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Bank Accounts and Youth Financial Knowledge: Connecting Experience and Education

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Abstract

This study examines the relationship between bank account ownership and student knowledge of personal finance. To assess financial knowledge, the study relies on national data collected every two years by the JumpStart Coalition for Personal Finance. Using test scores from the 2008 JumpStart survey, I assess whether scores are significantly higher among students that have bank accounts, relative to those students that have no formal banking relationship, controlling for demographic and socio-economic variables that might influence financial knowledge. The underlying research question is whether student experience with “real world” financial products is associated with higher levels of knowledge in personal finance. I find that student bank account ownership is significantly associated with higher scores on the test of financial knowledge, even after controlling for significant factors such as race, educational aspirations, and parental education. While the findings do not suggest causality, the results are informative for financial education delivery, particularly the importance of providing interactive opportunities for the application and practice of skills and knowledge.

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Introduction

As the nation recovers from one of the most severe economic crises in recent history, the skills related to personal financial management are more important than ever. In order to successfully navigate the rapidly changing financial system and maximize economic well-being, individuals must possess a basic level of financial knowledge and decision making ability. However, many Americans struggle with even the most fundamental financial concepts, such as spending and budgeting, savings and investing, and the proper use of credit and debt. Nowhere is this more evident than in the fallout from subprime mortgage lending, where it has become increasingly clear that many consumers didn't fully understand the terms of their loans or the risks associated with so-called "innovative" mortgage products. These new financial instruments represent a departure from the traditional fixed mortgage products of the past, and while financial innovations have certainly improved our lives in a number of ways, they've also exposed consumers to new complications and costs. Growing concerns over predatory financial products and service providers, from check cashers and payday lenders, to overdraft charges, are exposing some of the risks that come with a changing financial landscape.

It is unlikely that when the current crisis ends, financial innovation will be a thing of the past. Rather, financial products and underlying technologies will likely continue to evolve, suggesting that financial capability will only grow in importance as a necessary "life skill," particularly among America's youth. For example, a 2009 study by Sallie Mae finds that on average, college students have 4.6 credit cards, with a mean balance of \$3,173 (Sallie Mae 2009). There is ample evidence that many young people are entering adulthood with high debt burdens and low levels of financial knowledge (JumpStart Coalition 2009). What continues to perplex policymakers, however, is how to most effectively deliver financial knowledge, particularly in a way that influences behavior. A number of financial education programs have been introduced over the past decade, but efforts to measure the effectiveness of these programs have not kept pace. Program evaluation remains a challenge for a number of reasons, such as the time and cost required to track changes in knowledge and behavior over time, and we still don't have a thorough grasp on what works (Lyons, Palmer, Jayaratne and Scherpf 2006).

While we need to further increase our understanding of the specific program elements that make youth financial education most effective, a few key factors have been identified as important. For example, at a convening sponsored by the New America Foundation and the Citi Foundation on the effectiveness of youth financial education, experts suggested the following "promising practices." First, financial education must be relevant, meaning the content should appeal to the students' interests and present needs. Participants placed emphasis on ensuring that the content has real-world application for a diverse youth population (Lopez-Fernandini and Murrell 2008). For example, most teenagers will not be considering a home purchase for many years, and may have little interest in the subject. A second key factor, closely related to relevance, is timing.

Several participants suggested providing financial education to youth as early as possible and stressed the importance of “just in time” education, or lessons that focus on topics that are of immediate importance to students. For example students could learn about annual percentage rates and building their credit scores around the time they acquire their first credit card, thus the lessons would occur “just in time.” Given these lessons, the conference participants stressed the importance of connecting financial education to financial activity, such as child savings accounts (Lopez-Fernandini and Murrell 2008).

While the idea of coupling education with an interactive activity, or “learning by doing,” is certainly not new, various organizations are developing innovative applications of this practice for youth financial education. Junior Achievement (JA) operates the “Finance Park” and “BizTown” programs at various locations across the country, which offer real-world learning simulations for elementary, middle, and high school students. Students learn about personal financial management and career exploration (Finance Park) as well as entrepreneurship, free enterprise, and financial planning (BizTown) in the classroom, and then visit a JA site to participate in a hands-on role play simulation. For example, students visiting Finance Park are randomly assigned a “life situation” card which determines their job, income, education level, marital status and number of children for the simulation. Based on these factors, students use bank services, purchase housing, food, health insurance, and other necessities, and experience firsthand the process of budgeting, saving, and making choices and tradeoffs to live within their means. JA suggests that curriculum should be age-appropriate and developed with real-world applicability, and that students learn most effectively when they have foundational learning integrated with experiential learning (Lopez-Fernandini and Murrell 2008).

Another example of financial education paired with financial activity is the “Bank at School” program, which brings the banking experience to students by establishing active bank branches on school campuses. A number of states, such as Delaware, Louisiana, West Virginia, and Illinois, operate their Bank at School programs as a partnership between schools, local banks, and the state treasurer’s office. The program includes classroom-based training on financial topics (often aligned with state educational standards) and couples the traditional curriculum with real world banking experiences. Students can open non-custodial, no-fee savings accounts at the school branches and have the opportunity to make regular deposits at the bank as part of the program.¹ In some cases, students can also gain “work” experience as they perform duties as tellers, customer service representatives or even bank managers. Research and evaluation of these types of experiential learning programs are scant, but the underlying concept of connecting foundational learning with integrated experiences is worth further exploration.

