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# Program Knowledge and Savings Outcomes in a Child Development Account Experiment

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# Program Knowledge and Savings Outcomes in a Child Development Account Experiment

## *Abstract*

*This study investigates whether participants' program knowledge is associated with savings outcomes in Child Development Accounts and whether differences in program knowledge explain racial and ethnic disparities in savings outcomes. Analyses of data collected from treatment participants in the SEED for Oklahoma Kids (SEED OK) experiment (N = 1,139) indicate that knowledge of SEED OK program features is low: on average, participants are aware of 1.24 of three features, and averages are lower among Blacks and Hispanics. Logit and Tobit regressions show that program knowledge is positively related to likelihood of holding a SEED OK participant-owned account and to individual savings amounts. Program knowledge is estimated to contribute to racial disparities in savings outcomes: if Whites and minorities had the same levels of program knowledge, gaps in savings outcomes would significantly decline. These findings challenge the assumption, based in neoclassical economics, that individuals participate in savings programs if benefits from incentives outweigh costs of participation. Findings call for the development of policy designs and communication tools to enhance knowledge of program features among participants, especially members of racial and ethnic minorities.*

**Keywords:** *Child Development Accounts, survey, evaluation, racial and ethnic differences, knowledge level, incentives*

In recent decades, interest in college savings has dramatically increased among policymakers and the general public in the United States. Widening earnings gaps between college-educated adults and high school graduates show that college education plays a critical role in individuals' success in the current economy (Baum, Ma, & Payea, 2010; Danziger & Gottschalk, 1995), yet the cost of college has skyrocketed, rising twice as fast as the general inflation rate (FinAid, 2014). Education ranks third, following retirement and emergencies, in most frequently mentioned motivations for saving (Bucks, Kennickell, Mach, & Moore, 2009).

In this context, federal and state governments have implemented various savings programs to improve children's futures. Important examples of these efforts can be found in 529 college savings plans and the associated tax benefits (Clancy, Cramer, & Parrish, 2005). In addition, new initiatives are testing progressive and universal Child Development Accounts (CDAs), which are savings or investment accounts opened for lifelong development and, often, for postsecondary education. Proponents of CDAs suggest that savings programs for children's future may improve families' efforts to save for specific purposes and generate positive outcomes for the families as well as children. For example, such programs may improve financial management skills, hope for children's future, and children's developmental outcomes (Beverly, Elliott, & Sherraden, 2013; Huang, Sherraden, Kim, & Clancy, 2014; Nam, Kim, Clancy, Zager, & Sherraden, 2013).

Over the same period, policymakers and social researchers in the United States have observed widening racial and ethnic disparities in wealth, recognizing the impacts of those disparities on children's educational attainment. The median wealth gap between Whites and Blacks, measured as

the ratio of median wealth held by Whites to that held by Blacks, increased between 1995 (7:1) and 2009 (19:1). The gap between Whites and Hispanics rose over the same period: 7:1 in 1995 and 15:1 in 2009 (Taylor, Kochhar, Fry, Velasco, & Motel, 2011). In estimates from analyses that control for many other factors, parents' wealth is consistently associated with children's formal educational attainment (Conley, 2001; Nam & Huang, 2009; Zhan & Sherraden, 2003). Accordingly, reducing racial and ethnic disparities in wealth and savings may be a way to decrease education gaps between Whites and minority groups. No existing savings policies or programs directly address racial and ethnic disparities in the United States, although a few recent policies target low-income households (Nam, Ratcliffe, & McKernan, 2008; Schreiner & Sherraden, 2007; Sherraden, 2001; Tufano & Schneider, 2010).

Despite heightened awareness of the need for college savings and an increasing number of savings policies and programs, substantial proportions of families do not take advantage of economic incentives offered by CDAs and other tax-based approaches to saving for education. Rates of participation are especially low in savings programs that require individual action (e.g., opt-in programs, which oblige eligible individuals to open and to make deposits into an account). In 2001, only 3% of households with children held a 529 college savings plan or other education savings account with tax benefits (Dynarski, 2004). In a 2008 pilot for Maine's Harold Alfond College Challenge program, the families of infants born in two Maine hospitals received hands-on outreach and enrollment assistance, but the enrollment rate was only 53%. When offered statewide in 2009–2013, the program was unable to sustain intensive outreach efforts, and it enrolled about 40% of eligible children. Recognizing the limitations of requiring parents to opt into enrollment for their child, the College Challenge has worked with state officials to launch statewide automatic deposits in 2014. Each newborn Maine resident newborn will receive a \$500 postsecondary education grant, which will be deposited automatically into the College Challenge's 529 college savings plan account (Clancy & Lassar, 2010; Clancy & Sherraden, 2014). Michigan SEED, a community-based CDA program, also employed active recruitment efforts through mail, phone calls, and in-person visits. Like the pilot in Maine, Michigan SEED required adults to opt in by opening an account for the child beneficiary, and 62% of the treatment group held such an account by the time of a follow-up survey conducted at the end of the 4-year program. On average, the accounts held \$220 in savings at that point (excluding savings incentives from the program; Marks, Rhodes, Engelhardt, Scheffler, & Wallace, 2009). Findings from Michigan SEED also indicate that savings outcomes among members of racial minorities are worse than those among their White counterparts: Savings and total asset amounts (savings plus incentives from the program) are significantly lower for Blacks than for their White counterparts with comparable characteristics (Marks et al., 2009).

