The Effectiveness of Financial Literacy Instruction: The Role of Individual Development Accounts Participation and the Intensity of Instruction

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We examine improvements in financial knowledge for 8th-grade participants in our financial fitness camp, part of our multifaceted financial literacy program. Eighty-three students enrolled in the camp, and 59 had individual development accounts (IDA). We address several issues raised in the literature by focusing on low-income, predominantly Hispanic students, varying the treatment intensity, comparing outcomes for students in our IDA program with those who are not, addressing the potential endogeneity of IDA participation, and testing for selection bias. Financial knowledge increased by approximately 12 percentage points from camp participation. Standardized Language Arts scores, rather than treatment intensity or IDA participation, most affected gains in financial knowledge. There was no evidence of selection bias. Parents with high "present bias" were less likely to enroll their students in the camp, implying that integrating financial literacy education in the regular school curriculum will better serve students in such families.

Keywords: financial knowledge, individual development account, low-income youth, present bias, self-selection

In 2009, President Obama famously asked "every American to commit to at least one year or more of higher education or career training" and said that "every American will need to get more than a high school diploma" (Obama, 2009a). In an address to the Hispanic Chamber of Commerce Conference on Education, he again emphasized that of the 30 fastest growing occupations in America, more than half require a bachelor's degree or more and that higher education was indeed a necessity, being "the clearest pathway into the middle class" (Obama, 2009b). In addition, Bowen, Chingos, and McPherson (2009) point out large disparities in college enrollment rates exist between low- and high-income households.

In this context, a measure to increase access to college education among low-income youth is the individual development account (IDA) program. IDAs, as incentivized savings plans, were first proposed as a policy measure by Sherraden (1991) to help low-income individuals save for the purchase of an asset. These asset purchases were typically the down payment for a home purchase, an investment in a small business, postsecondary education or training, or contributions to retirement savings. The importance of educational IDAs and their distinctive features are highlighted by Bryce-Laporte, Yang, and Kezar (2009). These authors noted that because the distribution of income has become more unequal, educational IDAs have helped address the financial needs of families at the lower end of the economic spectrum that are struggling financially to pay for postsecondary education.

In partnership with U.S. Bank, we developed a 5-year youth IDA program directed at eighth-grade students in three Title I middle schools in California. Title I schools receive special U.S. Department of Education funding based on their high percentage of students from low-income families. The program began in June 2011 and ends in June 2016, time periods that denote respectively when the students started eighth grade and when they should graduate from high school. Eligible students who opened IDAs as eighth graders in Fall 2011 save $10 a month that is matched by our program with $20 a month for 5 years until June 2016, when the total savings are transferred directly toward college tuition in any accredited college designated by the student.

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Ninety-three eighth-grade students (of 1,838 students) from three Title I schools in our local area opened IDAs, and they made their first deposit of a minimum of $10.

An integral part of our overall IDA program was the establishment of a 1-week financial fitness camp, which was offered in June 2012 to all students from the three Title I schools in the area. Eighty-three students enrolled in the camp, and 59 of those students had IDAs. McCormick (2009) highlights the need for such youth financial education, particularly before students reach high school. The purpose of this article is to examine the effectiveness of the camp in improving financial knowledge among this young cohort of 83 students based on a pretest–posttest design with particular attention to the role of IDA participation and the intensity of instruction on financial knowledge gained.

In addressing the camp's effectiveness, our study design enables us to address five important issues raised in the literature regarding the efficacy of financial literacy interventions. First, our attention to a sample of predominantly Hispanic students from low-income families is responsive to Schuchardt et al.'s (2009) summary of recommendations from a national symposium on financial education. The authors, citing Gutter, Hayhoe, and DeVaney (2008), identified the lack of attention to culturally diverse, low- and middle-income populations as a critical gap in financial literacy research. Second, we ask whether opening an IDA and actively participating in the IDA program served to increase what was learned from our camp instruction. In this regard, our work most resembles the recent work of Jamison, Karlan, and Zinman (2014) and Sherraden, Johnson, Guo, and Elliott (2011). As we discuss below, these recent works provide mixed evidence about the relationship between participating in a savings plan and various measures of financial knowledge. We follow the call of Schuchardt et al. to evaluate financial education in combination with other interventions (i.e., the IDA), which promote family savings behavior. Third, we address the concern that our measure of IDA participation may be endogenous in our camp pretest–posttest regression design. As noted by Seiling and Shockey (2006), those individuals who elect to open IDAs are not likely to be the "typical cross-section" of low-income families because "they have self-selected to make changes" to improve their financial situation (p. 30). For example, unobservable financial savviness on the part of participants and their parents could be expected to lead to higher pretest–posttest differences for participants, while at the same time, financial savviness may be correlated with IDA participation. Although we lack suitable instrumental variables for participation in an IDA, we take measures to reduce potential bias by controlling for participants' prior knowledge of financial concepts and parents' income, education, and marital status in our pretest–posttest regression design. The attention to parents' characteristics is particularly warranted by the recent work of Dohmen, Falk, Huffman, and Sunde (2012) who provide strong evidence on the intergenerational transmission of risk and trust attitudes from parents to children. They show that children's attitudes about risk are strongly related to those of their parents. This leads to our concern that financial savviness may be transmitted from parent to child as well. Thus, our controls for parents' income, education, and marital status are designed to control for the financial savviness of parents, which may, in turn, be passed on to children.

Our fourth contribution is to assess the effect of instruction intensity on acquired financial knowledge. We respond to suggestions to improve youth financial education research set out by Choi, Reid, Staten, and Todd (2010). They indicate that research designs used to determine the effectiveness of financial education should include methods to assess the impact of the depth and length of exposure of financial education on outcomes. We implement this suggestion by randomly selecting a subset of camp participants to receive additional financial literacy instruction.

