial literacy course, so that it is not clear whether improvements are due to the course, repeated visits to the park, or other time-varying factors.

Similarly, Varcoe et al. (2005) conduct a pre-post analysis to evaluate a program (Money Talks) in which 13-18 year-olds in various settings, including public high schools, received four newsletters which covered different topics, such as savings habits, shopping tips, car costs, and money values. Using a sample of 114 students, the authors find that students show both greater financial knowledge and improved financial behavior after the course compared to before.

Walstad et al. (2010) study the effects of a DVD-based curriculum for high school students – Financing Your Future. The five video segments cover such topics as saving, money management, banking, credit and debt, and investing, and add up to six hours of instruction. They find that 673 students who participated in the education program showed a significant gain in financial knowledge (as measured by pre-test and post-test scores) compared to 127 students in a matched control group, but they do not study subsequent behavior change.

Luhrmann et al. (2012) evaluate 90 minute financial education sessions delivered to 14-16 year old students in lower stream German high schools. They compare 558 treatment students to 158 control students and find significant improvements in financial knowledge and a hypothetical

savings scenario. However, schools are chosen to receive financial education sessions based on how busy teachers feel they are with students prior to the end of the academic year, which raises serious selection concerns since teachers in control schools may also be dealing with relatively poorly performing students or other unobserved underlying student, class, or school characteristics.

Randomized evaluations of school based financial education programs are scarce; in fact we are aware of only two other such studies. Berry et al. (2012) conduct an evaluation of a program offering voluntary after-school clubs in Ghana for primary and junior high students in 135 schools over a 10 month period. The study randomly assigns a group of 5<sup>th</sup> and 7<sup>th</sup> graders to a social and financial treatment and another to basic training. It is not clear how exposed students are to financial decision making at such a young age, and eliciting reliable and consistent responses in this age group is generally difficult; hence there are some measurement concerns. The treatment is also short and participation voluntary. The findings are unsurprisingly muted – while the study identifies some effects on savings, there are no improvements in financial knowledge, test scores, or social and psychological measures.

Another experiment is a study among 17 to 19 year old high school students in Italy by Becchetti et al. (2011), covering 944 students in 36 classes. The authors offered a 16 hour long course on finance over three months. Difference-in-difference estimates show no statistically significant effect on financial knowledge. Instead, both the treatment and control groups show improved knowledge over time, suggesting that students adapt to repeated financial literacy tests. Becchetti and Pisani (2012) extend the sample to 3,820 students in 118 classes. They now detect positive effects of the course on financial knowledge in a difference-and-difference analysis. Surprisingly, however, treatment group students already performed better on the financial knowledge test before the course, raising questions about the implementation of the random assignment. The paper does not examine effects on financial behavior or attitudes.

Against the state of the existing literature on high school financial education, our study fills an important gap by bringing together: (1) a randomized evaluation methodology, (2) a comprehensive financial education intervention that was mandatory for students and lasted 3 semesters over 17 months, (3) a very large sample size (868 schools and nearly 20,000 students), (4) widespread coverage over six states in Brazil, (5) a measure of financial knowledge that changes from survey to survey to avoid remembered answers, while still being comparable over time, (6) studying impacts on financial behavior, (7) a unique set of measures of financial attitudes and preferences developed specifically for the youth segment of the population, (8) analysis of “trickle-up” effects for parents, and (9) estimating the additional effects of a complementary workshop for parents. As such, our study offers new insights into the impact of financial education for youth and their parents.

## 2.2. The Brazilian Context

Brazil has a relatively low national saving rate of around 16 percent of GDP and levels of financial awareness are also low. For example, a survey conducted by the *Instituto Data Popular* in 2008 found that 82 percent of Brazilian consumers were unaware of the interest rate when borrowing money. To address these issues, policymakers set up a working group of representatives from the financial sector including public, civil society, and private institutions.<sup>4</sup> In 2010, the working group launched a National Strategy for Financial Education (ENEF) with the goal of fostering a culture of financial education in the country and enabling citizens to make sound financial decisions. The strategy's scope is national, targeting children, youth and adults, and its goals ambitious, involving a large set of actors and a multiplicity of delivery mechanisms for financial education.<sup>5</sup>

One of the first pilot projects of the ENEF was a financial education program for public high schools. This program was developed in collaboration with the Federal Ministry of Education and State and Municipal Secretariats of Education. We joined the project team to help assess whether the high school pilot program had the desired effects on financial knowledge, attitudes and behavior. The results of our study would be used to inform improvements to and the eventual national scale up of the program.<sup>6</sup>

## 3. Financial Education Curriculum

The financial education curriculum was developed by a team of education experts, psychologists, and sociologists in Brazil who were commissioned by ENEF. The content encompasses innovative instructional material designed to capture the interest of young adults and is relevant to their lives. Specifically, financial education is introduced through a cross-curricular approach based on 72 learning frameworks that can be integrated into regular school subjects such as Mathematics, Portuguese, Science, Geography, and History.

High school students in Brazil typically have 14 mandatory subjects, each with a set of pre-defined skills and content that must be taught. The cross-curricular approach is a teaching technology that allows any of these 14 subjects to use financial education to cover the pre-defined skills and content required for their courses. For example, students are expected to learn how to relate different measurements (length, mass, area, and volume) and these skills are typically taught in Mathematics, Physics, and Biology. The financial education curriculum

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<sup>4</sup> Participating public sector institutions included the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários, CVM), the Central Bank, and pensions and insurance regulatory agencies (Superintendência Nacional de Previdência Complementar, PREVIC, and Superintendência de Seguros Privados, SUSEP). The group also included the association of financial institutions (Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais, ANBIMA), BM&F BOVESPA (the stock exchange), and the federation of banks (Federação Brasileira de Bancos, FEBRABAN).

<sup>5</sup> After the working group fulfilled its purpose, a new committee, the National Committee on Financial Education (CONFEF – including Minister of Education, Minister of Justice, Ministério da Fazenda e Ministério da Previdência Social) was created to spearhead the financial education agenda.

<sup>6</sup> CVM coordinated the pilot project, with collaboration and support from BM&F BOVESPA, ANBIMA, FEBRABAN, Instituto Unibanco and Citi Foundation.



includes learning frameworks that allow teachers to use financial education as a theme to develop these same set of skills. One such exercise in the curriculum is a case study of a group of friends planning a barbecue who have had previous disagreements dividing up costs of food and drinks. So this time they plan in advance and calculate the amount of food and drinks they need to purchase and how to divide up these costs. This involves, for instance, calculating the number of soda bottles they should buy given the number of guests and expected consumption, and involves calculating volume. Apart from teaching the core concept, the financial skill that is simultaneously developed through this exercise is the tracking of expenses and budgeting. The learning is further enhanced by using a case study (i.e. planning a party) that is very relevant to the lives of young high school students. Similarly, when discussing the international economy, students are asked to identify the imported products they use in everyday life. Each learning framework concludes with a short outline of the skills and content that students are expected to learn.

The learning is also repeated and continuous throughout the school year. In contrast to typical workshop based financial education programs that are delivered in one shot and vary in length from 90 minutes to a few hours, the textbooks in our program contain material for between 72 and 144 hours of teaching (1-2 hours per topic). Further, the material includes exercises that students complete with their parents such as household budgeting, or planning their professional careers.<sup>7</sup>

Finally, the curriculum includes detailed teaching guidelines and teacher training. The guidelines explain how to integrate the financial education framework into the regular curriculum, and teacher training provides an introductory two-day seminar, a reference DVD, and a training website with complementary material and a blog on teaching tools.

## **4. Research Design, Sampling, and Timeline**

### **4.1. Research Design**

We use a randomized control trial to measure the causal effects of the high school financial education program described in section 3. Treatment was assigned at the school level. Treated schools received financial education material and teacher training. Control schools did not receive any material or training, but participated in surveys and testing in the same manner as the treated schools. One eleventh grade class in each school participated in our study. Treated classes received financial education during the second semester of eleventh grade (fall 2010) and the second and third semesters of financial education throughout twelfth grade (spring 2011 and fall 2011), the last year of high school. Students in the sample were between 15 and 17 years of age at the start of the intervention.

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<sup>7</sup> A detailed outline of the curriculum is provided in appendix 1.

In addition to the school financial education program, we also study the impact of a complementary parent intervention in treatment schools.<sup>8</sup> During the second semester of financial education (spring 2011), parents of students in treatment schools were invited to participate in a school workshop. At the workshop, they were directed to watch either a financial education video (workshop treatment group) or a health education video (workshop control group) through random assignment. Parents learned which video they had been assigned to watch only *after* they arrived at the workshop. The purpose of the parents' workshop was to raise awareness among parents about the importance of financial education and to encourage them to interact more with their children on financial matters, thereby leveraging and reinforcing the material students were taught through the school program. The reason for showing a health education video to the workshop control group was that our counterparts did not think it was logistically and politically feasible to invite only certain parents within a school to a workshop, but not others. We do not expect the health video to have an impact on financial outcomes. Figure 1 summarizes the study design.

#### **4.2. Sample Selection and Representativeness**

Brazil is divided into 26 states and a Federal District. The Federal District and five states were part of the study, including three of the most populous and developed states (São Paulo, Minas Gerais, and Rio de Janeiro), and two states (Ceará and Tocantins) that represent less developed areas of Brazil. In 2009, the Federal District had the highest GDP per capita in Brazil (US\$ 28,951). Minas Gerais, Rio de Janeiro and São Paulo are located in the Southeast, with GDP per capita of US\$ 8,289, US\$ 12,524, and US\$ 14,872, respectively. Ceará and Tocantins are located in the Northeast and North of Brazil with GDP per capita of US\$ 4,399 and US\$ 5,960, respectively.

In April and May 2010, the Secretariat of Education in each state assembled a list of public high schools that volunteered to participate in the financial education pilot program, totaling 815 schools. We divided these schools into a treatment and control group through stratified and matched randomization as soon as we received each list, so that the teacher training for treatment schools could be organized and conducted before the mid-year school break in July. São Paulo being the state with the largest number of schools sent four separate lists on different dates. In addition, one of the project's partner institutions (Instituto Unibanco) provided us with an additional list of 101 public schools that they partnered with in Rio de Janeiro, São Paulo, Minas Gerais, and the Federal District.