Building on these ideas, this paper presents new empirical analysis that provides insight into the connection between financial education, financial experience, and financial knowledge among youth. This study examines the relationship between bank account ownership and student knowledge of personal finance. To assess financial knowledge, the study relies on national data collected every two years by the JumpStart Coalition for Personal Finance. Using test scores from the 2008 JumpStart survey, I assess whether scores are significantly higher among students

¹ The Office of the Comptroller of the Currency (OCC) published a report detailing how the school-based bank savings programs operate, including the benefits and potential risks to banks participating in these programs. For more information, see www.occ.gov/cdd/Insights-Schoolbasedbank.pdf

that have bank accounts, relative to those students that have no formal banking relationship, controlling for demographic and socio-economic variables that might influence financial knowledge. The underlying research question is whether student experience with “real world” financial products is associated with higher levels of knowledge in personal finance. I find that student bank account ownership is significantly associated with higher scores on the test of financial knowledge, even after controlling for significant factors such as race, educational aspirations, and parental education. While the findings do not suggest causality, the results are informative for financial education delivery, particularly the importance of providing interactive opportunities for the application and practice of skills and knowledge.

The paper proceeds as follows. I begin with a review of the existing literature on youth financial education, then present the empirical analysis including information on data and methodology, and lastly discuss the implications of the findings for financial education practitioners and policymakers.

Review of Literature

A number of studies have measured the impact of financial education on a variety of outcomes, and while the general consensus is that financial education positively affects financial behaviors and outcomes, the findings across programs are mixed (Lyons, Palmer, Jayaratne, and Scherpf 2006). Certain research finds that financial education can lead to positive knowledge, attitude, and behavior change. For example, the National Endowment for Financial Education (NEFE) offers the High School Financial Planning Program (HSFPP) which was designed and developed based on the idea of *performance-based learning*, an educational approach that allows students to take what they learn and apply it directly in the course of each lesson. Studies find that students demonstrated a statistically significant increase on all financial knowledge, behavior and confidence questions immediately after completing the program, and these knowledge gains were demonstrated again three months after completion of the curriculum (Boyce and Danes 1998, Danes 2005). Similarly, a longitudinal study of the FDIC’s Money Smart program finds that respondents reported significant positive changes in their level of savings, amount of debt, and likelihood to comparison shop for financial products at the end of their training and over the intermediate term six to twelve months later (FDIC 2007). In contrast, Gartner and Todd (2005) analyze results from the St. Paul Foundation’s Credit Card Project, which assesses the impact of online credit card education on cardholder behavior, and find no significant difference in behavior change between the treatment and comparison groups.

Other research has focused on assessing the effects of state mandates for financial education in public school standards; these too have produced mixed results. In a well cited study, Bernheim, Garrett and Maki (2001) find evidence that state mandates for personal financial education in high school have a positive effect on savings rates and net worth later in life during peak earning years. However, Cole and Shastry (2009) expand on the Bernheim, Garrett and Maki empirical model and find that state mandates for financial education did not increase financial market participation. Rather, Cole and Shastry find that state mandates were introduced during periods of high economic growth, thus resulting in a spurious correlation between state mandates and savings rates among students that would have been affected by those mandates. In a separate study, Tennyson and Nguyen (2001) find no significant relationship between mandates and financial knowledge when averaged over the broadest form of mandates (including any mandate

for curriculum standards, course requirements, or testing requirements). However, they find that specific course mandates for personal financial education were significantly associated with higher levels of financial knowledge.

There are a number of possible explanations for the wide variation in research findings on the effectiveness of financial education. Research on program evaluation is limited and metrics and methodology vary across different studies, resulting in findings that are not easily compared. (Lyons, Palmer, Jayaratne and Scherpf 2006). The varied findings could also be due in part to the wide range of financial education efforts aimed at youth. These include branded programs from mainstream banks and credit card companies (such as Visa's "Practical Money Skills for Life" or HSBC's "Your Money Counts"), extracurricular programs from nonprofit organizations (such as programs offered by Junior Achievement or the Boys and Girls Club), government sponsored programs (FDIC's "Money Smart for Young Adults"), or state mandated courses taught in public schools. Program design elements vary significantly across the different forms of youth financial education. For example, one program may teach financial education through group lectures in the classroom, while another program may provide one-on-one coaching in conjunction with a matched savings account; these two programs vary significantly by design and treating them as equivalent under the broad definition of "financial education" may confound our ability to assess effectiveness. Also, motivating and measuring behavior change is challenging. Increased knowledge does not automatically result in behavior change and as demonstrated by the growing work in the field of behavioral economics, individuals do not always act in their best financial interest (Braunstein and Welch 2002, Meier and Sprenger 2007, Thaler and Sunstein 2008).