As a final matter, we address the potential for selection bias in our pretest–posttest regression design. Here, too, we refer to points raised by Schuchardt et al. (2009), who identify selection bias as a critical research gap in financial education and program evaluation. The potential for selection bias arises in our study because we offered our financial literacy camp to all students from the three Title I middle schools in our study area. We are particularly concerned that families who did not open an IDA, but nonetheless had eighth graders who attended the camp, had high levels of unobserved motivation because they saw value in the camp. If motivation is a key factor in being financially literate as suggested by Mandell and Klein (2007), the estimates of coefficients in the equation that explains the change in financial knowledge from pretest to posttest may be biased; in particular, we are concerned that the coefficient on IDA participation may be biased downward.

Our attention to these conceptual issues identified in the literature leads us to ask the following three specific research questions regarding the efficacy of the financial literacy instruction. First, was the financial literacy instruction provided to the eighth-grade students successful in increasing their financial knowledge? Second, did students from families who opened and contributed to an IDA learn more from the camp instruction than students from families that did not open an IDA? Third, did students who received extra or more intensive instruction learn more from the camp relative to other students?

Our results show that our financial education instruction increased test scores by roughly 12 percentage points, on average, for our sample of eighth-grade students. Yet, we find no evidence that this change in test scores is related to the intensity of instruction or to the amount of savings in an IDA. First-stage probit estimates of the parent decision to send their eighth grader to the financial literacy camp show that parents with high "present bias" were less likely to enroll their students in the camp. In addition, we find no evidence of selection bias in the pretest–posttest regressions.

Literature

There is an abundance of literature on financial knowledge of youth, but we focus on the strands of literature relevant to our study. Jamison et al. (2014) noted a lack of evidence, particularly with respect to youth, on the effectiveness of financial education and access to formal savings accounts on various youth financial outcomes. They worked with 240 Ugandan youth clubs and randomly assigned the total sample of 2,680 individuals to three treatment groups (receiving financial education, easy access to a basic group savings account, or both) and one control group (receiving nothing). The authors found no evidence that participating in savings accounts improved financial knowledge beyond what is achieved from financial education, but they found that education and a savings account together increased numeracy, whereas education alone did not. In addition, they found that education and a savings account together showed a modest increase over education alone in increasing financial literacy, which they defined as the combination of financial knowledge, financial awareness, and numeracy.

Sherraden et al. (2011) also investigate whether access to financial services improve the effectiveness of youth financial education and thereby financial capability. They found that elementary school children who participated in a 4-year school-based financial education and savings program during 2003–2007 scored significantly higher on a financial literacy test taken in fourth grade, relative to a comparable group of students in the same school. These authors pointed out that the channel explaining this high correlation is unclear: Saving might have helped children improve their financial knowledge, more financial knowledge might have improved their saving, or some other factors might have driven the positive correlation. Evidence that such a channel could be one where financial knowledge led to improvements in saving was made by Huang, Nam, and Sherraden (2013) who found that participants' financial knowledge was positively related to opening an account in the treatment group but not in the control group in the Student Employment Experience Development Oklahoma program. Similarly, Carlin and Robinson (2012) found strong treatment impacts from their financial education program on the spending patterns of low-income students in South Los Angeles in a finance-related theme park.

Also pertinent to our study is the extensive body of research on the impact of assets on college enrollment. Grinstein-Weiss et al. (2012) presented experimental evidence on the impact of an educational IDA on the educational attainment of adults. They found that being assigned to a 3-year IDA program treatment group had a significant impact on educational enrollment. However, the impact on college degree completion was positive but not significant. They also found a strong positive effect on increased educational attainment for men but not for women 6 years after the conclusion of the IDA program. Elliott and Beverly (2011) used a longitudinal dataset from the Panel Study of Income Dynamics and its supplements, the Child Development Supplement, and the Transition into Adulthood supplement; they found that young adults who as youth had school savings of their own were about two times more likely to be "on course," that is, are currently attending or have graduated from college relative to those who did not have school savings of their own (p. 362). In addition, parents' savings for youth was significantly related to college progress.

Elliott and Beverly's (2011) study was not based on an IDA program, and although Grinstein-Weiss et al.'s study (2012) was based on an IDA program with the methodology of a treatment and control groups, their focus was on adults not youth. Carpenter (2008) summarized main findings and

research approaches of major IDA programs in the United States, including those for the purchase of a home or starting a business. A key finding relevant to our study is the presence of constraints faced by IDA participants in meeting their saving goals. A comprehensive study by Kezar, Yang, and Lester (2009) described several educational IDA programs across the country, a notable one being a statewide IDA initiative, Community and Shelter Assistance Corporation of Oregon. Kezar et al. concluded that even though educational IDAs have an important potential to help low-income students in several ways, such as the creation of access to higher education and providing financial education to enable participants to break from the cycle of poverty, this potential is maximized only when cross-sector coordination of strengths occur across postsecondary institutions and community agencies.

Our efforts in the youth IDA program are directed at working with predominantly Hispanic youth in an attempt to connect them early with financial education to improve their long-term economic health. The need for such intervention is emphasized by Olsen and Whitman (2012), who find that Hispanics and Blacks are less likely to use formal financial advice relative to their White counterparts.

Method

We implemented a pretest–posttest evaluation of a 1-week financial literacy curriculum taught to eighth-grade students from three participating Title I middle schools in California. The financial curriculum consisted of the five themes of the *Financial Fitness for Life* (Flowers and Laux, 2010; Gellman & Laux, 2011) published by the Council for Economic Education: The Economic Way of Thinking, Earning Income, Saving, Spending and Using Credit, and Money Management. In addition, the students played a stock market simulation game, *The Stock Market Game*™ (SMG), during the week. The pretest was administered in the first hour of the camp, and the posttest was administered on the concluding day in the last hour of the camp. In carrying out our evaluation of the camp's success in improving financial knowledge, we took into account parent characteristics and academic performance information of students provided by the participating schools. All facets of our data collection followed the institutional review board protocol.