The low account-holding rates and small savings amounts typical in opt-in savings programs are not limited to programs that focus on saving for children's future. Evidence indicates that enrollment and contribution rates are also low in retirement savings programs, although such programs often match individual savings with contributions from employers: 30% of eligible workers do not participate in employment-based retirement savings programs (Bureau of Labor Statistics, 2009); 20% to 72% surrender retirement benefits by contributing less than the match threshold in their 401(k) account (Choi, Laibson, & Madrian, 2011). In an H&R Block experiment offering savings matches for contributions to individual retirement accounts, the highest take-up rate is 14% among the treatment group offered a 50% match rate (Duflo, Gale, Liebman, Orszag, & Saez, 2006).

Account-holding rates are higher in opt-out retirement programs than in ones that require participants to opt in. That is, the rate is higher if programs automatically open accounts for eligible individuals and allow them to close the accounts than if individuals must act to open their own accounts. The impacts of automatic account opening are especially large among Blacks, Hispanics, and members of disadvantaged groups (e.g., low-wage workers). However, savings amounts are estimated to be lower in opt-out programs than in opt-in ones (Choi, Laibson, & Madrian, 2004; Madrian & Shea, 2001). In sum, considerable proportions of eligible individuals do not participate in savings programs if they are required to take purposeful action (opt-in programs), and a only small percentage save at the optimal point (i.e., an amount equal to the maximum eligible for a match).

These findings challenge an assumption of neoclassical economic theory: that rational individuals make decisions and act in accordance with their calculation of costs and benefits; they are expected to take advantage of generous incentives in savings programs if the cost of doing so (e.g., opening an account) is smaller than the benefit (Beverly et al., 2008; Stone, 2012; Weintraub, 1993). If the assumption is problematic, what explains the low rates of participation in retirement and other savings programs?

Procrastination is the most commonly mentioned theoretical reason for the low levels of responsiveness to savings incentives: Target populations delay action despite awareness of the potential benefits (Choi et al., 2004, 2011). Such research assumes, however, that eligible individuals are knowledgeable about savings programs. The research does not directly examine the possibility that lack of program knowledge contributes to inaction. Accordingly, we know little about the roles of eligible individuals' program knowledge in savings outcomes. In addition, the procrastination framework does not explain why program participation rates are lower among racial and ethnic minority groups than among Whites. It is plausible that there are racial and ethnic disparities in program knowledge and that these gaps explain racial and ethnic disparities in savings outcomes.

Using data from the SEED for Oklahoma Kids (SEED OK) experiment, we examine whether and how participants' program knowledge affects eligible individuals' chances of holding a participant-owned account. In addition, we examine the relationship between such knowledge and individual savings amounts in CDAs. We also investigate racial and ethnic disparities: Does the level of program knowledge among eligible individuals differ by race and ethnicity? Do these differences explain racial and ethnic disparities in savings outcomes?

This is the first empirical study that directly examines relationships between program knowledge and savings outcomes in CDAs. Most empirical studies have focused on retirement savings programs, such as 401(k)s and individual retirement accounts (Agnew, Szykman, Utkus, & Young, 2012; Choi et al., 2004, 2005, 2011). In addition, we use data collected with measures of actual program knowledge. Except for a small number of studies (e.g., Agnew et al., 2012), most research has employed proxy measures, such as indicators of general financial knowledge, financial education, and communication concerning retirement savings programs (Choi et al., 2005; Duflo & Saez, 2003). In addition, no study has investigated the role of program knowledge in racial and ethnic disparities in savings outcomes.

## 1. Research Review

### 1.1. General financial knowledge and savings outcomes

Previous research indicates that individuals' general knowledge about financial issues is positively associated with savings outcomes in programs designed to facilitate the accumulation of assets. The chances of participating in savings programs and the amounts saved are greater among those with a high level of financial knowledge than among those with a low level of such knowledge (Choi et al., 2011; Hastings, Madrian, & Skimmyhorn, 2013). However, causality is difficult to establish because of endogeneity. On one hand, financially knowledgeable individuals tend to make optimal financial decisions; they are likely to participate in such programs and accumulate savings. On the other hand, participation in savings programs may enhance individuals' financial knowledge. Accordingly, studies based on cross-sectional observation data cannot determine whether financial knowledge promotes participation in savings programs or vice versa (Hastings et al., 2013).