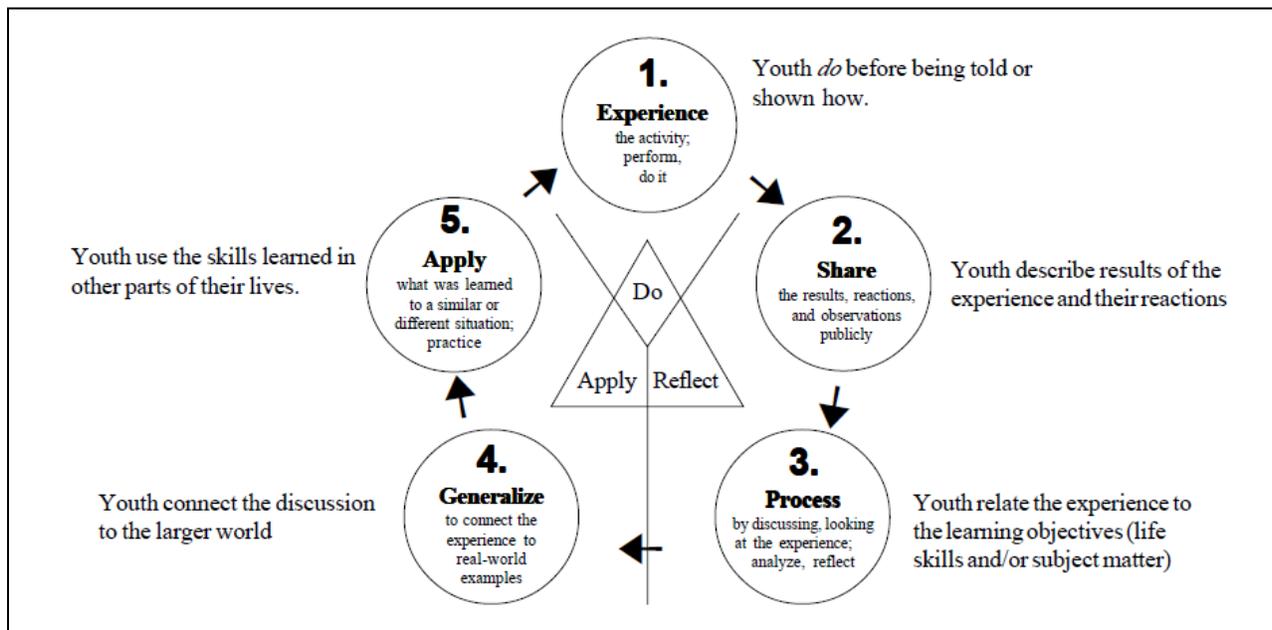
This paper considers the connection between real-world experience and education, and its implications for program design of youth financial education. Three strands of literature are especially relevant for this paper. The first considers how students learn and demonstrates the effectiveness of experiential learning. The second considers whether the effectiveness of experiential learning holds true in the financial education sector. The third strand of literature includes studies that analyze previous rounds of the JumpStart data and provide a framework for understanding the factors that are associated with increases in student knowledge of personal finance.

There are many types of learners and, as a result, many methods of learning, but the literature suggests that learning by experience is an effective approach. Kolb's (1984) experiential learning model is one of the theoretical frameworks on which the idea of "learning by doing" is based upon. This model proposes that personal involvement and concrete experiences with subject matter enhance effective learning outcomes. Kolb defines learning as "the process whereby knowledge is created through transformation of experience." In other words, this perspective suggests that learning is less about the acquisition of knowledge, and more about the interaction between knowledge and experience.

One popular application of the experiential learning model for youth is the 4-H program, which is based on the educational model of "learning by doing." Youth participate in a series of activities and discussions that allow them to reflect and learn from their experiences, preparing them to apply and practice the skills they've learned in other situations (see Figure 1 below). The program teaches a broad range of skills generally referred to as "leadership life skills,"

which include working with others, understanding self, communicating, making decisions, and leadership (Hoopfer 1981). Experiential learning is the cornerstone of 4-H youth programming, and intervention occurs at a young age as skills and attitudes formed during youth carry over into adulthood (Ladewig and Thomas 1987). Numerous studies have found a positive impact of the 4-H model on a variety of youth outcomes, including workforce skills (Ferrari, Arnett, and Cochran 2007), consumer decision making skills (Olson and Croymans 2008), and life and leadership skills (Garton, Miltenberger, and Pruett 2007).

Figure 1 – The 4-H Experiential Learning Model



Source: *Learning by Doing the 4-H Way*, by Keith G. Diem, Ph. D

While experiential learning is not necessarily new, the links between experiential learning and financial behavior have only recently been explored in the literature. Hilgert, Hogarth and Beverly (2003) find a positive correlation between financial knowledge and behavior and find that individuals with high levels of financial knowledge were more likely to report learning from personal experience. They also find that knowledge gained from personal experiences is highly correlated with improved financial behaviors and suggest that “there is a difference between providing information and providing education.” Peng, Bartholomae, Fox and Cravener (2007) find that college students that had bank accounts before age 18 had significantly higher levels of investment knowledge; the authors attribute this association to Kolb’s (1984) experiential learning model. Within the financial education literature, this theoretical perspective may help explain the consistent correlation between playing the stock market game and higher levels of financial knowledge among high school students, as the game provides an interactive opportunity for students to experience the process of gathering information and making financial decisions. Mandell (2006) finds that students who play the stock market game tend to have significantly higher financial test scores than those who don’t; this positive association has been found in every round of the JumpStart survey since 2000, when the stock market game was first included in the survey instrument (Mandell, 2007).