The Participating Schools and the IDA Program

Table 1 presents a description of aggregate data for 2012 for the three participating middle schools obtained from the California Department of Education website. The names of the three middle schools have been withheld, and they are referred to as School A, School B, and School C. We also report comparable summary statistics for the state of California and for the county in which the three schools reside. As shown, all three of the participating middle schools have a higher share of students on free or reduced price lunches and a larger share of Hispanic students compared to the state and the county. Students eligible for free or reduced price lunch are from low-income households that meet the income eligibility criteria stipulated by the California Department of Education.

As mentioned, 93 eligible students from these three schools opened their IDAs with our partnering bank in the fourth quarter of 2011. The income eligibility criteria for opening an IDA are stipulated by the U.S. Department of Health and Human Services (n.d.).

TABLE 1. Aggregate Middle School Statistics for 2012

	School A %	School B %	School C %	County %	California %
Free reduced price lunch	92.20	64.60	70.90	46.40	57.50
Hispanic	90.90	64.60	81.70	48.10	52.00
White	5.20	12.90	8.90	30.30	26.10
Asian	1.80	8.90	3.30	14.60	8.60
African American	1.30	5.30	2.30	1.60	6.50
Other	0.80	8.30	3.80	5.40	6.80

Note. California Department of Education (n.d.). *Data and statistics*. Retrieved from http://www.cde.ca.gov/index.asp

Each participant saves $10 a month for 5 years from June 2011, which was the start of eighth grade, to June 30, 2016, the end of twelfth grade. Our program matches the participants' savings with a 1:2 match of $20 maximum per month until June 2016. The accumulated total after 5 years will be transferred directly for expenditure toward college tuition to an accredited 2-year or 4-year college designated by the participant. Participating students are required to attend at least one financial literacy camp organized by our program over the 5-year period. No withdrawals are permitted from the account. Participating students who do not enroll in college at the end of the program or who do not wish to continue in the IDA program will be able to withdraw their portion of the savings along with interest but will not receive any portion of the match.

The Financial Fitness Camp

We announced an invitation for the June 2012 1-week financial literacy camp to all eighth graders in the three participating schools. The purpose of the financial fitness camp was to teach financial literacy and introduce the students to a university campus. The camp was designed by one author of this article and the design largely followed Jacobs' (1988) approach to program evaluation as described for personal finance programs in Asarta, Hill, and Meszaros (2014). Accordingly, the content of the curriculum drew from the five themes of *Financial Fitness for Life* (FFFL) mentioned previously. The trainers did not receive formal 1-week training as in Asarta et al., but the camp director, a university-level educator, attended several workshops on teaching the FFFL curriculum and trained the other instructors in using this curriculum. The camp instructor who taught the economic way of thinking is a university professor who teaches microeconomics. The instructor who taught topics in credit and money management is a certified financial advisor with a graduate degree in economics. Knowledge outcomes were specified and measured primarily with respect to the widely used FFFL curriculum. The curriculum for the camp was adapted to the specific needs of our student body that was transitioning from middle school to high school. Because the students were not of driving age or working age, we excluded topics on auto insurance and details of deductions from paychecks that are covered at greater length in the high school curriculum. The topics—payday loans, scams and schemes, and the exorbitant interest rates paid for borrowing in the informal banking sectors—are covered in the high school version of the FFFL but were taught to our camp students because these topics were of immediate relevance to households that live in low-income neighborhoods.

Eighty-three students from the participating schools attended the camp. Fifty-nine of the 83 students who came to the camp had opened IDAs in Fall 2011, whereas 24 of the camp participants had not opened an IDA. In addition, 34 students had opened the IDA in Fall 2011 but did not come to the camp. We use information on these 34 students to implement our test of selection bias, as described below. We refer to the total of 83 students who came to the camp as being in the treatment group regardless of whether they opened the IDA or not.

The Financial Literacy Test

The financial literacy test consisting of 44 multiple choice questions was administered both as a pretest and a posttest to the 83 camp participants. Because the FFFL has no coverage of questions that test the reading of stock price tables and the calculation of portfolio gains or losses, our financial literacy test was adapted to include four questions from the SMG curriculum made available by Securities Industry and Financial Markets Association (n.d.). Thirty-seven of the 44 questions were from the FFFL Test Manual, out of which 31 were from the middle school test, and 6 were from the high school test. The high school questions covered scams and schemes, payday loans, and the annual percentage rate of a loan—topics that were introduced as being important to households in low-income neighborhoods that interact more frequently with the informal financial sector. Three questions, two of which were from Spending and Credit and one from Savings, were introduced from the *Jump$tart Coalition* (1997–2013) because they were clearly written scenarios that related to material taught in the camp. A more detailed description of the test can be obtained on request from the authors.

A valid concern is whether our test is stable and internally consistent because it draws from three sources: FFFL, *Jump$tart*, and SMG. Most of the questions, 37 out of 44 questions, are from FFFL, which is normed and validated (Walstad & Rebeck, 2006). The KR-20 test (Kuder-Richardson Formula 20) of internal consistency has a value of 0.7 for our pretest and 0.9 for our posttest, indicating that overall our test appears to be reliable.

The Camp Participants

We describe in Table 2 the summary statistics for the sample of 83 students who attended the financial fitness camp in June 2012. Table 2 is organized as follows: The first row of the table gives the mean pretest scores, mean posttest scores, mean California Standards Test (CST) scores in Language Arts, mean CST Mathematics scores, and mean overall grade point average (GPA) for the entire sample of 83 students. The Language Arts scores and GPA were obtained directly from the participating schools. The second and third rows of the table give the same descriptive statistics organized by a binary indicator for those students who had opened IDAs in 2011 (IDA = 1), and for those students who had not opened IDAs (IDA = 0). A binary indicator was also used to distinguish the roughly half of the entire sample of 83 students who were chosen randomly and provided with an extra 90 minutes of instruction that might have given them a better understanding of the economic way of thinking, the rule of 72, compounding of interest, calculation of stock returns, diversified portfolio, scams and schemes, and making a budget. This additional instruction was relevant to 19 test questions on the test. We refer to this group as INTENSITY = 1 and the group that did not get the extra 90 minutes of instruction as INTENSITY = 0.