Overall, our sample is fairly representative of public high schools in Brazil. According to data from the Federal Ministry of Education, there were 18,193 public high schools across Brazil in 2008, of which nearly 44% were located in our sample states – 21% in Sao Paulo, 12% in Minas Gerais, 6% in Rio de Janeiro, 3% in Ceara, 1.4% in Tocantins, and 0.4% in Federal District. Our

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<sup>8</sup> Due to political constraints, we were unable to extend the parent intervention to control schools.

study sample drew predominantly from the larger States of Sao Paulo (42% of sample) and Rio de Janeiro (31% of sample). To assess representativeness within states, Appendix Table 1 compares school quality measures for in-sample and out-of-sample schools where in columns (1) and (4) high school graduation and dropout rates are regressed on an indicator for in-sample schools and state dummies. Columns (2) and (5) add interactions with state dummies to assess state by state differences. Finally, columns (3) and (6) include even finer controls with municipality fixed effects. Standard errors are clustered at the municipality level and data is available for nearly 8,000 schools in 1,966 municipalities. The coefficients on all regressions and interactions with state dummies are statistically indistinguishable from zero, which affirms the representativeness of our sample in terms of school quality.

For the sample of schools in our study, we further obtained municipality level economic indicators and first stratified by whether they were located in a municipality with above or below median number of financial institutions per capita. Within strata, we formed matched pairs of schools and randomly assigned one school in each pair to be in the treatment group and the other school to be in the control group. We matched on the following school and municipal variables to improve balance on these characteristics across the treatment and control groups: GDP per capita of the municipality, savings volume per capita of the municipality, school location, number of students in the school, number of teachers in the school, school dropout rate, and school graduation rate. We chose these variables since they may be correlated with the impact of the material on financial knowledge, attitudes, and behavior. We were not able to match on variables collected through our surveys because the randomization had to take place before the baseline survey to enable the program to train the teachers on time.

Randomization was done by us and through a computer, implying that any differences across the treatment and control group are due to pure chance. After the randomization was completed, we had to move three control schools to the treatment group manually since some states requested that at least one school in each school district participate in the program. We chose these schools at random among the schools in the school district and drop them and their pairs from the analysis. Also, after the randomization was completed but before the program was implemented, we discovered that twelve schools indicated by the Instituto Unibanco decided not to participate in the pilot. We drop these schools and their pairs from the analysis also. In addition, five schools had accidentally been listed twice (three were on both the state ministries' and Instituto Unibanco lists and two were duplicated on the state ministries' lists). We randomly chose which entry to drop (along with their pair). Another six treatment group schools from São Paulo did not participate in any of our surveys for unknown reasons. We drop these schools from our sample along with their pairs. In the end, we are left with 868 schools for the analysis – 432 in the treatment group and 436 in the control group. The majority of the schools are located in the most populous states, São Paulo, Rio de Janeiro, and Ceará.

### 4.3. Sample Selection for Parent Intervention

For the implementation of the parent workshops, treatment schools sent in a list of current students enrolled in the class receiving financial education during the spring of 2011. Only schools that sent the list were included in the study as this was taken as a signal that they were willing to implement the workshop. We used these lists instead of relying on information from earlier surveys because of potential student turnover from one school year to the next. A total of 264 treatment schools provided a list, covering 8,534 students.

We matched the lists with data from the baseline parent survey on the basis of the student's name, and stratified and randomly assigned parents in each school into treatment and control groups by computer. We used the following strata: (1) no baseline information on parents; (2) parent had low baseline financial literacy; and (3) parent had high baseline financial literacy. We defined the level of baseline financial literacy based on the number of correct answers to the two standard financial literacy questions on interest rates and inflation asked on the survey.<sup>9</sup> About 41 percent of parents did not answer either question correctly. We classify these parents as having low baseline financial literacy. Parents who answered one or two questions correctly are classified as having high financial literacy.

Each school that provided a list of their students received two separate lists in return: one with the names of the students whose parents would watch the financial education video during the school workshop (treatment group) and one with the names of students whose parents would watch the health video (control group). Schools were provided the financial education and health videos and parent exit questionnaires. Each school was responsible for organizing and implementing the workshop at a time of their choosing and administering the questionnaire at the end of the workshop.

### 4.4. Empirical Specification

Based on the random assignment, the impact of student financial education is measured as the difference in average outcomes in the treatment and control groups using the following intention-to-treat OLS regression:

$$y_{i,s,f} = \alpha + \beta \text{Treatment}_{i,s} + \sum \gamma_s d_s + \delta y_{i,s,b} + \varepsilon_{i,s} \quad (1)$$

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<sup>9</sup> These two questions are:

Question 1. Assume that you would like to get a loan for R\$ 50,000. Bank A offers you a loan of R\$ 50,000 that needs to be repaid after one year with an interest rate of 15% payable at the end of the loan. Bank B offers you a loan for the same amount, R\$ 50,000, for which you will have to pay R\$ 60,000 also after a period of one year. Which option do you prefer?

A) Bank A, B) Bank B, C) Don't know.

Question 2. Assume that the interest rate on your savings account is 1% per year and the inflation rates 2% per year. After one year without making any transactions on our saving account, would you be able to purchase more, the same amount, or less than what you could purchase today with the money in the account?

A) More than today, B) The same as today, C) Less than today, D) Don't know.

where  $y_{i,s,f}$  is a measure of the financial knowledge, attitude, or behavior, of student or parent  $i$  in school pair  $s$  at follow-up  $f$ . The variable  $Treatment_{i,s}$  indicates whether an individual is in a school that was randomized into treatment or not and is thus equal to one for the treatment group and equal to zero for the control group. We include school pair dummies,  $d_s$  in all specifications and control for baseline values of available dependent variables,  $y_{i,s,b}$  as per Bruhn and McKenzie (2009) and McKenzie (2012). When baseline values have missing observations, we replace these with zero and include a dummy variable indicating that the observation was missing. Standard errors are clustered at the school level. Finally, note that results from the first and second follow-up surveys are not fully comparable due to changes in class composition from one year to the next, as discussed in section 6.3.

The analysis of the parent workshops is based on workshop attendance rather than invitation, hence the treatment variable in specification (1) takes on the value of 1 if the parent watched the financial education video, and 0 if the parent watched the health education video. As mentioned before, these assignments were unknown to the parents prior to arriving at school, and both videos were shown simultaneously and in identical settings.

#### **4.5. Study Timeline**

The sample selection and randomization for the student intervention occurred in April-May 2010. A baseline survey was conducted in early August 2010 among students and parents in both treatment and control schools. The financial education program was rolled out immediately after. By mid-August 2010, teachers began using the financial education materials in the classroom. The program continued until November 2011 for a total of three school semesters.

Over the course of this study, two rounds of follow-up surveys were conducted. The first follow-up survey was implemented in early December 2010, four months after the program started. The results of this survey measure the short-term effects of the program. A second follow-up survey was implemented in December 2011 to assess the longer-term impacts.

The parent intervention was introduced in May 2011, and parent outcomes recorded through an exit survey and the December 2011 follow-up survey.

### **5. Program Take-up and Implementation**

#### **5.1. Student Program**

Following school assignment to treatment and control, the program distributed textbooks to treatment schools and organized training sessions for the teachers. The vast majority of treatment schools received the financial education textbooks and distributed them to students. In both rounds of the follow-up survey, we asked school principals as well as teachers and students a series of questions regarding implementation and usage of the financial education program.

Follow-up 1 spans the first semester of the program, while follow-up 2 covers the second and third semesters.

Over 95 percent of treatment school principals report that they received the textbooks for the first semester, and 93 percent report receiving them for semesters 2 and/or 3. The large majority of teachers also say that students received the textbooks (i.e. the books were actually distributed to students), 94 percent and 92 percent in follow-up 1 and 2, respectively. On training, 78 percent of teachers report that they received training on how to use the financial education material in the first semester, and 65 percent report receiving it in the second/third semesters.

In terms of usage, 87 percent of students report that teachers actively used the financial education textbooks in classrooms in the first semester, though a drop-off occurs in semesters 2 and 3, with 74 percent of students reporting usage. However, the percentage of principals reporting that financial education was taught in school remained high throughout the study period (93 percent for all semesters).

Schools in the control group did not receive textbooks or teacher training through the financial education program studied in this paper, but they may have implemented other types of financial education. The principal and teacher questionnaires were only applied in treatment schools during the first follow-up survey, but during the second follow-up survey control schools also answered these questionnaires.<sup>10</sup> In this survey, 16.6 percent of control group principals stated that the school had a financial education program and 11 percent of control group teachers reported receiving some training related to financial education. We do not have detailed information on the financial education program implemented in control schools. However, only 5 percent of control group principals said that the school received a textbook with financial education material, suggesting that these programs may be less intensive than the one studied in this paper.

We supplemented this quantitative analysis with qualitative work in the form of teacher focus groups for treatment schools, which were organized with our Brazilian counterparts. The purpose of these meetings was to learn how teachers implemented the program studied in this paper, how material was integrated into the regular curriculum, and how the contents and/or delivery could be improved for future implementation. Six such meetings were held in September and October 2011, with teachers and educators from all six states. All meetings were conducted in facilities provided by the State Education Departments and meals were provided. The meetings were generally well attended (more than 200 educators attended in São Paulo), and lasted an average of four hours each.

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<sup>10</sup> The student questionnaire did not include questions on program implementation in control group schools in either follow-up survey.

In all states, the teachers and educators greatly approved of the textbooks and the financial education program. They said that students liked the case studies and felt that they connected well with their daily life situations. The teachers also complemented the clarity with which concepts were conveyed in the books. One teacher commented, “What motivates me the most about this project are the books. The content is directly related to students’ lives and helps to insert them in a highly-competitive market society. I learned a lot from the material, and similarly to what happened to my students, it has helped me to plan better for the future.”

In terms of implementation, most teachers employed work group strategies to teach the material, where students were divided into small groups and asked to work on different tasks. Examples of such tasks varied from identifying steps for opening a small firm to creating a school market. Several teachers reported assigning projects to students related to fundraising and organizing their own graduation party. Other teachers reported undertaking field trips to local markets, universities, and companies to learn how they operate. Others used various forms of media to explore the topics in the textbook, such as computer simulations and videos.

Overall, teachers and educators felt the financial education program was valuable, that the textbooks were extremely relevant, and that they as well as their students enjoyed the new learning opportunities afforded to them.