Other studies that analyze the JumpStart data provide guidance for identifying the factors that are associated with increases in student knowledge of personal finance. Peng (2008) finds that student race, educational aspiration, and parental educational attainment are significant predictors of financial knowledge in every round of the JumpStart survey from 1997 through 2006, but finds mixed evidence of the relationship between state mandates for financial education and performance on the test (a mandated course was found to be significantly associated with higher test scores in 1997, 2002 and 2004, but no such association was found in 2000 or 2006). Mandell and Klein (2007) find similar results in regards to student race, parental education, and student plans for future education. They also find that motivation (or caring about one's own personal finances) is an important driver of financial literacy and suggest that students need to better understand why financial knowledge is important and how it informs their present actions and future happiness.

This paper builds on the existing literature by analyzing the JumpStart data to assess whether or not the “experience” of having a bank account can predict higher levels of financial knowledge. While the JumpStart survey is often used to test the effectiveness of financial education on financial knowledge, the variables on bank account usage have yet to be analyzed in the literature. The hypothesis is that students that have bank accounts will exhibit greater financial knowledge, even after controlling for significant factors such as race, parental education and income, cognitive ability and student educational aspirations.

Data and Methodology

This study uses data from the 2008 survey conducted by the JumpStart Coalition for Personal Financial Literacy. The JumpStart Coalition for Personal Finance administers the survey every two years to a national sample of high school seniors, testing their financial knowledge and collecting pertinent demographic and background information. At the national level, students scored an average of 57 percent correct on the first test in the 1997-1998 school year and the average scores have remained below this level ever since; scores fell to 52 percent in 2000, 50 percent in 2002, and increased slightly to 52 percent in 2004 and 2006 (Mandell 2005 and Mandell 2006). Scores fell again in the most recent round of the survey, with students correctly answering just 48 percent of the questions in 2008. Schools are selected randomly and invited to take part in the study but may choose not to participate; schools in the sample population are thus self-selected. The financial test consists of 31 age-appropriate multiple choice questions testing knowledge in four key areas of personal finance: (1) income (2) money management (3) saving and investing and (4) spending and credit. In addition, the survey instrument includes additional questions related to student demographics, family background, educational aspirations and financial experience. Sample weights were provided with the data set and were used to improve representative accuracy.²

The sample includes 6,856 observations and students earned a mean score of 48.3 percent on the test of financial knowledge. Table 1 provides descriptive information on the student sample, revealing that 66.5 percent of respondents are Caucasian and earned a mean score of 52.5 percent

² Descriptive statistics describe the actual sample population. Weights were applied to all calculations of mean scores and regression coefficients to make them more nationally representative.

while non-Caucasian students as a whole earned a mean score of 43.3 percent. Male students comprised 45 percent of the sample and earned a mean score of 49.0 percent while females earned a mean score of 47.9 percent. The majority of responding students, 84.4 percent, reported that they plan to attend a two- or four-year college and only 1.9 percent reported having no further educational plans beyond high school. 22.6 percent of responding students reported that their parents attended some college and 40.5 percent reported that their parents earned a college degree or more. On average, JumpStart respondents are more likely to be non-Caucasian, female, and have parents that earned a college degree or more, in comparison to the general population.³

Table 1

Student Characteristics	n=	% of Respondents	Mean Score (%)
Race			
Caucasian	4,560	66.51	52.5
African American	931	13.58	41.3
Hispanic	616	8.98	45.1
Asian American	224	3.27	47.2
Native American	154	2.25	37.7
Other	277	4.04	41.1
Sex			
Female	3,684	53.73	47.9
Male	3,088	45.04	49.0
Educational Aspirations			
Don't know	360	5.25	39.2
No further plans	129	1.88	34.9
Other training or education	503	7.34	44.2
Two-year college	1,099	16.03	44.6
Four-year college	4,686	68.35	50.9
Parents' Education			
Don't know	322	0.05	36.9
Some high school	473	6.90	44.2
High school graduate	1,678	24.47	47.2
Some college	1,552	22.64	49.0
College graduate or more	2,775	40.48	51.8
Parents' Income			
Less than \$20,000	600	8.75	43.4
\$20,000 - \$39,999	1,278	18.64	47.3
\$40,000 - \$79,999	1,938	28.27	50.3
\$80,000 or more	1,611	23.50	52.3
Homeownership status			
Parents own home	5,571	0.81	49.7
Parents rent home	1,226	0.18	44.0
College Entrance Exams			
Scored above mean	3,169	46.22	53.5
Scored below mean/didn't take/don't remember	2,830	41.28	44.2
Total Sample	6,856		48.3

³ As compared to data from the U.S. Census Bureau, 2008 Annual Social and Economic Supplement.

This study uses multiple regression analysis to estimate the effect of a variety of demographic, education, and experience variables on financial knowledge test scores, and in particular tests the hypothesis that ownership of a bank account is associated with increased financial knowledge among youth. The variables used in the empirical analysis include race, gender, educational aspiration, parental education, parental income, homeownership status, college entrance exam scores, participation in financial education programs, and bank account status.