Table 2 shows the mean difference between posttest and pretest scores for the entire sample of students is 11.75 percentage points and this increase is significantly different from zero ($p < .05$). This average gain in financial literacy knowledge for our camp lies in between the range of estimates obtained by other authors. For example, Harter and Harter (2009) report a 5.13 and 9.06 percentage point gain for middle school and high school students respectively, and Walstad, Rebeck, and MacDonald (2010) report a 19.7 percentage point gain for high school students. Note as well, the IDA group showed more prior knowledge of financial concepts as indicated by higher mean pretest scores than the non-IDA group, and the gain in financial knowledge as indicated by the posttest–pretest differences is 3.52 percentage points higher for the IDA group. The posttest–pretest difference is 3.06 percentage points higher for the group of students receiving extra instruction (INTENSITY = 1) than for the comparison group (INTENSITY = 0). However, neither of these differences is statistically significant.

TABLE 2. Means and Standard Deviations for Overall Pretest Scores by Treatment Group and Other Indicators

	Mean Pretest Score		Mean Posttest Score		Mean CST Language Arts		Mean CST Mathematics		Mean GPA	
Group	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Entire sample of camp attendees	83	45.01 (12.81)	82	56.76 (20.15)	82	377.49 (55.69)	82	346.07 (58.53)	82	3.16 (0.58)
IDA group (IDA = 1)	59	46.72 (12.86)	58	59.52 (19.68)	58	384.55 (56.95)	58	350.95 (62.49)	58	3.17 (0.52)
Non-IDA group	24	40.81 (11.92)	24	50.09 (20.11)	24	360.41 (49.53)	24	334.25 (46.69)	24	3.12 (0.68)
INTENSITY = 1	38	44.07 (13.32)	38	57.47 (22.59)	38	378.29 (65.88)	38	351.65 (58.09)	38	3.19 (0.58)
INTENSITY = 0	45	45.80 (12.46)	44	56.14 (18.02)	44	376.80 (45.91)	44	341.25 (59.14)	44	3.14 (0.58)
School A entire sample of camp attendees	36	43.62 (13.66)	36	54.67 (20.01)	36	365.92 (57.33)	36	355.97 (49.30)	36	3.22 (0.61)
School B entire sample of camp attendees	44	46.28 (11.82)	43	59.25 (19.95)	43	388.02 (52.90)	43	339.00 (64.78)	43	3.10 (0.56)
School C entire sample of camp attendees	3	43.18 (19.81)	3	46.21 (26.54)	3	365.33 (65.68)	3	328.67 (69.33)	3	3.45 (0.28)

Note. CST = California Standards Test; GPA = grade point average; IDA = individual development account. Standard deviations are in parentheses.

Table 2 also shows that the IDA group had higher mean California Standard Test (CST) scores in Language Arts and Mathematics compared to the non-IDA group, but these differences are not statistically significant.

Parent Information

We collected information from most students' parents when they opened their IDAs and from some parents when their students attended the camp. In addition, six parents provided information but did not open an IDA. For purposes of this study, we collected information on family income, parents' educational attainment, parents' marital status, the number and ages of children in the household, car ownership, and a question that allowed us to infer rates of time preference. As highlighted earlier, parents' financial attitudes likely affect those of young adults (Dohmen et al., 2012; Kim & Chatterjee, 2013). Table 3 summarizes the parent characteristics. Column (iii), which refers to parent data only from students who came to the camp, shows that 35.84% of the households had income more than $45,000. According to U.S. Census data for 2007–2011, the county median household income was $75,762 and the state median household income was $61,632. The cutoff of $45,000 used in our data to denote HIGHER_INCOME is $12,000 in excess of the sample median income of $33,000. Column (iii) also shows that 34.42% of respondents had one or more college courses, 77.19% of respondents had households with married parents, and 88.52% of respondents were in households that owned a car. These are all larger in magnitude compared to the respective means in column (ii) that refers to the entire sample of respondents who presented parent data. Column (iii) also shows that 52.63% of the households that sent their student to the camp had children younger than 12 years of age as opposed to 60.21% of the entire sample that presented parent data in column (ii).

As a final matter, we asked parents about a hypothetical cash prize of $1,000. Parents were asked if they would prefer the $1,000 now or some larger amount in the future. We adjusted the larger dollar figures to correspond to simple annual rates of interest of 2%, 5%, and 10%. The parents were asked to compare receiving the $1,000 now to the larger dollar figures in the future sequentially and were told to skip the remaining comparisons if they selected a higher future value. For example, parents were asked if they would prefer to receive $1,000 now or $1,020 1 year from now. Those parents who reported that they would prefer to receive the $1,020 1 year from now were told to skip the remaining comparisons. Those parents who answered that they would prefer the $1,000 now were asked to consider a future payment of $1,050 and so on. For purposes of this study, we define high present bias as an implied discount rate greater than 10%. As shown, Table 3 column (iii), which refers to students who attended the camp, indicates a lower share (18.18%) of parents with present bias, relative to the corresponding share (25.84%) in column (ii) for the entire sample of students who submitted parent data. In all, the differences in sample characteristics across columns (ii)

TABLE 3. Selected Parent Characteristics Means

(i)	(ii) Entire Sample That Presented the Parent Data		(iii) Students Who Attended the Camp and Presented Parent Data	
Group	***N***	**%**	***N***	**%**
HIGHER_INCOME	84	31.00	53	35.84
SOME_COLLEGE	98	31.63	61	34.42
PARENT_MARRIED	92	71.73	57	77.19
CHILDREN <12 years of age	93	60.21	57	52.63
OWN_CAR	99	82.82	61	88.52
PRESENT_BIAS	89	25.84	55	18.18

Note. The variables described in this table are binary variables, and the sample sizes mentioned in each row include only the number of responses that were available in each case. HIGHER_INCOME = household income more than $45,000; SOME_COLLEGE = one or more college course.

and (iii) become relevant to our estimation of the parent's decision to send the student to the camp, as discussed in the econometric models below.