## **5.2. Parent Workshops**

For the parent workshops, we asked schools to mail the filled-in parent exit questionnaires back to us after the workshop, and we determine which schools implemented the workshops based on our receipt of these questionnaires. We received 1,553 filled-in parent questionnaires from 109 treatment schools, implying that parent workshops did not take place in the other 153 treatment schools that had originally provided a current list of their students for the parent intervention (these schools either did not organize the workshop or parents did not attend the workshop). When planning the parent intervention, our counterparts had cautioned that attendance rates may be low since parents of public high school students in Brazil tend to not participate in school events.

Comparing the lists of current students we received from schools before the workshop to the filled-in exit questionnaires gives an average attendance rate of 46 percent across the 109 schools that returned questionnaires. The attendance rate does not differ across parents who were randomized into the treatment and control groups. Parents did not know whether they had been assigned to watch a financial education or health video until the video was screened at the workshop. That is, the decision to attend was independent from treatment status. Hence, in our impact analysis of the parents’ workshop, we only keep students and parents if the parent attended a workshop. The interpretation of the results is applicable to families who are more interested in school events and respond to school invitations.

## **6. Survey Data and Summary Statistics**

### **6.1. Survey Data**

For the data collection, we partnered with the *Centro de Políticas Públicas e Avaliação da Educação* (CAEd/UFJF), a local education research and survey institute with extensive experience in designing and implementing knowledge tests in Brazilian schools. CAEd has a wide network of supervisors and surveyors across Brazil and was able to implement simultaneous surveys in all schools in our sample.

Survey implementation took three days per school during each survey round (baseline and both follow-ups). On the first day, CAEd staff independently administered a financial knowledge test and distributed parent questionnaires to students. The students were instructed to take the parent questionnaire home, ask one of their parents to fill-out the questionnaire and return the questionnaire on one of the following days. On the second day, students filled out a self-administered questionnaire measuring financial attitudes and behavior. The third day provided an opportunity for any student who had missed one or both of the previous days to fill out the test and/or questionnaire. The student tests and questionnaires were administered in the classroom in the same way as a regular school exam, i.e. distributed to students, supervised by the surveyor and collected by the surveyor at the end of the allocated time. School teachers were not privy to the tests or questionnaires beforehand, and were not involved in proctoring them.

### **6.2. Baseline Summary Statistics**

Table 1 shows pre-program summary statistics of school and student characteristics for treatment and control schools. The school level variables are for 2008 and were provided by the Federal Ministry of Education. As a result of the school matching and randomization procedures described in section 4, the pre-program school characteristics were the same on average in the treatment and control group. For example, the drop-out rate was about 10 percent and the class passing rate was 74 percent in both treatment and control schools.

The remaining variables in table 1 were collected through the baseline survey that was conducted in August 2010. Student background characteristics show that 56 percent of students participating in the study were female, 67 percent had some form of income (from work or from parents) and about 35 percent were working at baseline. Additionally, 33 percent were beneficiaries of the *Bolsa Família* government cash transfer program, indicating that they belonged to low-income households. About 60 percent of the students' parents had less than high school education. In terms of financial characteristics, only 11 percent made a list of their expenses every month, but 75 percent negotiated the price or payment method when making purchases. There were no differences in baseline levels of financial proficiency, financial autonomy, or intention to save. Overall, the data in table 1 indicates that students' background



and financial characteristics were the same across the treatment and control group at baseline, as expected since treatment status was randomly assigned.

### **6.3. Survey Participation and Attrition**

Table 2 shows the number of schools, students and parents that participated in the surveys at baseline and at follow-up. At baseline, 866 out of 868 schools in our study sample participated in the survey, although two of these schools did not implement the financial literacy test and the parent questionnaire. In each follow-up survey, about 40 schools did not implement the survey. Reasons for non-implementation varied and were mostly related to scheduling difficulties. The schools that did not participate in the follow-up surveys were different in each round, so we have follow-up data for most schools from either follow-up 1 or follow-up 2.

After realizing that survey participation had dropped between baseline and follow-up 1, we provided incentives for survey completion during follow-up 2. Both treatment and control schools where more than 75 percent students completed at least 80 percent of the survey questions were entered into a lottery for one of twenty five computers. Despite this incentive, we did not have a higher number of schools participate in follow-up 2 than in follow-up 1. However, a greater number of students within the participating schools answered the surveys in follow-up 2 than in follow-up 1. The number of students surveyed per school in follow-up 2 is still lower than in the baseline (about 22 vs. 28 students per school). One reason for this decline in the number of students per school is that the drop-out rate is quite high in our sample (about 10 percent per year at baseline).

Note that student rotation is also common in our study sample. As shown in table 1, 30 percent of students reported that they had repeated at least one school year at baseline. In part due to high drop-out and repetition rates, some schools reshuffle classrooms from one year to the next. In our sample, the majority of students in follow-up 1 were present in baseline (follow-up 1 was implemented in the same semester as the baseline, about four months apart). However, only about 60 percent of students in follow-up 2 were present at baseline (follow-up 2 took place about 16 months after baseline). For the financial education program, this high rotation implies that more than a third of the sample was not exposed to the material for a full three semesters, but rather for only one or two semesters.

With respect to the parent questionnaire, table 2 shows that participation was quite high, considering that this questionnaire was self-administered at home. About 88 percent of students returned parent questionnaires at baseline. In the follow-up surveys, this number dropped to about 76 percent.

To test whether survey attrition differed across treatment and control schools, we perform the following analysis for follow-up 2. We use enrolment counts at the beginning of the fall 2011

semester to calculate response rates to the survey conducted at the end of the semester. These enrolment counts were available for 631 schools in our sample. We then run a regression of response rates on a treatment dummy and randomization school pair dummies. The results are reported in table 3 and show that survey attrition is uncorrelated with treatment status for both the student and parent surveys. The response rate for the student (parent) survey was about 80 (55) percent in both treatment and control schools.

## **7. Analysis and Discussion of Main Results**

### **7.1. Student Financial Proficiency**

Table 4 shows the impact of the school financial education program on students' financial proficiency. The proficiency tests were tailored to the program's material and objectives and the same tests were administered in both treatment and control schools. Tests were constructed using item response theory (which is also used to construct the GRE and SAT in the United States), and were comparable across students and across time. This implies that a series of equivalent questions were used to test the same concept leading to different combinations of questions on each test. The questions that each student received were thus likely to be different in each survey round and different from other students in class. This minimized the risk that students simply remembered correct answers from previous rounds without truly understanding the question and also reduced the scope for cheating. Teachers were not privy to the tests at any point prior, after, or even on the day of the tests and CAEd proctors were present in classrooms for the entire duration. No awards were given for performance on tests. These steps protect the analysis from concerns of teachers teaching to the test.

Student financial proficiency was calculated and scored on a scale of 0 to 100. Table 4 shows the average level of financial proficiency was significantly higher in the treatment group than in the control group in both follow-up 1 and in follow-up 2. The difference is of 3.5 points and 3 points, respectively, corresponding to a 5 to 7 percent increase in financial knowledge. These increases are equivalent to a quarter of a standard deviation improvement by follow-up 1 and a fifth of a standard deviation improvement by follow-up 2.

Further, as shown in figure 2, test scores improved across their distribution benefiting low and high achieving students. Specifically, the proportion of students that performed exceptionally well increased by 28 percent and the proportion of students that performed exceptionally poorly decreased by 26 percent. This effect represents a rightward shift in the distribution of test scores for treated schools compared to control schools. Hence, the financial education program helped poorly performing students to improve significantly, and well performing students to do even better. These distributional effects are important and show that the program benefited students along a broad performance spectrum rather than being driven by any one category, and that the curriculum speaks to the learning needs and interests of all types of students.

Comparing these results with impacts in the previous literature is difficult because the small number of existing studies on financial education in schools is fraught with identification concerns, as discussed in section 2.1. But there are school based studies outside the realm of financial education that are important for comparison purposes. The type of education interventions in secondary schools that have been tested through random control trials include the provision of monetary incentives to students and student tutoring. In general, these studies identify improvements in student learning during the periods studied, although the effects are not always statistically significant.

Perhaps the most well-known studies of monetary incentives for secondary school students are Angrist and Lavy (2009) and Angrist et al. (2002). In the first study, Israeli students were provided cash incentives to pass their graduation exams, and while the mean estimates are positive they are not statistically significant. In the second study, lotteries were used in Columbia to distribute vouchers to partially cover the cost of private secondary schooling for 1,600 students who maintained satisfactory academic progress. Three years after the lotteries, winners were about 10 percentage points more likely to have finished 8th grade, and scored 0.2 standard deviations higher on achievement tests, although the latter result is only marginally significant. Barrera-Osorio and Linden (2009) study the introduction of computers to supplement learning in Colombian schools and find negligible improvements in language and math test scores and limited use of the computers for academic learning in higher grades despite the program's focus to do so. Compared to these studies, our finding of an increase of 0.2-0.24 standard deviations in financial proficiency lies in the top end of statistically significant improvements in test scores.<sup>11</sup>

## **7.2. Student Graduation**

An important corollary effect of the financial education program was on student graduation rates. One hypothesis on student graduation suggests a positive impact especially if the financial education material covered was engaging and interesting, with the new textbooks providing both teachers and students more motivation and interest in teaching and learning. At the same time, however, a greater emphasis on financial education topics and exercises may have come at the expense of neglecting aspects of the regular curriculum. Hence, it is important to empirically investigate impacts on graduation rates.

The data on graduation comes from administrative records of the Brazilian Ministry of Education for 2011 – the last year of the financial education program when the students in our sample were in the third and final year of high school. While we do not have access to individual student-level or class-level data, we were provided information at the aggregate level for final grade classrooms. Table 5 shows the impact of the financial education program on 2011 grade-

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<sup>11</sup> There are also a number of papers that study classroom interventions in primary schools. These papers tend to find effects on test score between 0.15 and 0.47 standard deviations (for example, Banerjee et al., 2007; Cabezas et al., 2011; Muralidharan and Sundararaman, 2011; He et al. 2008; Linden, 2008).

level graduation/passing, failure, and dropout rates. Column (1) presents the treatment coefficient on passing rates and finds a 1 percent improvement over the control group, a statistically significant effect at the 10 percent level. Columns (2) and (3) identify treatment effects on failure and dropout rates. While we do not detect statistically significant effects on the likelihood of dropping out of school in 2011, the effect on failing is negative and statistically significant at the 5 percent level and represents an 11% reduction in failure rate compared to the control group average.

