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Financial Knowledge and Child Development Account Policy

A Test of Financial Capability

Jin Huang
Saint Louis University

Yunju Nam
University at Buffalo, State University of New York

Margaret Sherrard Sherraden
University of Missouri – St. Louis
Center for Social Development

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Financial Knowledge and Child Development Account Policy: A Test of Financial Capability

This study examines how study participants' financial knowledge and participation in a Child Development Account (CDA) intervention affect 529 College Savings Plan account holding among caregivers of infants. The study uses data from the SEED for Oklahoma Kids experiment (SEED OK, N=2,651), a statewide randomized experiment using a probability sample of infants selected from birth records. SEED OK is a policy test of universal and progressive CDAs that encourage families to accumulate assets for their children's future. Results of logit regression show that participants' financial knowledge is positively related to the account holding in the treatment group, but not in the control group. This finding implies that the effect of financial knowledge on financial decisions related to college savings is affected by institutional features, such as incentives and information. In other words, individuals' financial knowledge may have positive impacts on 529 College Savings Plan account holding only if they are situated in institutional supports for savings. These findings support the propositions of financial capability, and suggest that expanding financial capability requires both improved individual financial knowledge and supportive policy.

Key words: *asset building, college savings, financial literacy, wealth*

There is growing awareness of the importance of financial capability in optimal financial decision making and financial well-being (Johnson and Sherraden 2007; Sherraden forthcoming). To be financially capable, families must have financial knowledge and skills, but also have access to appropriate financial products and services. Among low-income and disadvantaged families, financial capability is especially important. Financial challenges are more acute, while financial literacy is low (Mandell 2008), and families are less likely to have access to financial services (Bucks et al. 2009).

The concept of financial capability has three key propositions. First, an individual's financial knowledge and skills are important determinants of financial well-being. Second, individuals require access to financial institutions, which is shaped by the policy context. Third, there is an interaction between the two: an individual's ability is influenced by the policy context; the institutional setting creates certain opportunities for individuals to apply their financial knowledge and skills. Individual ability and external conditions together contribute to individual financial capability and well-being (Nussbaum 2000).

This study tests the above three propositions regarding financial capability, using the data from the SEED for Oklahoma Kids experiment (SEED OK). SEED OK is a statewide randomized social experiment to test a Child Development Accounts (CDAs) program that encourages families to accumulate assets for children's future using the existing 529 College Savings Plan in Oklahoma (OK 529 plan). CDAs are savings accounts for children that provide a structured opportunity to save and accumulate assets by providing access, information, and incentives (Cramer and Neville 2009; Sherraden 1991). 529 College Savings Plans are tax-advantaged savings programs designed by the federal government and operated by state governments to encourage saving specifically for future college costs (Clancy 2003; U.S. Department of Treasury 2009).

The SEED OK experiment offers various college savings options for participants, which provides a unique opportunity to examine the interaction between individual ability and policy environments. In particular, this study uses 529 account-holding status as an outcome measure, and investigates three research questions: (1) Does financial knowledge increase an individual's chance of holding a 529 account for a child's future? (2) Does a CDA intervention (i.e., the SEED OK experiment) increase an individual's likelihood of 529 account holding regardless of level of financial knowledge? (3) Are there any interactive effects between an individual's financial knowledge and the CDA intervention? That is, does financial knowledge have different impact on the probability of holding a 529 account for the SEED OK participants in the treatment and control groups?

Background

Financial capability and financial literacy

Research on financial literacy has grown substantially in recent years (Lusardi and Mitchell 2011; U.S. Financial Literacy and Education Commission 2007). Financial literacy has been proposed as an effective approach for individuals to achieve optimal financial decisions. The term financial literacy is defined as an individual's knowledge and skills needed for efficient management of that individual's financial resources (Huston 2010; Remund 2010). Research shows that financial literacy is a key determinant of an individual's financial functioning, such as spending, saving, borrowing, and investing (Behrman et al. 2010). The effects of financial literacy extend beyond individual's socioeconomic characteristics (Lusardi and Mitchell 2011), and the importance of financial literacy on financial decision-making has been confirmed even in experimental settings (Agnew and Szykman 2011). Therefore, appropriate financial education and training should be provided for individuals to improve their financial knowledge, especially for disadvantaged populations.

In comparison to financial literacy, we know less about financial capacity despite the increased research and policy interest in this topic. While the concept of financial literacy focuses on individual ability, such as financial knowledge and skills, the concept of financial capability suggests that access to appropriate financial services (an institutional idea) is critical for building financial well-being. In this way, financial capability considers both an individual's ability to act (knowledge and skills) and opportunity to act (through access to appropriate and beneficial financial services) (Johnson and Sherraden 2007; Sherraden forthcoming). In other words, financial capability does not reside solely within the individual; it captures the relationship between people's internal ability and their external environments. In practice, the concept of financial capability has been applied to multiple innovations in financial products and services (Birkenmaier, Sherraden, and Curley forthcoming).

From the perspective of financial capability, promoting savings, such as college savings for children, requires not only improving financial knowledge and skills through education and training, but also improving access to financial services and the ways these services are designed and delivered. To promote access to financial services, Michael Sherraden and colleagues have proposed an institutional theory of saving, and identified institutional constructs that shape households' saving behavior (Sherraden 1991; Sherraden, Schreiner, and Beverly 2003; Sherraden and Barr 2005), including access, information, incentives, facilitation, expectations, restrictions, and security.