Econometric Model

The models presented provide the empirical framework for evaluating our research questions that pertain to the effect of IDA involvement and the intensity of instruction on financial knowledge gained from the financial literacy instruction, controlling for student and family characteristics. We discuss, in turn, our baseline regression, endogeneity issues, and the potential for selection bias.

Baseline Regression Model. Our baseline regression for assessing the effectiveness of the financial literacy camp in increasing financial knowledge is given by Equation (1) below, referred to hereafter as the gain score equation.

$$GainScore_i = \alpha_0 + \alpha_1 X + \alpha_2 IDA\_Low_i + \alpha_3 IDA\_Med_i + \alpha_4 IDA\_High_i + \alpha_5 INTENSITY_i + \varepsilon_i \quad (1)$$

where *GainScore* represents the difference between a student's posttest and pretest scores. Both the posttest and pretest scores are measured as the percentage of questions answered correctly on our financial literacy test. The vector X in Equation (1) represents standard controls for students' academic performance. In our baseline specification, we use students' scores on the CST Language Arts test and GPA to account for the fact that academically stronger students may achieve higher gain scores, controlling for other factors.

The variables representing participation in the IDA savings plan and the variable representing intensity of instruction are central to our stated research objectives. Turning first to the IDA variables, we measure the extent of IDA involvement with a series of binary variables. IDA_low, IDA_Med, and IDA_High denote, respectively, whether the student's family contributed up to 49%, 50%–99%, and 100% and above of his or her share of the IDA contribution as of June 2012, the month when the financial fitness camp was held. The reference category for these IDA dummy variables is the group of non-IDA students who attended the camp. Because being involved in a college savings plan such as an IDA may motivate students to learn financial concepts, we expect to find that all of the coefficients on the binary IDA indicators are positive. In addition, the extent of IDA involvement may also affect gain scores if a greater commitment to saving via the IDA further motivates students to learn financial concepts. If true, we expect to see that students who contributed a larger share of their IDA contribution will achieve higher gain scores ($\alpha_4 > \alpha_3 > \alpha_2 > 0$).

As mentioned, we vary the intensity of instruction. The variable, INTENSITY, a binary indicator, is equal to 1 for those students who were randomly assigned to receive an additional 90 minutes of instruction. We expect to find that those students receiving additional instruction will achieve higher gain scores ($\alpha_5 > 0$).

Endogeneity of IDA Participation. One of our key explanatory variables is the extent to which students and their parents contributed to their IDAs. Ascribing a causal impact for IDA contributions on the change in test scores is problematic if contributions to IDAs are correlated with factors contained in the error term, ε_i, of our baseline regression equation. Parents' financial savviness and motivation to save, for example, are factors likely to lead parents to open an IDA and to keep their accounts current. These same characteristics of parents may be transmitted to their children and ultimately manifest in greater financial knowledge and greater motivation to learn on the part of our camp participants enrolled in the IDA. As mentioned earlier, if greater financial savviness and motivation to learn leads to greater gains in financial knowledge as suggested by Mandell and Klein (2007), IDA is potentially endogenous in Equation (1) and ordinary least square (OLS) parameter estimates are biased and inconsistent.

A potential solution to this problem is instrumental variables (IV) estimation. That is, we require an instrumental variable that is correlated with IDA participation but is uncorrelated with both the change in test scores, controlling for IDA and other explanatory variables, and factors contained in the error term. Unfortunately, we lack suitable instruments in the current application. Whereas our dataset does contain variables potentially correlated with IDA participation, there are none for which we can argue an absence of correlation with the error term, ε_i, in Equation (1) and, hence, none that are exogenous to our baseline regression. Instead, we proceed by augmenting our baseline regression with proxy variables designed to control for the potentially confounding effects on test scores of students' preexisting financial knowledge and parents' and, hence, students' motivation and financial savviness.

Our controls for students' preexisting financial knowledge are represented by the variables CLICKERS and Financial Industry Regulatory Authority, Inc. (FINRA) questions. Prior to the start of camp instruction, students were given a very basic quiz conducted with clickers on elementary concepts on financial literacy. The percentage of questions students answered correctly was recorded. Also, prior to the start of instruction, students were asked to answer the five basic questions that test financial literacy developed by Lusardi and Mitchell (2008, 2011) that have been added to the *National Financial Capability Study* commissioned by the FINRA. Investor Education Foundation (n.d.) in 2009 and to many other surveys in the United States and across the world. These five questions test knowledge of compounding of interest, inflation, bond price, mortgage payments, and portfolio diversification.

We also control for the potential confounding effects of some key parental characteristics that could ultimately be linked to a student's motivation to learn financial concepts. These parental characteristics include the following variables described earlier in Table 3 and are each measured as binary variables: HIGHER_INCOME denotes that the family income was more than $45,000, which is roughly $12,000 above the median income of the sample; SOME_COLLEGE indicates that the survey taker had taken at least one college course; and PARENT_MARRIED indicates whether the survey taker was a parent who was married.

Selection Bias of Camp Participation. We only observe test scores for those students from our three participating schools whose parents elected to send them to the summer camp. The potential for selection bias arises because unobservable characteristics that lead students to attend the camp may be correlated with unobservable characteristics determining what is learned from the camp instruction, and this can possibly bias the coefficients estimated in the gain score equation. For example, those students who did not open an IDA, but nonetheless attended the camp, may have high levels of motivation to learn financial concepts. These students are not likely to be representative of the students who did not open an IDA. Thus, IDA participation and unmeasured motivation could be correlated in the selected sample of camp participants.