An important point to note is that the analysis on graduation likely underestimates the true effect since the administrative data is at the grade level, whereas our financial education program was provided to a single classroom in each school. Moreover, the results allay concerns about the financial education program diverting attention and jeopardizing grades in the regular curriculum. The evidence, in fact, suggests a complementary role of financial education. Part of the explanation is that financial education was not offered as a separate course but rather integrated into the regular curriculum, and was introduced through exercises and case studies that were extremely relevant to the lives and activities of young high school students.

### **7.3. Financial Behavior and Attitudes**

Next we turn to analyzing changes in financial behavior and attitudes. While these measures were self-reported, students were made well aware that their responses would not be used to assess their grades or influence any aspect of school performance, that their identities would be kept anonymous, and that school staff including their teachers would not be allowed to review any completed surveys. These disclosures were important to allay concerns of demand effects in self-reported data.<sup>12</sup>

The student survey asked questions on outcomes related to topics emphasized in the financial education curriculum. Impulsive spending was an important behavior that the financial education program targeted. Consumers nowadays are exposed to a multitude of cleverly marketed consumer products, and falling prey to such temptation is particularly easy for young adults who are likely influenced by additional factors such as social norms, trends, and fashion. Furthermore, consumer items in Brazil such as cell phones are readily available to purchase on installment plans that come with large implicit (and often hidden) interest charges. A sizeable

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<sup>12</sup> Administrative data on financial behaviors and attitudes for high school aged students in Brazil does not exist in a centrally accessible registry. Less than 30% of our sample had formal savings that are likely spread out across a wide array of financial institutions with little data sharing and central aggregating. Most of saving and spending among youth in Brazil is informal and cash-based which makes it impossible to record administratively. As part of the study, we did assign each student a national ID card which we can track as students get older and enter the formal financial system more regularly. Furthermore, unlike the United States where school-based evaluations are widespread, this concept is fairly new in Brazil and our general interaction with students suggests that they were inclined to simply report the truth and that they did not face any kind of pressures from their teachers or parents. Finally, none of the students we spoke to in school visits intimated that they were trying to please the program evaluators in their responses.

proportion of our student sample had part-time employment at baseline (35 percent) and an even greater proportion had disposable money available from other sources (67 percent), hence these temptations were real and meaningful. Against this setting, the financial education program highlighted the importance of responsible inter-temporal financial choices.

Our expected channel and direction of impact has precedent in the literature. Existing evidence from psychology supports a mechanism by which individuals can be taught to self-regulate better. The literature identifies self-control as being important in overriding temptation (Barkley, 1997; Baumeister et al., 1994), and how abiding and following learned rules can help individuals exhibit self-control and delay gratification (Hayes, 1989; Hayes et al., 1996). Repeated practice of such rules can further strengthen self-control mechanisms (Baumeister and Heatherton, 1996; Baumeister et al. 1998; Muraven and Baumeister, 2000; Baumeister et al. 2007). Some of the rules that were taught and repeated over a 17-month period in our course, and measured in the follow-up surveys included saving up for purchases instead of buying items on installments, comparison shopping, negotiating prices, and keeping track of expenses by making budgets.

### *7.3.1. Savings Behavior and Attitudes*

Table 6 presents regression results on savings behaviors and attitudes. As further robustness against self-reporting bias, we used multiple elicitation and recall methods to measure treatment effects. We measured savings in several ways: (a) by direct elicitation of saving patterns, (b) by asking questions on attitudes towards saving and spending, and (c) by a psychology-based index on intentions to save that aggregated a series of questions that identified preferences over hypothetical savings and spending scenarios.

Columns (1) and (2) report results for follow-ups 1 and 2 respectively, on a question that directly asked students whether they considered themselves to be savers or spenders. Students had to elect one of five options: (i) I'm a spender, (ii) I'm more or less a spender, (iii) I'm neither a spender nor a saver, (iv) I'm more or less a saver, (v) I'm a saver. We coded a dummy variable equal to one if students responded they were savers or more or less savers. Compared to 32 percent savers in the control group in either follow-up round, students in treated schools were 3 percentage points more likely to identify themselves as savers rather than spenders.

Columns (3)-(4) then ask about saving at least some disposable money; (5)-(6) ask about saving money for future purchases; and (7)-(8) inquire about formal savings. Compared to 40 percent of students in the control group, the financial education program prompted an additional 5 percent of students in the treated schools to save some of their disposable money. This result is similar and highly significant (at the 1 percent level) in both follow-up rounds. Similar statistically significant results are reported for saving money for future purchases and formal savings.

Table 6 also shows that students' average percentage of money saved increased significantly in column (10), by 1.4 percentage points in follow-up 2 (14.3 percent of disposable money saved in the treatment group as compared to 12.9 percent in the control group).<sup>13</sup> This 1.4 percentage point improvement represents a 0.07 standard deviation increase.

Finally, columns (11) and (12) report treatment effects on an intention to save index that aggregated a series of questions that identified preferences over hypothetical savings and spending scenarios. Students responded to questions on (i) attitudes towards financial behavior, such as "In my opinion, saving some money every month is extremely beneficial;" (ii) subjective norms and expectations, such as "My family has the habit of saving some money every month;" and (iii) perceptions of controlling one's behavior, such as "I believe I can save some money every month."<sup>14</sup> The results show that that students in treated schools had a significantly higher measured intention to save (51) than those in control group (49) at follow-up 1, and 53 compared to 51 in follow-up 2. Normalizing by the standard deviations in the control group, these effect sizes represent 9-12 percent of a standard deviation.

### *7.3.2. Purchasing Behavior and Attitudes*

Next, we study budgeting and purchasing behavior in table 7, and as with savings we measure outcomes in several ways: (a) by asking about listing of monthly expenses, (b) by questions on negotiating prices for purchases and conducting market research before buying, and (c) by a psychology-based financial autonomy index that aggregated a series of questions that measured whether students felt empowered, confident, and capable of making independent financial decisions and influencing the financial decisions of their households.

In line with the concepts taught in the curriculum, the results in columns (1) and (2) show that 16 percent of students in treated schools made a list of monthly expenses as part of a budgeting exercise compared to 13 percent in the control schools in follow-up 1. These numbers are 17 percent and 14 percent respectively, in follow-up 2. Both treatment effects are statistically significant at the 1 percent level. Columns (3)-(4) show a 3.1-4.1 percentage point greater likelihood of negotiating price or payment method prior to purchases by students in treated schools compared to an average of 74 percent in control schools. Columns (5)-(6) find a 2.1-2.5 percentage point greater likelihood of comparison shopping before making purchases compared to 66-67 percent in the control schools.

Finally, columns (7) and (8) measure treatment effects on the financial autonomy index. Autonomy has previously been studied in the psychology and sociology literatures to understand

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<sup>13</sup> This question was not asked in follow-up 1.

<sup>14</sup> The intention to save index and the financial autonomy index described in the next section were both developed by CAEd using insights from sociology and child psychology for age-appropriate measurement (Micarello et al., 2012). As such, these measures aimed to signal preferences on current as well as future financial decision-making potential of students. The complete list of questions used to develop these measures is provided in the Appendix.

and encompass attributes of independence, confidence, optimism, self-control, and conformity to parents and peers (Berndt, 1976; Steinberg and Silverberg, 1986; Reichert and Wagner, 2007). Noom et al. (2001) synthesize autonomy into attitudinal, emotional, and functional parts. Attitudinal autonomy refers to the ability to set goals, thinking before acting, and encompasses the notions of knowledge, consciousness, and responsibility. Emotional autonomy relates to the perception of emotional independence in the face of parents, relatives, and peer groups, and the feeling of confidence in one's own choices. Lastly, functional autonomy refers to perceptions of competence, control, and responsibility in making decisions. The measure of financial autonomy used in this paper and developed in Micarello et al. (2012) most closely follows these definitions. Specifically, the autonomy measure was designed to capture students' confidence, independence, and willingness to participate and influence household financial decisions. For example, the survey asked students the extent to which they agree or disagree with statements on (i) reflexive/attitudinal autonomy, such as "I like to think carefully before deciding to buy something;" (ii) emotional autonomy, such as "I feel prepared to talk to my parents about money matters;" and (iii) functional autonomy, such as "I always try to save some money to do things I really like." Five questions were asked in each category, totaling 15 questions. Student responses to these questions were then aggregated into a summative scale, the financial autonomy index, which ranges from 0 to 100.

The results show that the average financial autonomy score increased from 49 in control schools to 51 in the treated schools by follow-up 1; and from 51 in control schools to 52 in treated schools by follow-up 2. These results are statistically significant at the 1 percent level and correspond to a 0.09 standard deviation improvement over the control group.

Overall, these results show a clear improvement in student behavior and attitudes as a result of the financial education course, in line with concepts taught in the curriculum.

#### **7.4. Student Participation in Household Finance**

Apart from students' own financial behavior, we investigate whether students become more proactive in their households' financial decisions. Indeed, the curriculum included several take home exercises that were meant to be completed with parents such as making a household budget and exploring savings account options.

Data on student participation in household financial decisions comes from the parent questionnaires. The parent surveys included questions on socio-demographic characteristics, measured financial literacy through standard questions used in the literature, and elicited parents' financial behavior regarding budgeting and savings. The parent questionnaires also asked whether parents discuss financial matters with students and whether students help to organize the household budget.

We find that a significantly larger percentage of students in the treatment group talked to their parents about finances and participated in organizing the household budget. Table 8 shows that 71 percent of students in treatment schools participated in household financial decisions compared to 67 percent in control schools in follow-up 1, and 74 percent compared to 70 percent in follow-up 2. Due to the program, students were also significantly more likely to help organize the household budgets with significant improvements of 3.6-4.8 percentage points over the control group.