Financial knowledge as a measure of individual ability

Financial capability, however, presents a challenge in measurement because it incorporates individual ability and institutional features. Financial knowledge is an indicator of individual ability. Financial knowledge refers to an individual's understanding of financial concepts, and it has been commonly used as a measure or a proxy of financial literacy. In fact, financial literacy and financial knowledge are often used interchangeably in research literature. Huston (2010) summarizes the measures of financial knowledge in 71 individual studies drawn from 52 different data sets. Four distinct content areas have been identified in the definition of financial knowledge: (1) basic money concepts; (2) borrowing; (3) saving or investment; and (4) protection concepts. In most cases, financial knowledge is measured by multiple items, and a threshold value or a grading system is provided to explain levels of financial knowledge (Huston 2010).

Previous research has linked financial knowledge to financial functioning, such as saving and portfolio choice. For example, lack of financial knowledge or low financial literacy is found to be negatively related to retirement planning and saving (Behrman et al. 2010; Lusardi and Mitchell 2006, 2008, 2011), wealth accumulation, and stock investment (Christelis, Jappelli, and Padula 2008; van Rooij, Lusardi, and Alessie 2007). A low level of financial knowledge is also associated with higher interest rates and fees (Lusardi and Tufano 2009), and higher rates of housing delinquency, default, and foreclosure (Gerardi, Goette, and Meier 2010). Individuals with low levels of financial knowledge are less likely to select mutual funds with lower fees (Hastings and Tejada-Ashton 2008), and are less likely to diversify their investment portfolio (Guiso and Jappelli 2008).

Few studies, however, have focused on the impact of financial knowledge on financial planning for children's college. As shown in a recent survey (Sallie Mae 2010), saving for college has become just as high a priority as savings for retirement for American families with children; nonetheless, about 70% of low-income have not saved for their children's college education. This study, with a focus on financial capability, addresses this knowledge gap by looking at parents' financial knowledge related to college savings in a CDA intervention.

The SEED OK experiment

SEED OK is a statewide randomized policy experiment of CDAs to encourage families to accumulate savings for their children's future. The overall purpose of the SEED OK experiment is to test a universal and progressive policy of life-long asset building beginning at birth. SEED OK is built on the existing account structure of the Oklahoma 529 College Savings Plan (OK 529 plan), which provides tax incentivized accounts for college savings (Zager et al. 2010). The experiment is a partnership of the State of Oklahoma (Treasurer's Office, Department of Health, Department of Human Services, Tax Commission, and Oklahoma College Savings Plan), the Center for Social Development, and RTI International (Nam et al., 2011; Zager et al. 2010).

SEED OK drew a probability sample of 7,328 children from all infants born in two three-month periods in Oklahoma in April through June and August through October, 2007. In selecting infants for the study, the SEED OK experiment oversampled racial and ethnic minority groups, including African Americans, American Indians, and Hispanics. Among 7,328 infants selected for the study from birth records, 213 cases were determined ineligible (e.g., because of the death of the infant or mother). Of the 7,115 remaining cases, the primary caregivers of 2,704 SEED OK children agreed

to participate in the experiment and completed the baseline survey. The 2,704 primary caregivers are considered the study participants. After the baseline survey, SEED OK randomly assigned 1,358 participants to the treatment group and 1,346 to the control group (Marks, Rhodes, and Scheffler 2008; Zager et al. 2010). A packet containing information about the OK 529 plan and the SEED OK experiment was sent to treatment participants by the OK Treasurer’s Office after the random assignment.

SEED OK offered additional financial incentives and information on OK 529 plan to treatment participants on top of existing tax benefits of the OK 529 plan. Table 1 lists additional financial incentives provided by SEED OK. First, all treatment participants received a \$1,000 initial deposit in a state-owned 529 account for their child. A state-owned account was automatically opened for each treatment child, unless the participant opted out of this option. Second, treatment participants were encouraged to open their own participant-owned 529 account. Treatment group participants had the opportunity to receive a time-limited \$100 incentive for opening participant-owned accounts by April 15, 2009. Third, income-eligible participants in the treatment group were offered a savings match for deposits made in participant-owned accounts. The savings match varied according to household income. Households with an annual adjusted gross income below \$29,000 were offered a 1:1 match (for every dollar a participant deposited, SEED OK would match one dollar), and households with an annual adjusted gross income from \$29,000 to \$43,499 would receive a 0.5:1 match. Members of the control group did not receive any information from SEED OK about the OK 529 plan, were not eligible for the state-owned account, and were not offered any SEED OK financial incentives. However, they could open their participant-owned accounts in the OK 529 plan, just as any non-study participant could. In sum, the SEED OK experiment expanded the existing OK 529 plan to include three institutional features: incentives (e.g., \$100 account-opening incentive and matches), information, and access (through automatic account opening).

Table 1. SEED OK Financial Incentives by Treatment Status

	Treatment	Control
State-owned Account	State-owned account opened automatically for child with \$1,000 deposit.	No state-owned account for child.
Participant-owned Account	Participant-owned account opening encouraged. Time-limited \$100 account-opening incentive offered. Savings into participant-owned account is matched, if income-eligible.	Participant-owned account may be opened by control participant. No incentives or information offered.