Empirical Results

Table 4 presents the OLS estimates of our gain score model. The table is organized as follows. In columns (ii) and (iii), we report the parameters of our baseline regression model, which includes controls for academic performance and the IDA and INTENSITY variables. The academic performance variables are overall GPA in eighth grade and the CST scores in eighth-grade Language Arts and Mathematics. The CST scores in Mathematics and Language Arts were included to control for numerical and reading competency, respectively. The CST scores in Mathematics cannot be compared across students because students took the CST in varying levels of eighth-grade Mathematics classes such as honors and nonhonors pre-Algebra and Geometry. Therefore, we report results without and with the CST Mathematics scores in columns (ii) and (iii), respectively. Columns (iv) and (v) present the results when we augment the baseline regression model with controls for students' preexisting financial knowledge represented by the variables CLICKERS and FINRA. The CST Mathematics scores are excluded from the specification in column (iv) but are included in the specification in column (v). In columns (vi) and (vii), we include the parent characteristics, each measured as a binary variable: HIGHER_INCOME, SOME_COLLEGE, and PARENT_MARRIED. The CST Mathematics scores are excluded from the specification in column (vi) but are included in the specification in column (vii). Note that the sample sizes are reduced because we add explanatory variables to the baseline regression. The smallest number of observations is reported in columns (vi) and (vii) when we include parent characteristics.

Turning first to the OLS estimates reported in column (ii), a student's performance on the CST Language Arts examination is important in explaining what was learned from the camp instruction. The coefficient estimate of 0.061 for the CSTLA variable in Table 4 indicates that as we move from the 50th to the 75th percentile in CST Language Arts scores, the change from pretest to posttest scores increases by 2.14 percentage points, which is obtained as 0.061 times (417 − 382). As we move from the 75th to the 95th percentile, the change from pretest to posttest scores increases by 2.2 percentage points, which is obtained as 0.061 times (453 − 417). The importance of CST Language Arts scores indicates the importance of reading comprehension in improving pretest scores. In contrast, the coefficient for GPA is statistically insignificant. In specification (iii), when we include CST Mathematics, CST Language Arts is no longer statistically significant. A plausible reason for the nonsignificance of CST Language Arts is that the correlation

TABLE 4. Regression Explaining the Gain in Score (the Difference in the Posttest and Pretest Scores Where Each Is Measured as the Score in Percentage)

(i) Explanatory Variables	(ii) $N = 82$	(iii) $N = 82$	(iv) $N = 77$	(v) $N = 77$	(vi) $N = 47$	(vii) $N = 47$
CSTLA	0.061	0.036	0.061	0.035	0.068	0.022
	(0.03)**	(0.032)	(0.03)**	(0.035)	(0.05)	(0.071)
CSTMATH		0.069		0.07		0.069
		(0.033)**		(0.036)**		(0.060)
GPA	1.55	−0.54	3.25	1.61	0.739	0.070
	(3.27)	(3.67)	(3.63)	(3.83)	(6.59)	(6.51)
IDA_low	1.00	0.52	3.26	2.54	1.53	1.91
	(5.47)	(5.53)	(5.50)	(5.56)	(12.49)	(13.08)
IDA_med	1.50	0.89	3.95	3.54	2.46	3.58
	(5.48)	(5.26)	(5.92)	(5.61)	(12.45)	(11.93)
IDA_high	3.79	3.21	5.14	4.17	0.365	1.83
	(3.63)	(3.46)	(3.69)	(3.51)	(10.03)	(9.67)
INTENSITY	2.93	2.26	3.65	3.18	2.49	2.12
	(3.19)	(3.09)	(3.28)	(3.16)	(6.69)	(6.68)
CLICKERS			−0.03	−0.63	−0.049	−0.072
			(0.08)	(0.08)	(0.12)	(0.129)
FINRA			−0.09	−0.066	−0.039	−0.03
			(0.06)	(0.058)	(0.08)	(0.078)
HIGHER_INCOME					−3.55	−3.13
					(7.05)	(7.08)
SOME_COLLEGE					2.25	2.79
					(5.26)	(5.17)
PARENT_MARRIED					6.81	3.91
					(7.10)	(6.17)
F statistic (*p* value)	2.06	2.33	2.54	2.78	1.11	0.96
	(0.06)*	(0.033)**	(0.02)**	(0.008)**	(0.38)	(0.51)
R^2	0.11	0.17	0.15	0.2	0.143	0.18

Note. Robust Standard errors are in parentheses. GPA = grade point average; FINRA = Financial Industry Regulatory Authority questions.

*$p < .05$. **$p < .01$.

between CST Language Arts and CST Mathematics is high at 0.49. In columns (iii), (v), and (vii), the magnitude of the CST Mathematics coefficient is roughly 0.07 indicating that as we move from the 50th to the 75th percentile in CST Mathematics scores, the change from pretest to posttest scores increases by 3.92 percentage points, which is obtained as 0.07 times (393 − 337). As we move from the 75th to the 95th percentile, the change from pretest to posttest scores increase by 5.66 percentage points, which is 0.07 times (473.8 − 393). These results support evidence from authors such as Cole, Paulson, and Shastry (2013) and Lusardi (2012) about mathematical competency enabling higher levels of financial literacy.

The relative magnitudes of the coefficients of the three binary indicators for IDA involvement reported in columns (ii) through (v) of Table 4 indicate that the greater the IDA involvement, the larger is the gain in score from pretest to posttest. However, these magnitudes are not statistically significant and also depict sensitivity to the decrease in sample size that occurs when parent variables are included. Our methodology differs from Jamison et al. (2014), but our

findings in this regard match their conclusion that the act of saving alone does not directly increase financial knowledge.