### **7.5. Parent Outcomes**

Next, we examine impacts of student financial education on parents' financial knowledge and behavior. Financial knowledge is measured through two standard questions on interest rates and inflation (listed in a footnote in section 4.1). The results in table 9 show no impact on parents' financial knowledge in follow-up 1. However, in follow-up 2, parents of treatment school students were significantly more likely to correctly answer both financial knowledge questions than parents of students in control schools. In follow-up 2 we also detect a positive and statistically significant difference in knowledge of budgeting between the two groups: Compared to 68 percent of parents in the control group, parents of students in the treated schools were 6.3 percentage points more likely to understand the composition of a budget. This is a promising result as budgeting was keenly taught in the student curriculum, including the take-home exercises discussed earlier.

When examining the impact of the student financial education on parents' financial behavior in table 10, we detect no effects in follow-up 1 but again see several positive impacts in follow-up 2. The percentage of parents who save more than zero increased from 76 percent in control schools to 78 percent in treatment schools. The average percentage of income saved increased from 12 percent in control schools to close to 13 percent in treatment schools. Parents in student treatment schools were also more likely to list monthly expenses in a budget, with an increase from 37 percent of parents in the control schools to 39 percent of parents in the treatment schools.

These results indicate that the student financial education program had a “trickle-up” impact or spillover effect on parents. The next subsection discusses whether the parents' workshop reinforced this effect.

### **7.6. Parent Workshops**

To measure the impact of the parent workshops, we compare outcomes of parents who attended the financial literacy and the health literacy sessions. We only include parents who actually attended the workshops in this analysis, excluding parents in the same schools who were invited but did not come. As emphasized earlier, parents were not informed of their video assignment



(health vs. financial education) until they arrived at school, hence restricting the sample to attendees is a statistically valid exercise.

Note that parents who went to the workshop have different baseline characteristics from the ones who did not attend. They are more likely to be recipients of the *Bolsa Familia* cash transfer program and fathers are less likely to have completed at least some secondary education, suggesting that they are from relatively more disadvantaged households. Drop-out rates are also higher in schools that held a parent workshop. These differences imply that the parent workshop results are not representative of the full sample, although they are valid for the group of parents who attended a workshop (and the corresponding students).

As shown in table 11, we find no significant improvements in parents' financial behavior as a result of watching the financial literacy video – parents who watched this video were no more likely to make a budget or improve savings behavior compared to those who watched the health video. The lack of significant impact of the parents' workshop may be due to the relatively low intensity of the treatment or other constraints parents face in responding to the information. The exposure to financial education material through the DVD was relatively short and the workshops included no supplementary discussions. This finding is consistent with the existing literature on financial education (see for example, Bruhn et al., 2013, Cole et al., 2011, and Fernandes et al., 2013).

The remarkable result from this intervention, however, is the impact of the parents' workshop on student behavior. The parent workshops significantly improved the percentage of disposable money saved among students by 2.5 percentage points. Specifically, students whose parents participated in the health literacy workshops saved on average 13.5 percent of their disposable money. In comparison, students whose parent participated in the financial literacy workshops saved 16 percent of their money. This result suggests parents were able to use their improved awareness of financial issues to reinforce the school messages with their children.

## **8. Conclusion and Policy Implications**

Financial education in schools is an important policy focus in both developed and developing countries, yet its impacts are not well understood. This paper contributes to the literature by using a randomized control trial to study the impact of a financial education program for high school students in Brazil. We find significant improvements in financial proficiency of students as well as in behaviors and attitudes towards short- and long-term financial decisions. The analysis combines administrative data on test scores and class graduation rates with multiple elicitation methods in surveys to measure financial outcomes. To date, our study is the largest randomized evaluation in the financial education literature.

Our results offer some important policy lessons as well. First, while youth are the primary focus of school financial education, our analysis suggests that students can help engage their parents in the learning process and can transmit some financial knowledge to adults who may be difficult to reach through standalone financial education workshops. At the same time, holding parent workshop in schools can strengthen parents' involvement in their children's education and generate valuable learning dynamics within the household and provide an important feedback element in children's learning. Second, the successful partnership between private and public sector actors to promote financial education in Brazil suggests a strong complementarity between the highly educated and resourceful facets of financial and private sectors with the typically less-resourced education systems in order to achieve school reform.

In terms of realized policy impact, the findings of this study are already being used to guide policy discussions on the impact of financial education in schools. The Ministry of Education in Brazil recently scaled up their program to 3,000 additional public high schools, and green-lighted a pilot project for primary schools. Furthermore, several other countries in the region have expressed interest in the Brazilian experience to learn and adapt the program to their respective environments and schools systems.

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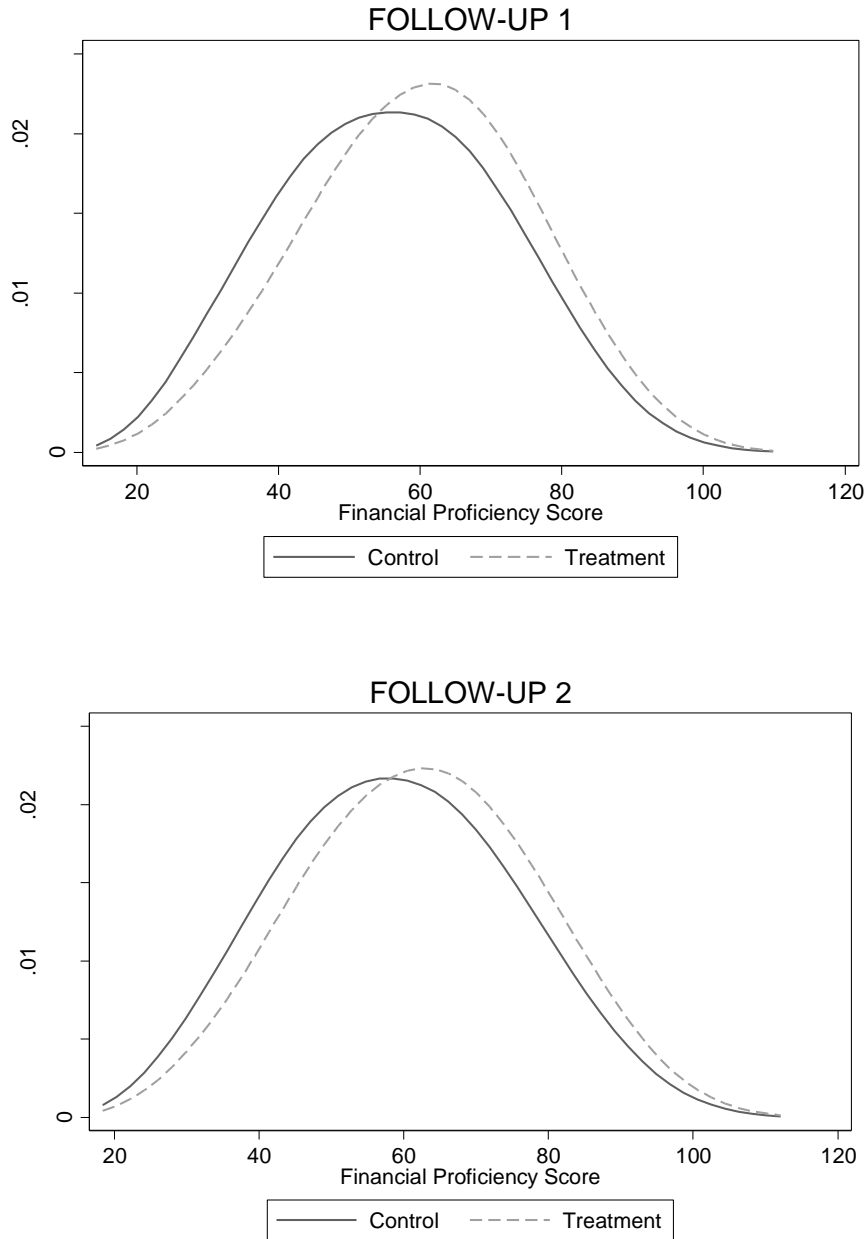
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**Figure 1: Study Design**

	<b>Group 1 Schools</b>	<b>Group 2 Schools</b>
<b>Student Intervention</b>	Control	Treatment
<b>Parent Intervention</b>	--	½ Treatment, ½ Control

**Figure 2: Distribution Shift in Financial Proficiency Scores**



This figure compares density plots for student financial proficiency scores in treatment and control schools. Follow-up 1 and follow-up 2 plots are presented separately.



**Table 1: Baseline Summary Statistics**

	Number of Schools	Number of Students	Control		Treatment		Difference in Means Test (p-value)
			Mean	Standard Deviation	Mean	Standard Deviation	
<b><i>School Level Variables Used to Form Matched Pairs:</i></b>							
Number of students in school	867		640.08	460.20	669.86	508.08	0.366
Number of teachers in school	748		37.41	24.28	38.11	25.77	0.702
School dropout rate	698		9.83	10.36	9.90	10.01	0.925
Grade passing rate	698		74.24	13.20	74.26	13.51	0.981
<b><i>Student Background Characteristics:</i></b>							
Student is female	864	26131	0.55		0.56		0.069*
Mother attended secondary school	863	22474	0.45		0.43		0.392
Father attended secondary school	863	22357	0.41		0.40		0.449
Student has failed at least one school year	863	22435	0.30		0.32		0.100
Student's family receives <i>Bolsa Familia</i> cash transfer	863	22662	0.32		0.33		0.281
Student has computer with internet at home	863	22502	0.52		0.53		0.542
Student has some form of income	866	24319	0.66		0.67		0.111
Student is employed	866	24303	0.35		0.35		0.902
<b><i>Student Financial Characteristics:</i></b>							
Financial proficiency score	864	23255	49.80	15.18	50.15	14.85	0.461
Saves money for future purchases	866	23851	0.15		0.16		0.175
Intention to save index	866	22797	48.29	18.95	48.19	18.57	0.772
Makes a list of expenses every month	866	24080	0.10		0.11		0.680
Negotiates prices or payment methods	866	23867	0.75		0.76		0.462
Financial autonomy index	866	22789	49.11	19.83	49.04	19.58	0.844

This tables presents baseline summary statistics as well as p-values for difference in means tests between students in treatment and control schools. The first four rows show school level variables from administrative data for 2008 obtained from the Brazilian Ministry of Education. These four variables were used to form matched school pairs prior to randomization. One school in each pair was then randomly assigned to treatment and the other to control. The subsequent rows in the table summarize survey data from the baseline survey. To calculate p-values, standard errors are clustered at the school level and randomization pair dummies are added as controls. \* denotes statistical significance at the 10% level.