The SEED OK experiment created different options for participants to save for their children’s college education: (1) Treatment and control group participants had the choice to open OK 529 plan participant-owned accounts; and (2) Treatment participants could receive an additional account-opening incentive and savings match for their participant-owned accounts. Participants’ financial

decisions on the participant-owned account, therefore, provide a unique test to examine the interaction between financial knowledge and policy features. In particular, we examine three research questions on the holding status of participant-owned accounts to test the propositions of financial capability: (1) Does SEED OK participants' financial knowledge increase the probability of holding a participant-owned account? (2) Does the SEED OK experiment increase participants' likelihood of holding a participant-owned account? (3) Are there any interactive effects between an individual's financial knowledge and SEED OK intervention on account holding?

Methods

Data and sample

This study uses data from three sources in SEED OK: 1) birth records of SEED OK children; 2) a baseline survey conducted on all study participants in 2007; and 3) quarterly account data obtained from the OK 529 plan. Birth records include basic demographic and health information of SEED OK children and their biological parents. The baseline survey data, collected before random assignment of the treatment and control groups, contain detailed demographic and socioeconomic information of SEED OK participants, including financial knowledge. Finally, the quarterly account data provide accurate information (such as account holding status, account balance, deposits and withdrawals) of participant-owned accounts opened for SEED OK children (Nam et al. 2011; Zager et al. 2010).

Of the 2,704 study participants, 2,651 are included in the final analysis sample. First, SEED OK participants who did not live in Oklahoma at the time of the baseline survey ($n=22$) are excluded because non-residents in the control group may be less likely to open a participant-owned account given the differences in tax benefits of the 529 plans between Oklahoma and their resident states. The final sample also excludes participants who are not mothers of SEED OK children, such as fathers, grandparents, and siblings ($n=6$). This way, SEED OK children included in the analysis sample all have their mothers as study participants, and the characteristics of study participants are consistently measured. In addition, one case is removed because the SEED OK child died during the observation period. Finally, the study excludes 24 cases with missing values on several control variables used in the analytical models. We discuss these measures below.

Measures

Dependent variable

The dependent variable, participant-owned account holding status is created using data from the quarterly account data. This variable indicates whether a participant-owned account was held by SEED OK participants as of September 30, 2010. The value of "1" is assigned to those with a participant-owned account on September 30, 2010 and "0" to others.

Independent variables

The main independent variables are an indicator of SEED OK treatment status and a measure of financial knowledge. Participants in the treatment group are coded as "1" and those in the control group are coded as "0" for the treatment indicator. The indicator of treatment status, therefore, shows the institutional setting specific to each group to save for their children's college education.

Financial knowledge is assessed using the information collected in the baseline survey with three questions drawn from the 2004 Health and Retirement Survey (Lusardi and Mitchell 2006). These three questions, listed below, evaluate a participant's ability to understand basic financial concepts, including compound interest, inflation, and risk diversification:

- *“Suppose you had \$100 in a savings account and the interest rate was 2% per year. After five years, how much do you think you would have in the account if you left the money to grow: more than \$102, exactly \$102, less than \$102?”*
- *“Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?”*
- *“Do you think that the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund.”*

We create a dichotomous measure of financial knowledge based on participants' responses to these three questions. Those with correct responses on all three questions are considered to have a high level of financial knowledge and are assigned the value of “1”; others are assigned the value of “0”.

Control variables

The study has four groups of control variables. First, children's characteristics include age (measured in months), gender (1=male; 0=female), and race. Created from the birth record, child's race has five categories: non-Hispanic white, non-Hispanic black, non-Hispanic American Indian, non-Hispanic Asian, and Hispanic. The second group of control variables is study participants' characteristics, including age, education, marital status (1=married; 0=not married), and employment status (1=employed; 0=unemployed). Educational attainment is categorized into four levels: below high school, high school, some college, and four-year college or above. As mentioned above, all of these characteristics are collected from mothers of SEED OK children.

We also include several measures of household socioeconomic background in analyses, such as household size, number of children, homeownership (1=homeowners; 0=otherwise), welfare participation (1=yes; 0=no), and household income-to-needs ratio. Household size is top-coded at “7” since only a small proportion of households have household size greater than seven. The number of children is categorized into households with one child, two children, three or more children, or a missing value, because nearly 40 participants do not report this information in the baseline survey. Regarding welfare participation, we assign the value of “1” to participants whose households received income from TANF, Food Stamps, SSI, or SSDI in the previous 12 months and the value of “0” to other participants. Household income-to-needs ratio is created based on the 2007 US-Federal Poverty Guidelines. In order to address the missing values (n=105), the sample is categorized into four groups according to the value of household income-to-needs ratio: below two, between two and four, above four, and missing values. Finally, the study includes a group of control variables indicating household asset-holding status, such as checking or savings accounts (0=no; 1=yes), CDs, treasury bills, or corporate bonds (0=no; 1=yes; 2=missing values), savings bonds (0=no; 1=yes; 2=missing values), retirement accounts (0=no; 1=yes; 2=missing values), and other stocks or mutual funds (0=no; 1=yes; 2=missing values).

Analyses

After descriptive analyses, we run two logit models since the dependent variable of participant-owned account holding is dichotomous. The first model regresses the dependent variable on two independent variables—financial knowledge and treatment status—and all the control variables. This model tests the first two questions of this study: the impacts of financial knowledge and the SEED OK intervention on one’s chance of holding a 529 account for the child’s future. In this model, the regression coefficient of financial knowledge indicates whether a higher level of financial knowledge increases the likelihood of account holding for SEED OK children regardless of treatment status.