The variable for race is coded into the categorical variable non-Caucasian; Caucasian students were coded as 0 and students from all other racial categories were coded as 1. Based on prior studies, I expect that being non-Caucasian is associated with lower scores on the test of financial knowledge (Peng 2008). The base category for the gender variable is male (male students are assigned a value of 1, female students 0) and I expect no significant difference between sexes (Peng 2008). Educational aspiration is divided into three categories for students planning to attend a two-year college, a four-year college, or receive other training. Students were assigned a value of 1 for the specific category they indicated (students could only select one category); the omitted variable represents students that had no further educational plans or reported that they did not know, and were assigned a value of 0. Based on prior studies, I expect that having educational plans beyond high school is associated with higher scores on the test of financial knowledge (Mandell and Klein 2007, Tennyson and Nguyen 2001).

I also include a variable controlling for parental educational attainment; I assume that higher levels of parental education are associated with higher student scores. Parental education is coded into a single categorical variable reflecting whether or not parents received any postsecondary education, with a value of 1 for students reporting that their parents either completed some college or earned a college degree, and 0 for students reporting that their parents earned a high school diploma only, or less, or that they didn't know their parents' level of educational attainment. A significant percentage of students in the sample indicated that they didn't know their parent's level of educational attainment, which could lead to misclassification of this variable. However, in examining the data, students that did not know their parents' level of educational attainment scored much lower; on average, these students correctly answered only 36.9 percent of questions, compared to a mean of 48.3 percent for the entire sample. I therefore assume that a response of "don't know" is in itself an indicator of a lower level of parental emphasis on the value of education (in comparison to students that were able to provide a response to the question).

Previous studies have shown that family income tends to be a weak predictor of financial literacy, but that there is the expected positive monotonic relationship between higher incomes and higher scores (Mandell, 2009). Since we would assume that in general income would be a key predictor of financial knowledge, the weak relationship in previous studies may be due to problems with the survey instrument. Student estimates of parental income may be inaccurate, and a large proportion of students in the JumpStart survey reported not knowing their parents' income (n=1,366). Rather than excluding this variable from the analysis, I choose to control for youth who come from "high income" families, and recode parental income into a categorical variable which is set to 1 if students reported parental income above \$80,000 (the highest option available), and 0 for all other responses. Another key control variable for socio-economic status is homeownership. The ability to purchase and maintain a home should signal a degree of financial knowledge and capability, as owners must save for a down payment, budget their monthly expenses, and navigate the mortgage financing process. I therefore expect that

homeownership will be a significant predictor of financial knowledge as students would presumably observe and learn from the positive financial behaviors associated with homeownership (although the current foreclosure crisis suggests that many families did not follow sound financial practices when purchasing or refinancing their homes). Homeownership may also serve as a proxy for unobserved assets and socio-economic advantage that may also influence financial knowledge.

The 2008 JumpStart survey also includes new variables on students' college entrance exam scores. This variable was included for the first time in an attempt to better capture a youth's overall level of knowledge and cognitive and test taking abilities. Performance on college entrance exams is theoretically tied to problem solving ability and overall intelligence (Mandell 2009). Students self-reported their scores into the following categories for the SAT: less than 1,500; between 1,500 and 2,000; more than 2,000; and for the ACT: less than 20; between 21 and 26; and more than 27. According to the College Board and ACT, Inc. (the agencies responsible for the tests) the mean composite scores for the 2008 exams were 1,511 for the SAT and 21.1 for the ACT, which correspond with the survey response categories.⁴ As a result, the categorical variable for entrance exam score is set to one if students scored above the mean on the entrance exam and zero if students scored roughly below the mean (less than 1,500 on SAT and less than 20 on ACT), didn't remember their score, or didn't take the exam.

In addition to demographic and socio-economic variables, the models also control for various forms of financial education. Students were asked to report whether they had taken an entire course in money management (which includes personal finance), a portion of a course in money management, an entire course in economics, a portion of a course in economics, or played a stock market game in high school. Students could respond to multiple categories if they participated in more than one type of financial education. As shown in Table 2, of those responding, 24.2 percent reported taking an entire money management course while a much larger share, at 41.2 percent, reported taking an entire course in economics. Students reporting that they had played a stock market game earned the highest mean score of 51.0 percent, relative to the other financial education exposure groups. Students reporting that they had been exposed to an entire course in money management earned a mean score of 47.5 percent, the lowest score among the different educational exposure groups.

Table 2

Financial Education Exposure	n=	% of Respondents	Mean Score (%)
Money Management			
Entire course	1,658	24.2	47.5
Portion of course	1,864	27.2	48.8
Economics			
Entire course	2,822	41.2	48.8
Portion of course	1,611	23.5	49.4
Played stock market game	1,763	25.7	51.0

⁴ Score information available through The College Board (www.collegeboard.com) and ACT Inc. (www.act.org)

Finally, to capture the effect of experience, I include information on students' bank account status to test whether having a bank account is correlated with improved financial knowledge. Students were asked to report whether they had no bank account, a savings account only, a checking account only, or both a savings and a checking account. Table 3 shows that 36.1 percent of students had both a savings and a checking account and earned a mean score of 50.3 percent. In contrast, 20.6 percent of responding students had no account of any kind and scored an average of 43.7 percent. This figure is striking; one in every five responding high school seniors enters adulthood without a bank account.