**Table 2: Survey Participation**

	Number of Schools			Number of Students		
	Baseline	Follow-up 1	Follow-up 2	Baseline	Follow-up 1	Follow-up 2
Financial Knowledge Test (Day 1)	864	829	824	23290	17831	18420
Student Questionnaire (Day 2)	866	826	824	24473	16512	17680
Parent Questionnaire	864	810	818	21603	13532	14080

This table maps the number of schools and the number of students in our study sample across the three waves of surveys: baseline, follow-up 1, and follow-up 2. The survey team visited each school for three days for each round. On day 1, the financial knowledge test was administered and parent questionnaires were handed out. On day 2, the student questionnaire on behaviors and attitudes was administered. Day 3 was reserved for any make-up surveys for students who missed any of the earlier surveys, and the completed parent questionnaires were also collected on day 3.

**Table 3: Survey Attrition**

	Student Survey Response Rate	Parent Survey Response Rate
	(1)	(2)
Treatment School	0.02 (0.019)	0.03 (0.020)
R-squared	0.656	0.663
Sample Size (Number of Schools)	631	631
Dependent Variable Mean in Control Group	0.77	0.55
Dependent Variable Standard Deviation in Control Group	0.19	0.24

This table presents attrition regression results for the follow-up 2 sample. The dependent variable is the survey response rate at the end of the semester, which is the ratio of survey response to enrolment at the beginning of the semester. Column (1) present the response rate among students and column (2) presents the response rate among parents. Enrolment counts for 631 schools were obtained. The regressions include school pair dummies and shows robust standard errors in parentheses.

**Table 4: Student Financial Proficiency**

	Financial Proficiency Score	
	<u>Follow-up 1</u>	<u>Follow-up 2</u>
	(1)	(2)
Treatment School	3.548*** (0.296)	3.020*** (0.355)
R-squared	0.455	0.328
Sample Size (Number of Students)	17831	18415
Number of Schools	829	824
Dependent Variable Mean in Control Group	56.135	59.003
Dependent Variable Standard Deviation in Control Group	14.804	14.908

This table shows OLS regression results for the impact of the financial education program on student financial proficiency. The sample in columns (1) and (2) includes students present in follow-up waves 1 and 2, respectively. The number of students and schools included in the sample fluctuate within a wave because not all students answered every question; and they fluctuate across waves because of student turnover. The outcome variable in this table is a student financial proficiency score, which aggregates financial knowledge questions included in the survey on a 0-100 scale. All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \*\*\* denotes statistical significance at the 1% level.

**Table 5: Student Graduation**

	Grade-Level Passing Rate (1)	Grade-Level Failing Rate (2)	Grade-Level Dropout Rate (3)
Treatment School	0.013* (0.006)	-0.010** (0.005)	-0.003 (0.004)
R-squared	0.582	0.592	0.632
Sample Size (Number of Schools)	858	858	858
Dependent Variable Mean in Control Group	0.841	0.093	0.066
Dependent Variable Standard Deviation in Control Group	0.103	0.081	0.069

This table presents OLS regression results for the impact of the financial education program on student graduation and retention rates. The analysis uses administrative data from the Brazilian Ministry of Education from the 2011 school year for grade-level outcomes at the end of the school year. Passing rate, failing rate, and dropout rate sum to 1 for each school. Column (1) show treatment effects on the graduation rate, while columns (2) and (3) identify treatment effects for students who did not pass, by whether they failed the grade (column 2) or dropped out of the grade during the school year (column 3). Robust standard errors, clustered at the school level, are in parentheses. \* denotes statistical significance at the 10% level; and \*\* denotes statistical significance at the 5% level.

**Table 6: Student Savings Behavior and Attitudes**

	Says They are a Saver		Saves at Least Some of Their Disposable Money		Saves Money for Future Purchases		Has Formal Savings		Percentage of Disposable Money Saved		Intention to Save Index	
	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment School	0.034*** (0.006)	0.032*** (0.006)	0.047*** (0.006)	0.052*** (0.007)	0.026*** (0.005)	0.024*** (0.005)	0.013*** (0.004)	0.010* (0.006)	N/A	1.389*** (0.316)	2.471*** (0.297)	1.914*** (0.324)
R-squared	0.207	0.119	0.210	0.106	0.123	0.063	0.460	0.233		0.045	0.278	0.168
Sample Size (Number of Students)	16420	15858	16288	17320	16256	17390	16035	15779		16695	14919	16286
Number of Schools	825	822	825	822	825	821	824	821		822	823	821
Dependent Variable Mean in Control Group	0.323	0.316	0.440	0.404	0.165	0.189	0.200	0.264		12.897	49.020	51.342
Dependent Variable Standard Deviation in Control Group										18.958	21.157	21.232

This table presents OLS regression results for the impact of the financial education program on student saving behavior and attitudes. The sample in odd numbered columns is follow-up 1 and in even numbered columns is follow-up 2. The number of students and schools included in the sample fluctuate within a wave because not all students answered every question; and they fluctuate across waves because of student turnover. The outcome variables in this table are: an indicator variable equal to 1 if the student says they consider themselves to be a saver vs. spender (columns 1 and 2); an indicator variable equal to 1 if the student saves at least some of their disposable money (columns 3 and 4); an indicator variable equal to 1 if the student says they save money for future purchases (columns 5 and 6); an indicator variable equal to 1 if the student has formal savings (columns 7 and 8); the percentage of monthly disposable money that is saved (columns 9 and 10); and an intention to save index that aggregates responses to questions on hypothetical savings and spending scenarios (columns 11 and 12). All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \*\*\* denotes statistical significance at the 1% level.

**Table 7: Student Purchasing Behavior and Attitudes**

	Lists Monthly Expenses in a Budget		Negotiates Prices or Payment Methods		Comparison Shops Before Making Purchase		Financial Autonomy Index	
	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment School	0.026***	0.030***	0.041***	0.031***	0.025***	0.021***	1.703***	1.774***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.234)	(0.305)
R-squared	0.149	0.093	0.219	0.131	0.099	0.067	0.449	0.250
Sample Size (Number of Students)	16358	17475	16175	17343	16119	17295	14283	16019
Number of Schools	825	822	825	822	825	822	824	822
Dependent Variable Mean in Control Group	0.129	0.139	0.740	0.740	0.656	0.674	49.035	50.544
Dependent Variable Standard Deviation in Control Group							19.785	20.724

This table presents OLS regression results for the impact of the financial education program on student purchasing attitudes and behavior. The sample in odd numbered columns is follow-up 1 and in even numbered columns is follow-up 2. The number of students and schools included in the sample fluctuate within a wave because not all students answered every question; and they fluctuate across waves because of student turnover. The outcome variables in this table are: an indicator variable equal to 1 if the student makes a list of monthly expenses in a budget (columns 1 and 2); an indicator variable equal to 1 if the student negotiates the price or the payment method when making a purchase (column 2 and 3); an indicator variable equal to 1 if the student comparison shops before making a purchase (columns 5 and 6); and a student financial autonomy index that aggregates questions on whether students feel empowered, confident, and capable of making independent financial decisions and influencing the financial decisions of their households (columns 7 and 8). All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \*\*\* denotes statistical significance at the 1% level.

**Table 8: Student Participation in Household Finance**

	Student Discusses Financial Matters with Parents?		Student Helps Organize Household Budget?	
	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>
	(1)	(2)	(3)	(4)
Treatment School	0.036***	0.039***	0.048***	0.036***
	(0.007)	(0.006)	(0.007)	(0.008)
R-squared	0.171	0.104	0.194	0.115
Sample Size (Number of Parents)	13357	13844	13345	13867
Number of Schools	810	816	809	816
Dependent Variable Mean in Control Group	0.673	0.701	0.487	0.522

This table presents OLS regression results for the impact of the financial education program on student participation in household finance. The sample in odd numbered columns is follow-up 1, and in even numbered columns is follow-up 2. The number of parents and schools included in the sample fluctuate within a wave because not all parents answered every question; and they fluctuate across waves because of student turnover. The outcome variables in this table are: an indicator variable equal to 1 if a student discusses financial matters at home (columns 1 and 2); and an indicator variable equal to 1 if a student helps organize the household budget (columns 3 and 4). Both questions are based on responses in the parent questionnaires. All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \*\*\* denotes statistical significance at the 1% level.



**Table 9: Parent Financial Knowledge**

	Interest Rate Question		Inflation Question		Budgeting Question	
	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment School	-0.001 (0.008)	0.017* (0.009)	0.007 (0.008)	0.014* (0.008)	N/A	0.063*** (0.009)
R-squared	0.091	0.071	0.132	0.104		0.080
Sample Size (Number of Parents)	13368	12691	13327	12609		12710
Number of Schools	809	816	809	816		816
Dependent Variable Mean in Control Group	0.444	0.443	0.329	0.320		0.678

This table presents OLS regressions results for the impact of the financial education program on parent financial knowledge. The sample in odd numbered columns is follow-up 1 and in even numbered columns is follow-up 2. The number of parents and schools included in the sample fluctuate within a wave because not all parents answered every question; and they fluctuate across waves because of student turnover. The outcome variables in this table are three financial literacy questions in the parent surveys: the interest rate question (columns 1 and 2) tests the ability to calculate an interest rate using percentages; the inflation question (column 3 and 4) tests the understanding of how inflation affects future purchasing power; and the budgeting question (columns 4 and 6) tests the knowledge of what goes into a budget. All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have a missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \* denotes statistical significance at the 10% level; and \*\*\* denotes statistical significance at the 1% level.

**Table 10: Parent Savings and Spending Behavior**

	Has Formal Savings?		Percentage of Income Saved		Lists Monthly Expenses in a Budget?	
	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>	<u>Follow-up 1</u>	<u>Follow-up 2</u>
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment School	0.003	0.014**	N/A	0.667**	-0.012	0.021***
	(0.006)	(0.006)		(0.263)	(0.007)	(0.007)
R-squared	0.334	0.206		0.050	0.190	0.116
Sample Size (Number of Parents)	13079	13533		12953	13187	13566
Number of Schools	810	816		816	810	816
Dependent Variable Mean in Control Group	0.734	0.762		12.171	0.366	0.369
Dependent Variable Standard Deviation in Control Group				16.521		

This table presents OLS regressions results for the impact of the financial education program on parent savings and spending behavior. The sample in odd numbered columns is follow-up 1 and in even numbered columns is follow-up 2. The number of parents and schools included in the sample fluctuate within a wave because not all parents answered every question; and they fluctuate across waves because of student turnover. The outcome variables in this table are based on responses in the parent survey and include: an indicator variable equal to 1 if the parent has formal savings such as a current account, savings account, debit card or checks (columns 1 and 2); the percentage of monthly income that is saved (column 4); and an indicator variable equal to 1 if the parent makes a list of monthly expenses in a budget (columns 5 and 6). The percentage of income saved question was not asked in follow-up 1. All regressions control for baseline outcomes and include school pair dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors, clustered at the school level, are in parentheses. \*\* denotes statistical significance at the 5% level; and \*\*\* denotes statistical significance at the 1% level.