In order to test the interactive effects of financial knowledge and SEED OK intervention (the third question), the second model categorizes the sample into four groups: control group members with low-level financial knowledge, control group members with high-level financial knowledge, treatment group members with low-level financial knowledge, and treatment group members with high-level financial knowledge. The model can be expressed as follows:

$$Y_i = \beta_0 + \beta_1*(T_0F_h)_i + \beta_2*(T_1F_l)_i + \beta_3*(T_1F_h)_i + \beta_4 *X_i + \epsilon_i \quad (1)$$

where Y_i indicates log-odd of holding a POA for participant i ; T_0F_h denotes whether participant i belongs to the control group with high-level financial knowledge; T_1F_l denotes whether participant i belongs to the treatment group with low-level financial knowledge; T_1F_h denotes whether participant i belongs to the treatment group with high-level financial knowledge; X_i is a vector of control variables; and ϵ_i indicates random error.

In equation 1, the parameters of interest are β_1 , β_2 , and β_3 , which indicate differences in probabilities of holding a participant-owned account by treatment status and participants’ level of financial knowledge. The coefficient of control group with high-level financial knowledge (β_1) indicates how this group’s chance of 529 account holding is different from that of the control group with low-level financial knowledge (the reference group). Similarly, the other two coefficients (β_2 and β_3) assess differences in likelihood of 529 account holding between the reference group and the treatment group with low-level financial knowledge and between the reference and the treatment group with high-level financial knowledge, respectively. This study uses a Wald test to investigate whether the difference between β_2 and β_3 (difference caused by distinct levels of financial knowledge within the treatment group) and the difference between β_1 and β_3 (difference generated by the SEED OK intervention among participants with a high level of financial knowledge) are statistically significant.

Supplementary analyses are conducted to test the robustness of our findings. First, two alternative measures of financial knowledge are created using the same survey questions listed above. One measure sets the threshold of high-level financial knowledge at two rather than three correct responses. Following Lusardi and Mitchell (2006), this study also uses a continuous measure: the number of correct answers from the three questions. Second, we add additional control variables of financial prudence and financial education experiences in analyses since these measures may be highly related to financial knowledge. Financial prudence is an aggregative measure from three financial management questions, including setting financial goals, sticking to a financial plan, and tracking spending. Financial education experiences measure whether participants have training on different financial strategies, such as budgeting, banking, credit and loans, and investment. Most of

these tests produce substantively identical results to those reported in the main analyses. All analyses in the study are weighted to take into consideration the oversampling of minority groups and potential response biases (Marks, Rhodes, and Scheffler 2008).

Results

Sample characteristics

Table 2 reports characteristics of the study sample. Less than one-sixth of participants (14%) has a high level of financial knowledge, or answers all three financial knowledge questions correctly. The majority of SEED OK children are non-Hispanic white (65%). On average, SEED OK participants are in their twenties. About 40% of participants have at least some college experience, and nearly two-thirds are married. Given the young age of SEED OK children at the time of the baseline survey, it is not surprising that less than half of the participating mothers (46%) are employed at the time of the baseline survey. The mean household size is four, and two-thirds of households have fewer than two children. Slightly less than half of the participants own their homes, and four out of every ten households received some public assistance in the previous 12 months. More than half of households (66%) have income-to-needs ratio smaller than two. Treatment and control groups are comparable on these observed demographic and household characteristics (Table 2, columns 2 and 3).

Participant-owned account holding by treatment status and financial knowledge

Table 3 reports the percentage of participants who hold a participant-owned account for SEED OK children by treatment status and financial knowledge. As of September 30, 2010, about nine percent of participants in the sample held a participant-owned account. While only one percent of control group participants had an account, the account-holding rate for the treatment group is 17%. The difference in the outcome measure between the two groups is statistically significant, indicating that the CDA intervention has substantial impact on participants' decision to open and hold a 529 account. Table 3 also indicates the impact of financial knowledge on the 529 account-holding rate: the probability of holding an account for participants with a low level of financial knowledge is 6.2%, almost 17 percentage points lower than for those with a high level of financial knowledge. This comparison suggests that individual financial knowledge may be an important determinant of one's decision to hold a 529 account.

To examine the interaction of the SEED OK intervention and financial knowledge, we further categorize participants into four groups depending on their treatment status and the level of financial knowledge. For the control group, those with a high level of financial knowledge have an account-holding rate (3.4%) about seven times that of those with a low level of financial knowledge (0.5%). The ratio, however, is reduced to less than four in the treatment group (45.0% and 11.9%).

Table 2. Demographic and Socioeconomic Characteristics of the Sample (weighted, N=2,651)

Variables	Percentage or Mean		
	Full Sample	Treatment Group	Control Group
<i>Independent Variables</i>			
Treatment status (treatment group)	49.95		
Financial knowledge (high-level)	14.36	14.98	14.75
Count measure of financial knowledge (number of correct answers)			
0	18.22	18.29	18.14
1	42.79	44.83	40.74
2	24.63	22.91	26.36
3	14.36	13.98	14.75
<i>Control Variables</i>			
Child's Characteristics			
Age as of September 2010 (mean, by month)	39.75	39.76	39.73
Gender (male)	53.13	53.52	52.73
Race			
White	65.24	65.47	65.00
African American	8.95	8.90	8.99
American Indian	11.51	11.51	11.50
Asian	1.35	1.27	1.44
Hispanic	12.95	12.84	13.06
Mother's (Participant's) Characteristics			
Age (mean)	25.57	25.53	25.61
Education			
Below high school	22.97	23.32	22.61
High school	33.96	33.78	34.15
Some college	24.14	22.52	25.76
Four-year college or above	18.93	20.38	17.48
Marital status (married)	60.26	59.55	60.97
Employment status (employed)	45.66	44.81	46.52
Household Characteristics			
Household size (mean)	4.17	4.20	4.14
Number of children			
1	35.36	33.94	36.79
2	33.39	33.48	33.31
3 or more	29.92	30.89	28.95
Missing	1.32	1.69	0.95
Homeownership (yes)	41.92	42.02	41.81
Welfare participation (yes)	40.85	40.17	41.53
Income-to-needs ratio			
<200%	66.08	65.82	66.33
200%-400%	18.03	17.95	18.10
>400%	12.85	12.61	13.08
Missing	3.05	3.62	2.48