The study by Huang, Nam, and Sherraden (2013) is unique in that it uses experimental data. It also employs a financial knowledge variable created with SEED OK baseline data as well as account and savings records. Since SEED OK measured financial knowledge in the baseline survey, before the intervention began, the study by Huang and colleagues is well positioned to examine how financial knowledge influences eligible individuals' participation in CDAs. It finds that financial knowledge has significant impacts only on the treatment group: Treatment participants with high levels of financial knowledge are more likely to hold a SEED OK account than are participants with low levels of such knowledge, but financial knowledge does not lead to significant differences in account holding among control-group members (Huang, Nam, et al., 2013). However, Huang, Nam, and Sherraden (2013) do not examine participants' knowledge of program rules and economic incentives.

### 1.2. Financial education and savings outcomes

Most studies on financial education investigate effects on retirement savings (not on CDAs), are based on survey data, and find that education programs have positive impacts (Bernheim & Garrett, 2003; Hastings et al., 2013; Nyce, 2005). However, these studies are subject to selection bias: Those likely to save (e.g., those with strong future orientation and those interested in building wealth) are prone to participate in financial education (Hastings et al., 2013).

In contrast, experimental studies generate more reliable evaluations because randomization limits selection bias. However, previous experiments have generated mixed findings on the effectiveness of financial education. On one hand, some empirical studies suggest that increasing information through education and media coverage has little impact. In results from an experiment that assesses the effects of exposure to information about the potential monetary benefits of increasing 401(k) contributions, Choi and colleagues (2011) find that contribution increases by treatment-group members exposed to the information are not significantly greater than increases by counterparts in the control group. Another study by Choi and colleagues (2005) finds that employee investment in employer stocks declined by only 2 percentage points after extensive media coverage of Enron and the risks of 401(k) plans that invest solely in employers' stocks.

On the other hand, several experiments (or natural experiments) generate evidence on the effectiveness of financial education and information for certain groups of employees. Financial

education increases participation rates and amounts saved in two types of retirement plans: the federal Thrift Savings Plan for military personnel (Skimmyhorn, 2012) and 401(k)s for young workers (Clark, Morrill, & Allen, 2012). Financial education may affect those directly exposed to the treatment as well as colleagues exposed through peer influence. A randomized experiment finds that inviting treatment-group members to a benefits fair and giving them a \$20 incentive to attend increases the likelihood that they will go to the fair; they are also more likely than control-group members to open a tax-deferred retirement account after attending. Interestingly, employees who work in the same department as a treatment-group member are more likely to attend the benefits fair and to enroll in the retirement savings program than are employees in departments that employ no treatment participant. These findings suggest the nature of the role played by social networks (Duflo & Saez, 2003).

Overall, research is inconclusive concerning the effect of financial education on outcomes in savings programs. Findings suggest that future inquiry should investigate what types of financial education improve financial decisions and savings outcomes, not whether financial education is generally effective. It seems likely that the content and delivery structure of financial education programs determine their effectiveness in promoting savings (Hastings et al., 2013).

### 1.3. Program knowledge and savings outcomes

As we mention, few studies include direct measures of program knowledge. Analyzing data from account records and survey responses, Agnew and colleagues (2012) use three measures to examine the effects of program knowledge on savings outcomes in 401(k) retirement accounts. The measures capture whether one is aware of match availability, match rates, and loan availability. Their analyses clearly identify positive impacts of program knowledge: The likelihood of opting into a program and the chances of choosing not to opt out are both greater among those aware that the match is available than among those who are unaware of it. Knowledge of match rates is positively associated with participation in the opt-in plan. Awareness of loan availability, however, is not associated with 401(k) plan participation (Agnew et al., 2012). Another study finds that knowledge of their employer's 401(k) plan is higher among employees who contribute enough to be eligible for the employer's match than among counterparts who do not contribute or among those who contribute less than the match threshold (Choi et al., 2011).

## 2. SEED OK Intervention

A social experiment testing a universal and progressive CDA policy, SEED OK is built on the structure of the tax-preferred Oklahoma 529 College Savings Plan (OK 529), which is operated by the state of Oklahoma and offers several tax incentives for college savings. There is no federal or state tax on OK 529 investment earnings as long as the savings are used for qualified postsecondary education expenses. Also, contributions to OK 529 can be deducted from state income taxes (up to \$10,000 a year for individuals and \$20,000 for couples filing jointly). However, there is a penalty for nonqualified withdrawals: Account owners pay federal and state income taxes as well as an additional 10% penalty *on investment earnings* (not contributions) of distributions that are not for qualified higher education expenses. In order to open an OK 529 account, a typical individual must submit an enrollment form and make a \$100 minimum initial contribution (Oklahoma 529 College Savings Plan, n.d.).