The INTENSITY coefficient measures the contribution of an additional 90 minutes of hands-on activities and examples that reviewed instructional material already taught in the camp with discussion and worksheets. This amounted to roughly 14% of additional instruction time in 11 instructional hours for the entire camp. The coefficient of INTENSITY is positive but statistically insignificant, suggesting that increasing the intensity of instruction did not fetch gains in financial knowledge in the overall test, above and beyond the 11 hours of instruction that was already provided to all students who attended the camp and after controlling for academic indicators. The total instructional time of 11 hours excludes breaks, testing, registration and attendance at a guest speaker event.

In results available on request, we find that the statistical insignificance of the INTENSITY coefficient persists even when the gain score is calculated only for the 19 questions that directly pertained to the additional instructional content and also when these 19 questions were broken down to 11 "knowledge" versus eight "comprehension" and "application" questions.

Our finding of the unimportance of intensity of instruction is not to be interpreted as the noneffectiveness of "constructivism" methods of learning as discussed by Choi et al. (2010). It may be the case that these students who received the higher intensity instruction are more likely to retain material for the long term. It is also possible that we need a greater degree of intensity to achieve noticeable results in increased gain scores beyond that accounted for by academic indicators such as CST scores.

To check for the possibility that our parameter estimates might suffer from a selection bias based on the decision of students and the parents of students attending the camp, we estimate a version of our gain score model using Heckman's (1979) two-step estimator. In the first stage of the procedure, we use a reduced-form probit model to estimate the probability that a student will attend the camp. The parameter estimates are used to form the inverse Mills ratio, which is then used as a regressor in the gain score equation. The Mills ratio is constructed as the standard normal density evaluated at the coefficients from the first-stage probit regressions and the explanatory variables included in the first-stage probit regressions, all divided by one minus the cumulative distribution function evaluated at the same coefficients and characteristics. Our identification strategy is to represent attendance at the camp as a decision by parents to invest in human capital for their children. The additional variables we use to account for this investment decision in the reduced-form probit equation include what we term present bias on the part of parents and time and transportation constraint variables. The variable PRESENT_BIAS is derived from parents' responses to our hypothetical $1,000 cash prize discussed in the data section. PRESENT_BIAS is set equal to 1 if parents exhibit a discount rate greater than 10%. The time and transportation constraint variables are represented by the variables YOUNG_CHILDREN and OWN_CAR, respectively. YOUNG_CHILDREN is set equal to 1 if parents have children younger than 12 years of age to indicate if the student might have to stay home to assist in child care of younger siblings during the summer. OWN_CAR is set equal to 1 to indicate the availability of transportation for parents to drop off students at the school site. The first-stage probit equation representing camp attendance should include all of the right-hand side variables from the gain score model in addition to the present bias and time and transportation constraint variables. However, we do not observe intensity of instruction, performance on the five FINRA questions, and the questions asked with clickers for the students who did not attend the camp. It was necessary to exclude these variables from the first-stage probit equation.

The results in Table 5 show that we fail to find selection bias in the pretest to posttest regressions based on camp attendance, that is, the Mills ratio coefficients in all three specifications are statistically insignificant. Note that the number of observations for the gain score model in columns (ii) to (iv) of Table 5 is smaller than in Table 4 because we can only include observations with valid parent characteristics used in the first-stage probit estimates. It is interesting to note from the first-stage probit estimates reported at the bottom of Table 5 that the coefficient on PRESENT_BIAS is negative and statistically significant across all columns. Recall that PRESENT_BIAS is a binary variable indicating a discount rate greater than 10%. We interpret this coefficient as showing that those parents who discount future returns heavily are less likely to see value in the camp. This result contrasts with Henegar et al. (2013) who find no significant linkage between a parent's (mother's) time preference and a

TABLE 5. Heckman Two-Step Estimator: Dependent Variables Are Gain Score and Camp Attendance

(i) Gain Score	(ii) $N = 50$	(iii) $N = 47$	(iv) $N = 43$
CSTLA	0.086 (0.040)**	0.087 (0.041)**	0.083 (0.047)
GPA	0.778 (4.31)	1.78 (5.02)	5.75 (6.26)
IDA_low	−12.46 (10.59)	−12.33 (12.09)	−2.14 (12.55)
IDA_med	−5.02 (8.14)	−4.69 (9.04)	2.34 (11.09)
IDA_high	−5.68 (7.67)	−6.35 (8.58)	0.48 (10.56)
INTENSITY	2.38 (3.74)	2.20 (4.02)	1.00 (4.82)
CLICKERS		−0.056 (0.106)	−0.11 (0.120)
FINRA		0.0005 (0.106)	−0.006 (0.111)
HIGHER_INCOME			−2.84 (5.46)
SOME_COLLEGE			−3.94 (7.06)
PARENT_MARRIED			10.59 (6.54)
Mills ratio	8.77 (10.38)	10.03 (11.90)	12.48 (9.37)
Camp (First-Stage Probit Estimates)	**$N = 74$**	**$N = 71$**	**$N = 65$**
IDA low	−0.778 (0.749)	−0.781 (0.750)	−0.192 (0.977)
IDA medium	0.331 (0.817)	0.192 (0.826)	0.866 (1.063)
IDA high	0.310 (0.724)	0.241 (0.725)	0.908 (0.977)
CSTLA	−0.003 (0.004)	−0.002 (0.004)	−0.004 (0.005)
GPA	0.566 (0.322)*	0.568 (0.323)*	1.151 (0.458)**
PRESENT_BIAS	−1.11 (0.456)**	−1.02 (0.460)**	−1.57 (0.59)**
OWN_CAR	0.303 (0.462)	0.385 (0.478)	0.224 (0.557)
YOUNG_CHILDREN	−0.491 (0.361)	−0.470 (0.362)	−0.694 (0.455)*
HIGHER_INCOME			−0.007 (0.488)
SOME_COLLEGE			−1.43 (0.55)**
PARENT_MARRIED			0.61 (0.45)
Wald statistic (p value)	7.02 (0.32)	6.31 (0.61)	8.34 (0.68)

Note. Standard errors are in parentheses. GPA = grade point average; FINRA = Financial Industry Regulatory Authority questions.
*$p < .05$. **$p < .01$.

child's credit card behavior. However, in our study, parents likely had direct control (authorization) of the camp participation decision, whereas the Henegar et al. study involved greater child autonomy.