Household Asset Holding			
Checking/savings accounts (yes)	79.04	78.82	79.26
CDs, treasury bills, or corporate bonds			
No	92.68	92.63	92.72
Yes	5.63	5.41	5.85
Missing	1.69	1.95	1.42
Savings bonds			
No	89.74	89.96	89.52
Yes	8.72	8.23	9.21
Missing	1.54	1.81	1.27
Retirement accounts			
No	58.19	57.85	58.53
Yes	39.85	40.46	39.25
Missing	1.95	1.69	2.21
Stock or mutual funds			
No	87.74	87.62	88.07
Yes	10.47	10.10	10.84
Missing	1.69	2.28	1.09

Table 3. Participant-owned Account Holding by Treatment Status and Financial Knowledge

Variables	POA Holding (%)
Participant-owned Account Holding in the Full Sample	8.73
Treatment Status***	
Control group	0.92
Treatment group	16.52
Financial Knowledge***	
Low-level financial knowledge	6.23
High-level financial knowledge	23.63
Financial Knowledge by Treatment Status***	
Control group: low-level financial knowledge	0.50
Control group: high-level financial knowledge	3.37
Treatment group: low-level financial knowledge	11.90
Treatment group: high-level financial knowledge	44.96

*** p<.01

Results of multivariate analyses

Results of Model 1

Results from Model 1 (see the first column of Table 4) show that both treatment status and financial knowledge have statistically significant coefficients after controlling for characteristics of child, participant, and household. The results suggest that the SEED OK intervention significantly increases participants' chance of holding a participant-owned account for their children even when considering their level of financial knowledge. At the same time, findings show the positive roles of financial knowledge on participant-owned account holding among participants.

Results of Model 2

The second model examines the interactive roles of SEED OK treatment status and financial knowledge. In this model, we include three dummy variables that differentiate the control group with low-level financial knowledge (the reference group) from the other three groups: the control group with high-level financial knowledge, the treatment group with low-level financial knowledge, and the treatment group with high-level financial knowledge.

Among control group members, financial knowledge does not make a significant difference in 529 account holding. Although the coefficient of the control group with high-level financial knowledge ($\beta_1=0.91$, $p=0.25$) is positive, it is not statistically significant, suggesting that participants' chance of account holding does not differ by level of financial knowledge. In contrast, the treatment status makes a significant difference: the coefficients of the two treatment groups indicate that the likelihood of holding a participant-owned account is significantly larger than control group members with low-level financial knowledge ($\beta_2=3.55$, $p<0.01$; $\beta_3=4.39$, $p<0.01$). Even among those with high-level financial knowledge, treatment group participants are much more likely to have a participant-owned account than their counterparts in the control group ($\beta_3-\beta_1=3.48$, $p<0.01$). These findings underscore the importance of the SEED OK intervention on OK 529 plan account holding.

At the same time, financial knowledge has a significant impact within the treatment group. The difference between the coefficients of treatment group with distinct levels of financial knowledge ($\beta_3-\beta_2=0.85$, $p<0.01$) is statistically significant at the 0.01 level, indicating that treatment participants with high-level financial knowledge are more likely to hold a participant-owned account than those with low-level financial knowledge. These findings imply that financial knowledge may help individuals take advantage of financial incentives and utilize financial information provided by the SEED OK experiment.