Table 3

Bank Account Status	n=	% of Respondents	Mean Score (%)
No account	1,409	20.6	43.7
Checking account only	831	12.1	49.1
Savings account only	2,057	30.0	49.7
Savings and checking account	2,475	36.1	50.3

Results

To analyze the key predictors of financial knowledge among youth, I develop three models. The first model tests the significance of socioeconomic, demographic, and education variables, such as race, gender, educational aspirations, parental education, parental income, homeownership status, and performance on college entrance exams. The second model then adds variables to test the significance of various forms of financial education, such as courses in money management and economics, or playing the stock market game. The third model adds the variables related to bank account ownership to measure the correlation between the “experience” of owning an account and level of financial knowledge.

The results of the ordinary least squares estimation (OLS) are shown below in Table 4. The first column contains estimates of the relationship between student background variables and financial knowledge, as measured by the JumpStart test. Caucasian students scored significantly higher than non-Caucasian students, consistent with previous years' data. Gender also has a significant effect, with male students scoring higher than female students. This result is somewhat unexpected as there were no significant differences in mean scores between male and female students in prior rounds of the JumpStart survey (1997, 2000, 2004, and 2006), with the exception of the 2002 survey in which female students scored significantly higher than male students (Peng 2008).

Students that plan to attain education and training beyond high school scored significantly better than their peers that do not know their future educational plans or have no further educational plans beyond high school. In particular, students planning to attend a four-year college scored significantly better than all other students, suggesting that future educational plans are a good indicator of student ability (Tennyson and Nguyen, 2001). Students scoring roughly above the mean on their college entrance exams (SATs and ACTs) performed significantly better on the test of financial knowledge, supporting the idea that performance on a test of financial knowledge is associated with problem solving ability. Parental education is also positively

related to student scores on the test of financial knowledge; the students whose parents received some level of postsecondary education (either completed some college or obtained a degree) scored significantly higher than students whose parents only finished high school, or less, or where parental education was unknown. The effect of parental homeownership is significantly related to higher financial knowledge scores at the 5 percent level. High levels of parental income do not have a significant effect on student scores.

The effect of financial education on financial knowledge scores is shown in the second column of Table 4. Traditional money management and economics courses did not have a significant effect on student scores, consistent with prior years' results. Students that took an entire course in money management scored below the sample mean, while students that took a partial course in economics scored above the sample mean. Whether students took an entire course in money management or economics, or a partial course in either of these subjects, the resulting differences in scores are not large enough to support the claim that traditional financial education courses have a statistically significant effect on financial knowledge scores. However, students that played the "stock market game," a simulation in which students invest a hypothetical sum of money in an online portfolio and track its performance, scored significantly higher than their peers that did not play the game, correctly answering 51.0 percent of the questions, compared to the mean sample score of 48.3 percent.

The final column of Table 4 presents the coefficient estimates for Model 3, which includes variables to reflect student bank account status. Students that reported having a savings account only, a checking account only, or a savings and a checking account scored significantly higher than students that did not have any type of bank account, even after controlling for all of the demographic, student background, problem solving, and financial education variables that were shown to have significant correlations with financial knowledge, as demonstrated in Model 1 and Model 2.

The estimated effect of bank account ownership on financial test scores is largest for students that have both types of bank accounts; these students score an estimated 2.2 points higher than otherwise predicted, given their personal characteristics. This is followed by smaller gains for students with a checking account only (2.0 points) and students with a savings account only (1.6 points). The significance of the homeownership variable disappears with the addition of the bank account variables. The data show that among students with a savings account only or a savings and a checking account, a greater proportion come from households that own their own home. A possible explanation could be that parents who are homeowners are more likely to encourage the use of financial services among their children, thus the effect of homeownership is captured in the bank account ownership variable. Students that have both a savings and a checking account earned higher scores than students with only one type of account or no account, suggesting that experience with a broader range of financial products is associated with higher levels of financial knowledge. While the correlation is statistically significant, the direction of causality remains unclear. However, the implications of these findings are still informative for financial education delivery, particularly the importance of providing interactive opportunities for the application and practice of skills and knowledge.