In addition, the probit estimates reported in column (iv) of Table 5 show that the presence of children younger than 12 years old reduces the probability that parents will send their child to the camp. If the parent taking the survey had "some college," the student was less likely to attend the camp, possibly indicating their high opportunity cost of bringing their child to the camp. We also find that students with a higher GPA were more likely to attend the camp.

Because School A and School B appear to differ in the percentage eligible for free and reduced price lunch and in racial composition as shown in Table 1, and School C has only three students who attended the camp, we introduced a dummy variable denoting "school" after dropping School C from the estimation. In results available on request, we find that the dummy variable denoting school is never statistically significant in Tables 4 and 5. However, the coefficient of CSTLA

for some specifications is not statistically significant when we add the dummy variable for school and drop School C.

Conclusion

This article,, with a focus on the summer financial fitness camp, represents the first step in our overall evaluation of the IDA program. Grinstead, Mauldin, Sabia, Koonce, and Palmer (2011) indicate that to be as successful as possible, IDA programs should examine the effectiveness of financial education. In this vein, we note that the mean difference between posttest and pretest scores for the entire sample of 83 students is 11.75 percentage points and is statistically significant. Our finding of this gain in score from the financial education we provided at the camp indicates that such education offers the potential to increase long-term financial health of low-income minorities.

In estimating students' gain in financial literacy knowledge from camp participation, the main contribution of our study arises from incorporating key aspects of research that have been deemed necessary by several authors as requiring more examination. We find no evidence to support two key hypotheses that were an outgrowth of this literature. We conclude that there were no returns from the additional 90 minutes of instruction that provided additional examples, discussion, and hands-on activities for material already taught to the entire camp. In addition, we find no evidence that participation in an IDA program improves what is learned from camp instruction.

We address the issue of selection bias which is a critical research gap in program evaluation of financial education, and we note the importance of present-biased preferences of parents in influencing camp attendance of children. Although present-biased preferences have been associated with higher credit card debt (Meier & Sprenger, 2010), less is known about how present bias on the part of parents impacts their decision to invest in human capital for their children by enabling their children's attendance at summer camps such as ours. After controlling for transportation and time constraints, we find that present bias of parents makes it less likely that students will attend the summer financial literacy camp.

Whereas we lack a control group in the strict sense of the words, we test our main hypotheses by using the reference categories for IDA and INTENSITY, those students who did not open an IDA or those students who did not receive the additional instruction. That is, a portion of our treatment groups serves as its own control group. Moreover, the very short (1 week) duration of our camp mitigates somewhat the need for a formal control group. Essentially, we are assuming that the pretest captures the mean outcome of the control population. It is unlikely that an untreated population's mean would change in the course of a week.

The cost of the 5-day camp incurred per student was $121.47 in 2012 dollars, and the average gain in score that was generated from the camp was roughly 12 percentage points. About 40% of the total cost of the camp arose from transportation cost and insurance paid on two school buses that transported the students to the camp. Supplies, food, and payment to camp chaperons and trainers accounted for the remainder of the expenses. As a comparison, we note that Levin et al. (2012) calculated the per student annual cost of Talent Search, a program geared toward high school, as ranging from $442.23 to $705.46, adjusted to 2012 dollars. Our IDA program terminates in 2016 when the students enroll in a 2-year or 4-year college.

In the next 3 years of the program, we will test for retention of financial knowledge by the treatment group as advocated in Mandell and Klein (2009). We plan to measure any change in attitudes and behaviors toward financial matters, measure the impact of the IDA on college enrollment, and compare these changes with a control group. We also expect our study to contribute to the less addressed aspects of youth financial literacy literature by modeling youth taste for risk and time preference with a view to examining their implications for financial well-being.

Implications for Financial Counselors, Educators, and Policymakers

The two related objectives of our Youth IDA program—to increase college attendance in a low-income, predominantly Hispanic community in California and to improve financial literacy of the youth enrolled in our program—are of interest to counselors and planners. Only 17 states require students to take a personal finance course, or require that personal finance be included in an economics or civics course as a high school graduation requirement (Council for Economic Education, 2014). Our findings that parents with present bias are less likely to enroll their students at a summer camp for financial literacy education imply that these

parents may not see immediate value in the benefits of their children attending the financial literacy camp. Additional reasons, such as having to stay at home in the summer to help care for younger siblings and nonavailability of transportation to the summer camp site, may mean that some students may not have access to financial literacy camps offered in the summer. These findings suggest that in order to provide financial education to all youth, policymakers and educators may find it worthwhile to integrate financial education as a requirement in high school, rather than leaving it as an optional camp enrollment.

The small scale of our program limits the generalization of our results. Nevertheless, as college tuitions soar and postsecondary education becomes less affordable, we hope that the design of our IDA program and the related research will shed some light on the importance of such an IDA program in achieving higher rates of college attendance among the low-income community. A study by Baum, Ma, and Payea (2013) indicates that 52% and 58% of high school graduates from the first and second quintiles of family income enroll in college, compared with 71% and 82% of the fourth and fifth quintiles of family income. Our IDA program is an attempt at increasing college enrollment for the low-income Hispanic community in our sample, and our study fills a void in terms of examining the impact of the IDA and financial education on financial knowledge and eventually on college enrollment for this community. As IDAs for postsecondary education expand in scope, financial counselors can assist families to tap into resources to promote higher college enrollment rates among low-income families.

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