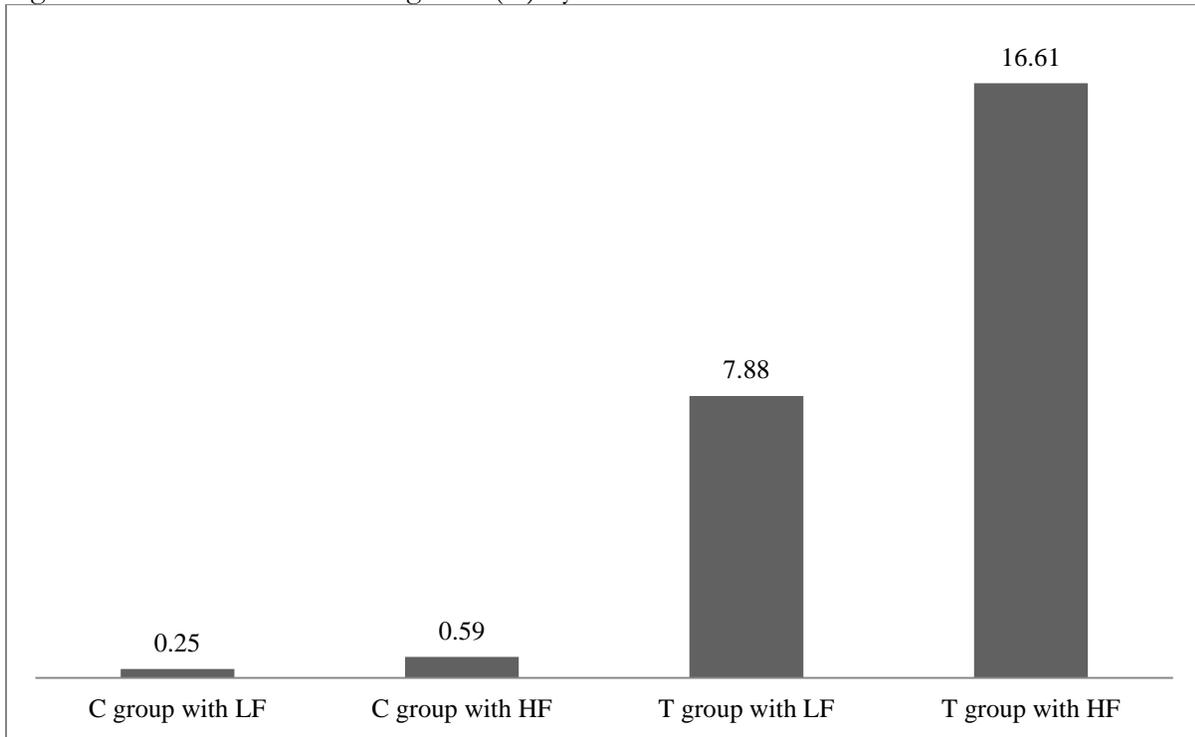
Table 4. Weighted Results of Multivariate Logit Models (N=2,651)

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Independent Variables</i>				
Treatment status (ref: control group)	3.51***	0.40		
Financial knowledge (ref: low-level)	0.85***	0.24		
Treatment status and financial knowledge				
Control group: low-level financial knowledge (ref.)				
Control group: high-level financial knowledge			0.91	0.78
Treatment group: low-level financial knowledge			3.55***	0.49
Treatment group: high-level financial knowledge			4.39***	0.52
<i>Control Variables</i>				
Child's Characteristics				
Age as of 2010	-0.05	0.04	-0.05	0.04
Gender (ref: female)	0.44**	0.21	0.44**	0.21
Race (ref: white)				
African American	-0.70*	0.38	-0.70*	0.38
American Indian	-0.48*	0.28	-0.48*	0.28
Asian	0.23	0.82	0.23	0.82
Hispanic	-0.55	0.37	-0.55	0.37
Mother's (Participant's) Characteristics				
Age	0.04	0.02	0.04	0.02
Education (ref: below high school)				
High school	0.60	0.43	0.60	0.43
Some college	1.07**	0.47	1.07**	0.47
Four-year college or above	1.60***	0.50	1.60***	0.50
Marital status (ref: unmarried)	0.03	0.32	0.03	0.32
Employment status (ref: unemployed)	0.14	0.22	0.14	0.22
Household Characteristics				
Household size	-0.52	0.22	-0.52	0.22
Number of children (ref: 1)				
2	0.43	0.32	0.43	0.32
3	1.24***	0.61	1.24***	0.61
Missing	0.56	1.29	0.56	1.29
Homeownership (ref: no)	-0.02	0.30	-0.02	0.30
Welfare participation (ref: no)	0.12	0.25	0.12	0.25
Income-to-needs ratio (ref: below 200%)				
200%-400%	0.22	0.33	0.22	0.33
Above 400%	0.66*	0.38	0.66*	0.38
Missing	-1.18	0.85	-1.18	0.85
Household Asset Holding				
Checking/savings accounts (ref: no)	0.36	0.40	0.36	0.40
CDs, treasury bills, or corporate bonds (ref: no)				
Yes	0.50	0.40	0.50	0.40
Missing	-0.64	0.90	-0.64	0.90

Savings bonds (ref: no)				
Yes	-0.33	0.35	-0.33	0.35
Missing	0.16	0.80	0.16	0.80
Retirement accounts (ref: no)				
Yes	0.34	0.30	0.34	0.30
Missing	0.38	0.86	0.38	0.86
Stock or mutual funds (ref: no)				
Yes	0.34	0.31	0.34	0.31
Missing	0.58	0.81	0.58	0.81

* $p < .1$, ** $p < .05$, *** $p < .01$

Figure 1. Predicted POA Holding Rate (%) by Treatment Status and Levels of Financial Knowledge



Note: Figure 1 reports the predicted probabilities of account holding for a typical SEED OK child. A typical case is defined as a 41-month-old White male child whose mother is 25 years old, married, unemployed, and with a high school degree; whose household has four members (including two children) with income lower than 200% of the poverty line; and whose household does not receive any public assistance, and does not own a home or any types of financial asset accounts except of a checking/savings account.

Figure 1 reports the predicted probabilities of holding a participant-owned account for a typical SEED OK child in different scenarios. Using the median values of control variables, a typical case is defined as a 41-month-old white male child whose mother is 25 years old, married, unemployed, and with a high school degree; whose household has four members (including two children) with income lower than 200% of the poverty line; and whose household does not receive any public assistance, and does not own a home or any other types of financial assets except a checking/savings account.

As reflected by the predicted probabilities for the control group, in the existing policy context, the probability of having an OK 529 plan account for a typical participant is extremely small regardless of participant level of financial knowledge (0.25% and 0.59%). The SEED OK treatment increases the predicted probabilities of account holding to 7.9% and 16.6%, respectively, for those with low and high levels of financial knowledge.