Table 4

Variable	Model 1	Model 2	Model 3
Intercept	0.38469* (0.00875)	0.3794* (0.00913)	0.37023* (0.00945)
Non-Caucasian	-0.06562* (0.00406)	-0.06379* (0.00408)	-0.06127* (0.00413)
Male	0.01423* (0.0038)	0.01408* (0.0038)	0.01463* (0.00381)
Plans two-year college	0.0660* (0.00832)	0.06631* (0.00831)	0.06475* (0.00832)
Plans four-year college	0.09674* (0.00765)	0.09712* (0.00764)	0.09485* (0.00766)
Plans other training	0.05362* (0.01008)	0.05495* (0.01006)	0.05201* (0.01009)
Parents post-secondary educated	0.01455* (0.00411)	0.0149* (0.0041)	0.01318* (0.00412)
Parents own home	0.00973** (0.00475)	0.00978** (0.00474)	0.007 (0.00479)
Parents income above \$80k	0.00204 (0.00475)	0.00182 (0.00475)	0.000503 (0.00477)
Scored above mean on college entrance exam	0.05901* (0.00417)	0.05824* (0.00417)	0.05641* (0.00419)
Entire money management course	---	-0.00636 (0.00463)	-0.00714 (0.00464)
Part money management course	---	-0.00131 (0.00431)	-0.00175 (0.00431)
Entire economics course	---	-0.00217 (0.00384)	-0.00268 (0.00384)
Part economics course	---	0.00452 (0.00449)	0.00515 (0.0045)
Played a stock market game	---	0.02418* (0.00457)	0.02399* (0.00457)
Has a savings account only	---	---	0.0162* (0.00533)
Has a checking account only	---	---	0.01999* (0.00677)
Has both a savings and a checking account	---	---	0.02195* (0.00518)
Adjusted R-squared	0.1564	0.1599	0.1608

Standard errors in parentheses

* Indicates estimated coefficient is significantly different from zero at the 1 percent confidence level

** Indicates significance at the 5 percent confidence level

Conclusion

This study finds that bank account ownership among high school seniors is significantly associated with higher levels of financial knowledge, even after controlling for significant factors, such as race and parental education. There are a number of possible explanations for this association. For example, students that have bank accounts may benefit from receiving regular account statements that provide information on deposits, withdrawals and even interest payments, or they may gain knowledge through interactions with bank personnel. However, this is not to suggest that simply having a bank account causes an increase financial knowledge; it could be the case that greater financial knowledge leads individuals to open accounts in the first place, or there could be a third variable, such as whether or not a parent has a bank account, which could influence both student knowledge and account ownership. While the direction of causality remains unclear, the demonstrated association between financial knowledge and personal experience merits further exploration.

This study attempts to shed light on the relationship between education and experience, but there are a number of limitations to this research effort. The JumpStart dataset exhibits some selection bias, as participation is voluntary and selected schools may choose not to administer the test. Additionally, while the sample size is large, it is still cross-sectional and does not allow for any tracking over time. Also, it should be reemphasized that the OLS regression does not allow for any causal inference, and while the observed correlations are statistically significant, the effect size is admittedly small. In addition, financial knowledge gains do not necessarily lead to improved financial behaviors, and the current study observes a relationship between financial experience and financial knowledge only, with no further assumption on the potential association with behavior change.

There is a growing effort to “bank the unbanked” and in particular bring low-income and minority adults into the banking mainstream, including the successful *Bank On San Francisco* program, which is now being replicated nationwide. Yet despite the growing interest in financial education for youth and hard-fought political battles for state mandates for personal financial education, there have not been comparable efforts to improve youth access to financial institutions and services (Johnson and Sherraden 2007). Coupling financial education with real world experience with financial products could improve financial knowledge, and more importantly, financial capability. Johnson and Sherraden (2007) suggest:

Financial literacy is a helpful but not a sufficient idea. Participation in economic life should maximize life chances and enable people to lead fulfilling lives. This requires knowledge and competencies, ability to act on that knowledge, and opportunity to act. This is more likely when people are able to convert knowledge into action. This, in our view, includes linking individual functioning to social institutions, and pedagogical methods that enable them to practice and gain competency in this functioning. We refer to this as financial capability.

The current study points to a significant correlation between youth ownership of bank accounts and financial knowledge, supporting the idea that experience can play an important role in education, but more research is needed to untangle the various relationships between financial knowledge, experience, competency and capability. For example, a non-profit financial

education program could partner with a local bank to offer specially designed youth bank accounts to be used in conjunction with an existing financial education curriculum. Additionally, many banks already offer their own youth financial education programs and could make an important contribution to the field by integrating their existing curriculum with activities tied to age-appropriate savings accounts provided by the bank, accompanied by a thoughtful evaluation. Existing “Bank at School” programs could also contribute to the field by developing rigorous evaluations and expanding measurement beyond student account balances to concurrently track changes in the financial knowledge and decision making abilities of participating students. It would also be interesting to observe the effects of experiential financial education programs among youth from low-income or immigrant households, as these populations have historically operated outside of the financial mainstream and such programs may provide a first encounter with banks and mainstream financial products. In addition, longer-term measurement and evaluation of the effectiveness of experiential learning are critical. Advocates continue to fight for state mandates and other forms of financial education, but a similar effort should be placed on identifying which types of educational approaches are most effective. Further exploration of experiential learning models for financial education, particularly as they relate to youth appropriate banking products, may lead to important gains in youth financial capability.

References

Bernheim B. Douglas, Daniel M. Garrett, and Dean M. Maki. 1997. "Education and Saving: The Long-Term Effects of High School Financial Curriculum Mandates." Working Paper no. 6085 (July). Cambridge, Mass.: NBER.

Boyce, L. and S. Danes (1998). *Evaluation of the NEFE High School Financial Planning Program 1997-1998*. Greenwood Village, CO: National Endowment for Financial Education.