**Table 11: Parent Financial Education Workshop**

	Parent Outcomes				Student Outcomes	
	Budgeting Question	Has Formal Savings?	Percentage of Income Saved	Lists Monthly Expenses in a Budget?	Saves for Purchases?	Percentage of Disposable Money Saved
	(1)	(2)	(3)	(4)	(5)	(6)
Attended Financial Education Workshop	-0.042 (0.026)	0.018 (0.026)	1.350 (1.057)	0.008 (0.030)	0.024 (0.027)	2.445** (1.135)
R-squared	0.197	0.375	0.202	0.254	0.253	0.170
Sample Size (Number of Parents/Students)	1022	1059	1016	1063	1273	1239
Dependent Variable Mean in Control Group	0.824	0.705	12.550	0.376	0.474	13.484
Dependent Variable SD in Control Group			14.838			17.567

This table presents OLS regression results for the impact of the parent financial education workshop. The sample in columns 1-4 includes parents in treatment schools who attended either a financial education or health education workshop. Since workshop assignment was not revealed in advance, the analysis only includes parents who attended. All data in this table is from follow-up 2 since the parent workshops occurred between the two follow-up survey rounds. Four parent outcomes are presented in this table: an indicator variable equal to 1 for correct answers to a question that tests the knowledge of what goes into a budget (column 1); an indicator variable equal to 1 if the parent has formal savings such as a current account, savings account, debit card or checks (column 2); the percentage of monthly income that is saved (column 3); and an indicator variable equal to 1 if the parent makes a list of monthly expenses in a budget (column 4). In addition, two student outcomes are presented in columns (5) and (6): an indicator variable equal to 1 if the student saves for purchases (column 5); and the percentage of monthly disposable money that is saved (column 6). All regressions control for baseline outcomes and include parent workshop stratification dummies. When baseline outcomes have missing values, they are replaced by zero and a dummy variable indicating such missing values is included. Robust standard errors are in parentheses. \*\* denotes statistical significance at the 5% level.

**For Online Publication:  
Appendix Table 1 and Appendices 1 and 2**

**Appendix Table 1: Sample Representativeness and External Validity**

	Graduation Rate (1)	Graduation Rate (2)	Graduation Rate (3)	Dropout Rate (4)	Dropout Rate (5)	Dropout Rate (6)
In Sample School	-1.569 (1.417)	-1.091 (1.424)	-0.044 (0.808)	-0.051 (0.702)	0.303 (0.995)	-0.549 (0.650)
In Sample School * Sao Paulo State		-1.837 (2.063)			-0.123 (1.070)	
In Sample School * Rio de Janeiro State		2.217 (4.360)			-0.667 (2.444)	
In Sample School * Minas Gerais State		-2.917 (2.191)			-1.806 (1.218)	
In Sample School * Tocantins State		-2.641 (2.654)			-0.512 (1.744)	
R-squared	0.189	0.191	0.506	0.237	0.238	0.445
Sample Size (Number of Schools)	7936	7936	7936	7936	7936	7936
Fixed Effects	State	State	Municipality	State	State	Municipality
Dependent Variable Mean in Control Group	79.034	79.034	79.034	8.171	8.171	8.171

This table presents regression results comparing graduation and dropout rates for schools in our study sample relative to schools outside our study sample. Robust standard errors, clustered at the municipality level, are in parentheses. \* denotes statistical significance at the 10% level; and \*\*\* denotes statistical significance at the 1% level.

## APPENDIX 1: Details of the Financial Education Curriculum

### A1.1 General Description

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The material used in the school financial education program in Brazil includes: (i) a student textbook, (ii) a student exercise book, (iii) a teacher guidebook, and (iv) a teacher training DVD. All materials were developed by the Pedagogical Support Group (GAP: *Grupo de Apoio Pedagógico*). This Appendix describes the content of the student textbook in detail.<sup>1</sup>

The student textbook is divided into three blocks and covers nine different themes. Each theme is taught through case studies/didactic situations (SDs), consisting of theoretical and applied content, activities and self-evaluative questions. SDs make use of texts, stories, images, and tables to convey the material in an accessible way. SDs also contain “experiment” sections that are designed to make the material relevant to students’ daily life. SDs conclude with a short outline of what is expected from the student in terms of learning.

The rest of this Appendix describes the themes included in each of the three blocks.

### A1.2 Block 1

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The first block discusses three themes: everyday family life, social life, and personal property.

#### **THEME 1: EVERYDAY FAMILY LIFE**

In everyday family life, students are exposed to common situations where they have to make decisions that impact their family’s financial wellbeing. This theme is covered in 7 sections:

1. Agenda and Planning
  - Record expenses regularly
  - Know where you spend money
  - Estimate the value of items purchased
2. Calendar
  - Make a list of personal and family expenses
  - Classify expenses as “fixed” or “variable”
  - Prepare a monthly budget separating “fixed” and “variable” expenses
3. House Repairs
  - Compare different repair cost estimates
  - Compare interest rates for personal loans
  - Decide whether to take a loan or use money previously saved
4. Supermarket
  - How to avoid overspending on “temptation” goods
  - To distinguish good and bad behaviors when going shopping
  - Advance decision making on items to purchase

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<sup>1</sup> The student exercise books and the teacher guidebooks and DVDs were meant to support the material covered in the student textbooks and did not offer new material of their own. The student exercise book provided assignments to students based on material taught through the textbook. Similarly, the teacher guidebook and DVD provided instructions on teaching and assessment methods for the course material, as well as examples of how to integrate the financial education curriculum into regular school learning.

5. Balancing
  - Distinguish and categorize personal and family expenses
  - Assess the importance of these different expenses
  - Identify spending categories where cuts can be made
  - Prepare a 5% spending-cut plan
6. Unforeseen Circumstances
  - Understand the value of insurance
  - Understand the specific vocabulary of insurance products
  - Identify alternative methods of prevention
7. Matching spending to earnings
  - Classify income sources as “fixed” and “variable”
  - Prepare a table with family incomes
  - Analyze how family spends and saves money

## **THEME 2: SOCIAL LIFE**

In social life, students are exposed to situations where they have to make financial decisions about their personal and social lives. This theme is covered in 7 sections:

1. What a waste
  - Analyze personal expenses and identify waste
  - Avoid waste
  - Identify actions that can lead you to spend more than necessary
2. Let's get this party started
  - Make estimates of the quantity of food and drinks necessary for a party
  - Make a budget for a party
  - Plan an environmentally friendly party
  - Identify pitfalls when making estimates
3. To give in or not to give in to peer pressure... that is the question
  - Organize financial information in a way that can be easily explained to others
  - Learn and apply concepts such as interest rates, risks and returns to everyday situations
4. Buying on credit
  - Identify elements of a credit card bill
  - Identify financial behaviors that lead to credit card debt
  - How to use a credit card in a responsible manner
5. Camping
  - Identify expenses involved in going camping
  - Always keep funds for unforeseen events
  - Prepare a financial plan to go camping
6. “Viva São João!”
  - Prepare a business plan for organizing a party to celebrate the São João holiday
7. Don't fall victim to advertising
  - Identify financial pitfalls of credit card advertisements
  - Analyze various options available for credit

### **THEME 3: PERSONAL PROPERTY**

In personal property, students learn from situations where they have to make personal shopping decisions. This theme is covered in 7 sections:

1. In search of the perfect shoes
  - Calculate the difference between the price paid in cash and the one paid with credit
  - Decide if it is better to pay in cash or with credit
  - Find specific information in the Consumer Defense Code
2. Computer
  - Identify the opportunity cost of owning a computer
  - Balance wants and needs when choosing a computer
  - Compare prices
  - Calculate the necessary savings in order to buy a computer
3. Digital camera
  - Follow similar steps as with purchasing a computer
4. If by magic...
  - Identify the elements of advertising aimed at generating consuming desire
  - Identify the conflict between desires and needs
  - Be wary of temptation traps and impulsive spending
5. Cell phone
  - Choose a cell phone that best fit your needs
  - Choose a plan that best fits your needs
  - Understand your cell phone bill
6. Consumer protection measures?
  - Identify cases of abusive practices and consumer rights violations
  - When to reach out to the Foundation for the Protection and Consumer Advocacy (PROCON)
7. Changing money
  - Convert the value of products priced in foreign currency to local currency
  - Know how the value of a credit card purchase in foreign currency appears in local currency on the bill

### **A1.3 Block 2**

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The second block discusses three themes: work, entrepreneurship, and large projects.