Results on control variables

Models 1 and 2 have the same results on control variables. Five control variables are statistically associated with the outcome measure. First, male children are statistically more likely to have a participant-owned account held for them than female children (Odds ratio=1.6); although it is not clear why. Second, compared to non-Hispanic white infants, non-Hispanic African American and non-Hispanic American Indian infants are less likely to be beneficiaries of participant-owned accounts. Third, there is a positive association between mothers' college education and the probability of holding a participant-owned account. In addition, households with three or more children and those with an income-to-needs ratio greater than four are more likely to hold an account for their children.

Robustness tests

The robustness tests (described in the Methods section) have almost identical results to those reported above. One exception is that, when a high level of financial knowledge is defined by two instead of three correct responses among the three survey questions, financial knowledge loses its statistical significance at the 0.1 level in Model 1.

Discussion

This study examines the effect of financial knowledge on OK 529 plan account holding in the two institutional settings created by the SEED OK experiment. From the perspective of financial capability, the study hypothesizes that financial knowledge increases the probability of holding a participant-owned account for children. The second hypothesis is that the SEED OK experiment increases the account-holding rate as well, because participants in the treatment group benefit from additional financial incentives to access the OK 529 plan. Furthermore, the concept of financial capability suggests that the CDA intervention and financial knowledge may contribute in an interactive way to participants' decision to hold a participant-owned account.

Hypothesis of financial knowledge

The hypothesis of financial knowledge is supported by the first logit model. When controlling for treatment status and other socioeconomic characteristics, participants with a high level of financial knowledge are more likely to hold a participant-owned account. For instance, in the treatment group, the predicted probability of holding a 529 account is 16.6% for a typical participant with a high level of financial knowledge and 7.9% for one with a low level of financial knowledge (see Figure 1).

The finding regarding financial knowledge is consistent with the literature on financial literacy. Existing studies of the effects of financial literacy show that financial knowledge is positively correlated with financial well-being, such as retirement planning and savings, pension contributions,

and overall wealth (Behrman et al. 2010; Lusardi and Mitchell 2011). Individuals with high-level financial knowledge are expected to have “good financial behavior” (Hung, Parker, and Yoong 2009) and appropriate financial decision making and planning (Remund 2010). This study adds to the literature by focusing on financial behavior related to college savings. Since long-term financial planning for child’s college is considered desirable financial behavior, a positive association between financial knowledge and 529 account holding is expected.

The positive association between financial knowledge and 529 account holding is also consistent with the finding from a study of the Maine 529 plan (Huang et al. 2011), which shows that financially sophisticated parents are more likely to open 529 accounts for their children. The Maine study, however, does not have a direct measure of financial knowledge, and uses stock/bond ownership as a proxy for financial sophistication. The current study shows that the measure of stock ownership is not statistically significant when a direct measure of financial knowledge is present.

Hypothesis of policy experiment

Results also suggest that the SEED OK experiment increases participant-owned account holding among treatment participants. As of September 30, 2010, the participant-owned account holding rate was 17% in the treatment group, but only 1% in the control group. While it is still far from achieving the goal of universal enrollment even in the treatment group, the difference in account-holding rates between the two groups is considered substantial. For comparison purposes, the Maine 529 program enrollment rate was 10% for one-year-old children in 2009 when a \$500 financial incentive was offered to every newborn in the state (Huang et al. 2011).

Results from Model 1 also imply that the SEED OK experiment has even more influence on the outcome measure than financial knowledge. After controlling for treatment status and other demographic variables, an improvement in financial knowledge from low- to high-level increases the odds of account holding by 2.3 times for participants in the control group. However, regardless of the level of financial knowledge, being in the treatment group raises the odds 33.5 times on average.

This is not to say that financial knowledge is not important for participants to make sound financial decisions and to achieve their financial well-being. As discussed above, the variable of financial knowledge in Model 1 is a significant predictor of account holding. Depending on policy design, program purpose, and other factors, it is not always clear whether a policy feature or financial knowledge has greater influence on financial decisions of an individual in a specific context. It is not unimaginable that a policy, when poorly designed, may create barriers to financial services and lead to undesirable financial behavior. As a key proposition of the concept of financial capability, both institutional setting and individual knowledge are likely to be important for achieving financial well-being.

Several components of the SEED OK experiment may contribute to the higher account-holding rate of participant-owned accounts in the treatment group. The \$100 time-limited account-opening incentive for the treatment group is likely to motivate participants to open a participant-owned account. For income-eligible participants, it is also necessary to hold a participant-owned account in order to receive match funds for individual savings. The financial incentive (\$1,000) in state-owned accounts, together with the program information package sent by Treasurer’s Office, may also increase the awareness of the OK 529 plan among participants, and therefore facilitate account

opening and holding. Other policy innovations (e.g., the Alford program in Maine) also report a positive association between financial incentives and 529 account holding (Huang et al. 2011)

Interactive effects of policy experiment and financial knowledge

A discussion of the importance of financial knowledge in account holding would be incomplete without exploring the interactive effects between financial knowledge and policy features created by SEED OK. As the results above suggest, individual knowledge and policy features cannot and should not be considered entirely separate.

Model 2 reports associations between financial knowledge and account holding in the treatment and control groups. As shown by the significance test, levels of financial knowledge do not differentiate participants in the control group regarding their status of holding a participant-owned account. Instead, high-level financial knowledge significantly increases the probability of 529 account holding in the treatment group. It seems that high-level financial knowledge motivates treatment participants to respond to the policy incentives more actively by opening and holding a participant-owned account.