Braunstein, S. and C. Welch. 2002. Financial Literacy: An Overview of Practice, Research, and Policy. *Federal Reserve Bulletin* (November): 445–457.

Cole, Shawn and Kartini Shastry (2007). "If You Are So Smart, Why Aren't You Rich? The Effects of Cognitive Ability, Education, and Financial Literacy on Financial Market Participation." Working Paper, Harvard Business School and Harvard Economics Department.

Danes, S. M. and H. Haberman (2005). *Evaluation of the NEFE high school financial planning program 2003 & 2004*. Greenwood Village, CO: National Endowment for Financial Education.

Ferrari, T. M., N. Arnett, and G. Cochran (2007). Preparing teens for success: Building 21st century skills through a 4-H work-based learning program. *Journal of Youth Development*.

Gartner, Kimberly and Richard M. Todd (2005). "Effectiveness of Online 'Early Intervention' Financial Education for Credit Cardholders," Presented at Federal Reserve System Community Affairs Research Conference, Promises & Pitfalls: as Consumer Finance Options Multiply, Who Is Being Served and at What Cost? Washington, DC. April 7-8.

Garton, M., M. Miltenberger, and B. Pruett (2007). Does 4-H Camp Influence Life Skill and Leadership Development? *Journal of Extension*. Volume 45, Number 4.

_____ (2007). "A Longitudinal Evaluation of the Intermediate-term Impact of the Money Smart Financial Education Curriculum Upon Consumers' Behavior and Confidence." Federal Deposit Insurance Corporation. April 2007.

Hilgert, Marianne, Jeanne Hogarth and Sondra Beverly (2003). Household Financial Management: The Connection between Knowledge and Behavior. *Federal Reserve Bulletin* (July): 309-322.

Hoopfer, L. (1981) "Mission Statement." Unpublished paper presented at the National Committee on Utilization of 4-H Materials, Washington, D.C.

Johnson, E. and M.S. Sherraden (2007). From financial literacy to financial capability among youth. *Journal of Sociology & Social Welfare*, 34(3), 119-145.

_____ (2009). *Making the Case for Financial Literacy 2009: A collection of personal finance statistics gathered from other sources*. JumpStart Coalition.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Knowles, Malcolm, Elwood F. Holton, and Richard A. Swanson (2005). *The adult learner: the definitive classic in adult education and human resource development*. Butterworth-Heinemann.

Ladewig, H. and J. Thomas (1987). "Does 4-H Make a Difference?" College Station: Texas A&M University System, Texas Agricultural Extension Service.

Lopez- Fernandini, Alejandra and Karen Murrell (2008). "The Effectiveness of Youth Financial Education" New American Foundation & Citi Foundation, December 2008.

Lyons, A., Lance Palmer, Koralalage Jayaratne, and Erik Scherpf (2006). Are We Making the Grade? A National Overview of Financial Education and Program Evaluation. *The Journal of Consumer Affairs*. Vol. 40, No. 2.

Mandell, Lewis (2005). "Financial Literacy – Does it Matter?" Buffalo, NY: University of Buffalo. April.

Mandell, Lewis (2006). "Financial Literacy: If It's so Important, Why isn't It Improving?" Networks Financial Institute Policy Brief No. 2006-PB-08.

Mandell, Lewis (2007). "Financial Literacy of High School Students." *Handbook of Consumer Finance Research*, Edited By Jing Jian Xiao Published by Springer, 2007

Mandell, Lewis (2009). "The Impact of Financial Education in High School and College On Financial Literacy and Subsequent Financial Decision Making" Presented at the American Economic Association Meetings, San Francisco, CA January 4, 2009

Mandell, Lewis and Linda Schmid Klein (2007). "Motivation and financial literacy." *Financial Services Review*, Vol. 16, 2007, pages 105-116.

Meier, Stephan and Charles Sprenger (2008). Discounting Financial Literacy: Time Preferences and Participation in Financial Education Programs. Federal Reserve Bank of Boston Public Policy Discussion Paper No. 07-5.

Olson, C. and S.R. Croymans (2008). Strengthening 4-H Youth Consumer Decision-Making Skills: Contest to Community Service. *Journal of Extension*. Volume 46, Number 1.

Peng, Tzu-Chin Martina (2008). "Evaluating Mandated Personal Finance Education in High Schools." Dissertation, The Ohio State University.

Peng, Tzu-Chin Martina, Suzanne Bartholomae, Jonathan Fox, and Garret Cravener (2007). The Impact of Personal Finance Education Delivered in High School and College Courses. *Journal of Family Economic Issues*, 28:265-284.

_____ (2009). *How Undergraduate Students Use Credit Cards*. Sallie Mae.

Tennyson, Sharon, and Chau Nguyen (2001). "State Curriculum Mandates and Student Knowledge of Personal Finance." *Journal of Consumer Affairs* 35(2): 241–62.

Thaler, Richard H. and Cass R. Sunstein (2008). *Nudge: Improving Decisions About Health, Wealth, and Happiness*. Yale University Press.

Vitt, Lois, Gwen M. Reichbach, Jamie L. Kent, Jurg K. Siegenthaler (2005). *Goodbye to Complacency Financial Literacy Education in the U.S. 2000-2005*. Institute for Socio Financial Studies.