### **THEME 4: WORK**

In work, students discuss several aspects of their current and future professional lives. This theme is covered in 7 sections:

1. What line of work?
  - Identify the type of work that attracts you the most
  - Decide on the most appealing type of job according to your life ambitions
2. First job
  - Prepare a CV
  - Identify the skills that are compatible with advertised positions



- Appropriately highlight your professional qualities in a simulated job interview
- Combine your desired job with the type of life you want to have
- 3. Gross vs net income
  - Differentiate gross and net income
  - How to explain this concept to others
- 4. Good times and bad times
  - Understand the concept of structural unemployment in a made-up story
  - Identify measures to overcome unemployment
- 5. The incredible story of the 13<sup>th</sup> salary that disappeared
  - Make a budget based on data and estimates
  - Make a financial plan in order to achieve a positive balance at the end of the month
  - Consider future situations in current monthly planning
- 6. Lifelines
  - Prepare an outline of a retirement plan, harmonizing long-term goals and the means to achieve them
- 7. *Antenor*, the wary employee
  - Develop a product and the message for an information campaign about insurance
  - Utilize the vocabulary of insurance as it applies to an information campaign

## **THEME 5: ENTREPRENEURSHIP**

In entrepreneurship, students learn about practical issues of creating and running a business. This theme is covered in 7 sections:

1. A great idea
  - Differentiate entrepreneurs driven by necessity and by opportunity
  - Relate own characteristics with business opportunities
  - Identify needs in own community that may generate a business opportunity
  - Brainstorm to generate good business ideas
2. What are your talents?
  - Distinguish between “knowledge”, “skill”, “attitude”, and “competencies” in the context of entrepreneurship
  - Evaluate if you possess the necessary knowledge to open a particular business
  - Evaluate if you possess the necessary skills to open a particular business
  - Evaluate if you possess the necessary attitudes to open a particular business
3. Profession: entrepreneur
  - Identify the characteristics of an entrepreneur
  - Differentiate entrepreneurship from intrapreneurship
  - Test if you have the profile of an entrepreneur
4. The soul of a business
  - Identify the target audience of a fictitious business
  - Create a brand and slogan for a fictitious product or service
  - Put together a fictitious marketing plan
  - Carry out market research for a fictitious product or service
5. Hands to work
  - Identify resources necessary to open and run a business

- Budget for opening and running a fictitious business
  - Determine the knowledge, skills, attitudes, and competencies of the personnel necessary to work in a fictitious business
6. Victory
    - Make sales and profit projections for a fictitious business
    - Measure the profit of a fictitious business
    - Cut costs and expenses related to products or services of a fictitious business
  7. Beyond profit
    - Distinguish between philanthropy and socio-environmental responsibility
    - Make a plan of socio-environmental responsibility for a fictitious business
    - Put together in a business plan all the information on entrepreneurship learned in this theme

## **THEME 6: LARGE EXPENDITURES**

In large projects, students are exposed to situations that involve significant financial outlays. This theme is covered in 7 sections:

1. Brick by brick
  - Balance the desires and needs of your family when choosing a house to purchase
  - Search for information on prices and financing for a house
  - Decide how much your family is willing to spend as a function of the household budget
  - Plan financially for the down payment and installments of a home mortgage
2. Surprise
  - Create a budget for a party
  - Plan a party that suits your financial situation
  - Make provisions for unforeseen expenses
  - Cut expenses according to your priorities
3. In your corner
  - Make investment decisions in a simulated market situation
  - Make an initial investment decision, taking into consideration family and personal preferences
4. She talks about the same thing all day long
  - Identify rights and duties that are not being met in a certain situation
  - Generate arguments to debate rights and duties of investors
5. Consumption and savings
  - Make consumption and savings decisions in a simulated situation
6. Now it's my turn to help my parents
  - Decide between two debt application options, taking into account interest rates
  - Explain how to avoid indebtedness
  - Come up with options to pay off a debt of R\$ 1000 (US\$ 583)
7. How much distance separates you from your future
  - Estimate fixed and variable expenses in order to study in another city
  - Calculate the monthly income necessary to study in another city
  - Make a financial plan to study in another city

### **A1.4 Block 3**

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The third block discusses three themes: public goods, the country's economy, and the world economy.

#### **THEME 7: PUBLIC GOODS**

In public goods, students address several issues concerning the use and financing of public goods and services. This theme is covered in 7 sections:

1. Everything has a price
  - It is always the case that someone pays for the public goods you consume for free
  - Calculate how much the government spends to sustain a high school class in a public school
2. School budget
  - Think about the school and its budget
  - Suggest improvements to the school that are feasible
3. School books
  - Identify the reasons for high environmental cost of school books
  - Calculate the consumption of paper in school
  - Identify actions that can save paper
  - Develop and engage in a campaign to save paper
4. Public spaces
  - Everyone has the right to access free public spaces
  - Maintenance of public spaces is costly and is paid for through taxes
  - The individual tax burden can be reduced if all citizens pay their taxes
  - Consult the community in order to know which public spaces need to be improved
5. Public services
  - A public budget is very similar to a family budget
  - The legislature – senators and congressmen – decides the public budget
  - Link the public duty to pay taxes with the government's duty to provide public services
6. Corruption
  - Corruption affects the lives of everyone because it reduces the money that the government can invest in public services
  - Check public accounts through public records
7. Taxation
  - Link the public duty to pay taxes with the government's duty to provide public goods and services
  - Understand the purpose of different taxes paid by citizens
  - Develop and engage in a campaign to provide incentives for citizens to pay their taxes

#### **THEME 8: THE COUNTRY ECONOMY**

In the country economy, students are exposed to several aspects of their country's economy that are relevant for their personal lives, including the concept of inflation, the law of supply and demand, the concept of minimum wage, and the basics of the national financial system. This theme is covered in 7 sections:

1. Culture and sports
  - Prepare an outline of a project for a cultural or sporting activity
  - Align the objectives of a project to the *Rouanet* Law (Law that provides tax incentives to private firms for supporting cultural activities)
  - Understand the sections of the laws concerning education that contain financial vocabulary
2. Inflation
  - Recognize the problems that inflation can generate when changes in income do not follow the increase in prices
  - Make adjustments in the family budget taking inflation into consideration
  - Explain the concept of inflation to someone else
3. Supervisors of the national financial system
  - Explain the national financial system to someone else
4. Speaking in economic terms
  - There exists a direct relationship between the nation's economic growth and the growth of a family's personal income
  - Families with low income can also organize themselves financially
5. Markets
  - Demand and supply simulations
6. Foresight
  - Estimate the income and expenses of a retired person
  - Prepare a simulated financial plan for a retired person
7. Minimum wage
  - Research prices to estimate the total value of the basic needs of a person
  - Link the value of the basic needs of a person with the value of the minimum wage

## **THEME 9: THE WORLD ECONOMY**

In the world economy, students are exposed to several aspects of the world economy that are relevant for their personal lives, such as the concept of imports and exports, international economic blocks, and measures of a country's wellbeing. This theme is covered in 7 sections:

1. Special issue on money
  - Contextualize the role of money in society
  - The importance of saving money
2. International cooperation
  - Identify the complications involved in international negotiations
  - International economic blocks organize themselves through arrangements that are negotiated
3. The game of economic blocks
  - Experience, in a game, some of the issues concerning international economic blocks
  - Think about simulated strategies of global conflict resolution
4. The business of China
  - Identify the imported products that you use in everyday life
  - Locate the countries where the imported products you use in everyday life come from

→ Search for data on national and international exports

5. International Organizations

→ Reflect upon the profile and the performance of representatives of a country in an international community

→ Develop a funding proposal for an international financial institution

6. The well-being of your country

→ Compare the Human Development Index and the GDP per capita for different countries

→ Link the economic performance of a country with its environmental impact

7. Moment of crisis: do I care?

→ Establish the relationship between an economic crisis and situations of your personal life

→ Identify ways to overcome the impact of an economic crises for individuals

## APPENDIX 2: Questions Used to Construct Preference Measures

### Financial Autonomy Index

- Reflexive Autonomy:
  - I like to think thoroughly before deciding to buy something
  - I like to research prices whenever I buy something
  - I make sure to get information on warranty periods
  - I always try to obtain more information on product quality
  - I pay attention to news about the economy as it may affect my family
- Emotional Autonomy:
  - I like to participate in family decision making when we buy something expensive for home
  - I usually have a critical view of the way my friends deal with money
  - I take part in domestic expense planning
  - I try to advise my parents on money matters
  - I feel prepared to talk to my parents about money matters
- Functional Autonomy:
  - I always try to save some money to do things I really like
  - I always like to negotiate prices when I buy
  - I suggest at home that we keep money aside for emergencies
  - I keep an eye on promotions and discounts
  - I am willing to make sacrifices now to buy something important

### Intention to Save Index

A total of 21 questions go into the intention to save index. The possible answers to each question are on a seven point scale, with answers ranging from extremely negative to extremely positive.

- Attitudes towards behavior
  - Complete the following statement “In my opinion, saving some money every month is...” – Answers ranging from
    1. Extremely harmful to extremely beneficial
    2. Extremely unpleasant to extremely pleasant
    3. Extremely bad to extremely good
    4. Extremely useless to extremely useful
- Subjective norms
  - To which extent do you agree with the following statement – Answers ranging from completely false to completely true
    5. “My family has the habit of saving some money every month.”
    6. “I have friends who save some money every month.”

- Perceived control over one's own behavior
  7. To which extent do you agree with the following statement: "I believe that I can save some money every month." – Answers ranging from completely false to completely true.
  8. Complete the following statement "For me, saving some money every month is..." – Answers ranging from extremely difficult to extremely easy.
  9. To which extent do you agree with the following statement: "Whether or not I save some money every month is in my own hands." – Answers ranging from completely disagree to completely agree.
  
- Attitudes about the possible effects of behavior
  10. To which extent do you agree with the following statement: "Saving some money every month would allow me to buy things I need." – Answers ranging from completely agree to completely disagree.
  11. Complete the following statement "For me, saving to allow me to buy the things I need is..." – Answers ranging from extremely bad to extremely good.
  12. To which extent do you agree with the following statement: "Saving some money every month is a good way of making sure I never accumulate debt." - Answers ranging from completely agree to completely disagree.
  13. Complete the following statement "In my opinion, borrowing money and accumulating debt is..." – Answers ranging from extremely bad to extremely good.
  
- Motivation for following subjective norms
  - All Answers ranging extremely unlikely to extremely likely.
  - 14. To which extent do you agree with the following statement: "My family hopes that I am able to save some money every month."
  - 15. "When it comes to spending and saving, how likely are you to follow your family's opinion?"
  - 16. To which extent do you agree with the following statement: "My friends would support me if I decided to save some money every month."
  - 17. "How likely are you to follow your friends' opinion about savings habits?"
  
- Perceived benefits of one's own behavior
  18. To which extent do you agree with the following statement: "Managing my expenses and not wasting money is essential for saving some money every month." – Answers ranging from completely agree to completely disagree.
  19. Complete the following statement "For me, managing my expenses and not wasting money is..." – Answers ranging from extremely difficult to extremely easy.
  20. To which extent do you agree with the following statement: "In order for me to save, it's essential that I avoid borrowing money and getting into debt." – Answers ranging from completely agree to completely disagree.
  21. Complete the following statement: "For me, being able to avoid borrowing money and getting into debt is..." – Answers ranging from extremely difficult to extremely easy.