This supports the third proposition that the association between financial knowledge and college saving behavior is partially defined by institutional features. This is not unexpected in SEED OK. The effectiveness of the SEED OK experiment may rely on participants' understanding and perception of financial incentives and other features. Such understanding and perception is largely related to financial knowledge. From the perspective of financial capability, financial knowledge and features of the SEED OK experiment work interactively to shape a participant's financial decisions. On one hand, financial knowledge helps participants explore and understand institutional features, and on the other hand, different institutional features create opportunities for participants to apply their financial knowledge.

Direction of interactive effects

Overall, results of Model 2 support the hypothesis of an interactive relationship between an individual's financial knowledge and institutional features in the SEED OK experiment. The strength of the association between financial knowledge and 529 account holding differs by treatment status. Participants with high-level financial knowledge are more likely to take up the opportunity to open participant-owned accounts.

This finding seems to reflect a general direction of the interactive effects: the more incentives the institutional features provide, the greater the impact of financial knowledge on financial well-being. However, this is not always true because the direction of interactive effects can be shaped by specific policy design and features. For instance, the direction of interactive effects might change if a program provides information or choices easy enough for an individual with low-level financial knowledge to understand, or if a desirable financial decision does not rely on an individual's financial knowledge.

Although not an outcome measure of this study, state-owned accounts in the SEED OK experiment are a perfect way to examine the direction of interactive effects. With automatic account opening, almost everyone in the treatment group (except one case) holds a state-owned account for their

child. Compared to the holding rate of participant-owned accounts, the state-owned account option achieves the goal of universal accounts for children. If Model 1 were tested on the outcome measure of state-owned accounts rather than participant-owned accounts, it is obvious that treatment status explains all variance on account holding; financial knowledge would not have significant effect on the outcome measure even in the treatment group. The impact of individual financial knowledge on holding a state-owned account becomes negligible. In summary, the direction of interactive effects is defined by the institutional features in SEED OK. When additional financial incentives are added to participant-owned accounts, a higher level of financial knowledge leads to a greater account-holding rate. When automatic opening is provided for state-owned accounts, individual's financial knowledge does not matter.

Policy implications

The findings of this study have several policy implications. First, in a fixed policy context, people with high-level financial knowledge are more likely to make sound financial decisions and have desirable financial behavior than those with low-level financial knowledge. In SEED OK, financial knowledge is positively related to participant-owned account holding in the treatment group. As is widely suggested by the literature on financial literacy, appropriate financial education and training should be provided for individuals to improve their financial knowledge, especially in disadvantaged populations. Existing research shows some evidence of effectiveness of financial education (Grimes, Rogers, and Smith 2010; Walstad, Rebeck, and MacDonald 2010). In the future, it is important to study the effectiveness of financial education curricula and teaching methods. Such research should be conducted with different populations, especially with disadvantaged groups.

However, results also suggest that financial education and training alone will not be sufficient to expand financial capability. What is equally important, if not more, is to create a supportive institutional setting. The policy setting affects the association between financial knowledge and participant-owned account holding status in SEED OK. Similarly, as discussed in Lusardi and Mitchell (2011), financial literacy becomes increasingly important as defined-benefit pension plans are transitioning to defined-contribution plans, requiring individuals to make more financial choices on their own. That is, the importance of financial literacy becomes magnified in the context of the transition of pension policies.

A supportive policy environment can expand financial capability. Findings from the field of behavioral economics can be particularly useful in this regard (e.g., Thaler and Sunstein 2008). In addition, several studies (e.g., Sherraden, Schreiner, and Beverly 2003; Sherraden forthcoming) provide general guidelines from an institutional perspective to shape individual financial actions. Because there is no single financial services strategy applicable in all situations and for all target populations, different policy innovations should be encouraged and tested in the future to achieve a supportive policy environment. In SEED OK, for example, additional financial incentives that result in significant increases in participant-owned account holding will not by themselves achieve universal enrollment. As the current study demonstrates, automatically-opened state-owned accounts, a different policy feature, have a nearly 100% participation rate in the treatment group.

Limitations

This study has several limitations. First, the measure of financial knowledge is limited. In existing research, financial knowledge is normally indicated by eight items on average that cover multiple content areas (Huston 2010). Our measure is based on three survey questions, and therefore may be less reliable. In addition, these three questions do not cover all four content areas in the definition of financial knowledge (Huston, 2010), and may not precisely reflect actual financial knowledge and skills (Kempson and Atkinson 2009). Second, this study examines the outcome measure of participant-owned account holding only. Other outcome measures, such as savings and total assets accumulated in accounts should also be studied in the future. Third, the sample is limited to young children born in Oklahoma. Although it is a racially and ethnically diverse sample, findings may not be generalizable to infants in other states or to the United States as a whole.

Conclusion

This study examines the effect of financial knowledge on 529 account holding in the SEED OK experiment. The findings support the propositions of financial capability. Financial knowledge is found to increase the participant-owned account-holding rate in the treatment group, but not in the control group. This indicates that the association between financial knowledge and financial decision making varies depending on the policy context. In SEED OK, the policy experiment seems to have greater impacts on the participant-owned account-holding rate than financial knowledge of an individual. From a public policy perspective, both effective financial education and supportive institutional features should be considered to expand financial capability.

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