Table 1. Program Rules and Incentives: OK 529 and SEED OK

Program features	OK 529	SEED OK intervention
<b>Eligibility</b>		
Who is eligible?	Adults aged 18 or older, including SEED OK control group	SEED OK treatment group
<b>Participant-owned accounts</b>		
Was information on the program provided directly to eligible individuals?	Public information on program is available online and in various written formats	Caregivers received mailed educational materials about OK 529, SEED OK intervention, and saving for college  Children receive quarterly SEED OK account statements
What must be done to open an account?	Submit enrollment form  Initial \$100 deposit required	Submit enrollment form  No initial deposit required
What incentives are available?	Tax benefits	Tax benefits same as those for OK 529  \$100 account-opening incentive  Savings matches (if income eligible)
What must be done to receive \$100 account-opening incentive?	Incentive not available	Open participant-owned account by April 15, 2009
What must be done to receive savings matches?	Match not available	Submit one-time match-eligibility form and make own deposits into participant-owned accounts
<b>State-owned accounts</b>		
What must be done to have state-owned account and \$1,000 seed deposit?	Features not available	No action required (Study participants gave Social Security number of their children before the intervention started)

*Note:* OK 529 = Oklahoma 529 College Savings Plan; SEED OK = SEED for Oklahoma Kids.

The SEED OK intervention focuses on a randomized sample of the primary caregivers (most of whom are mothers) of infants born in Oklahoma during 2007 (additional study details below). The intervention has offered no incentive or information to members of the control group but the following incentives to treatment participants, who also are eligible for the tax benefits described (Table 1). First, the Oklahoma treasurer’s office opened a state-owned OK 529 account on behalf of each infant whose caregiver is a member of the treatment group, and the office deposited a \$1,000 savings seed in each account. The state opened the accounts automatically and without requiring action by treatment participants, who could choose to decline the account and to opt out of SEED OK (one mother opted out for religious reasons). The state could open state-owned accounts in this way because study participants (treatment or control participants) provided their infant’s Social Security numbers while completing the baseline survey. Second, SEED OK encouraged treatment participants to open their own OK 529 account (i.e., a participant-owned account), which is separate from the one opened by the state. These accounts can be opened with an initial deposit of \$100, and



SEED OK sought to eliminate a participation barrier by providing that initial sum for treatment members who opened a participant-owned account for their infant before April 15, 2009. Third, the intervention provided savings matches of up to \$250 per year for the first 4 years of the program (2008–2011) if treatment participants made deposits into their own accounts and if their federal tax return listed an adjusted gross income below \$43,999. The experiment required treatment participants to submit a one-time match-eligibility form in order to receive the matches. The form allowed the Oklahoma Tax Commission to search participants' tax records for 2008–2011 so that SEED OK could determine income eligibility for the savings match (Marks, Rhodes, & Scheffler, 2008; Nam et al., 2013).

As such, SEED OK required treatment participants to meet distinct requirements in order to access incentives. Since the treasurer's office automatically opened and funded each child beneficiary's state-owned account, treatment participants did not need to take any action of their own to receive \$1,000 seed deposit. However, SEED OK required treatment participants to meet distinct requirements in order to access other incentives. The experiment required treatment participants to open a participant-owned account (filling out and submitting an enrollment form) in order to receive the \$100 account-opening incentive. In order to receive the matching deposits into the state-owned account for the child beneficiary, treatment participants were required to submit a form, meet a means-test, and save money into the their participant-owned account.. Accordingly, treatment participants' knowledge of SEED OK program rules and incentives may influence whether they hold a participant-owned account and the amount they save there.

The experiment gave treatment participants information to improve their program knowledge throughout SEED OK's implementation. At the beginning of implementation, SEED OK mailed three documents to all treatment participants: a frequently-asked-questions brochure, a booklet entitled *Let's Get Started*, and the terms of the savings match (SEED for Oklahoma Kids, 2009a, 2009b, 2009c). These materials contained both general information on OK 529 and specific information on the SEED OK intervention.<sup>1</sup> Since the initial implementation stage, OK 529 has mailed quarterly SEED OK account statements to beneficiaries. In addition, SEED OK occasionally sends small gifts (e.g., T-shirts and storybooks) and information. These efforts encourage saving and emphasize the importance of children's education and development.

It should also be noted that SEED OK has disseminated information almost exclusively through mail. Because of SEED OK's experimental nature, communication with participants is limited: The information should go only to treatment participants, not to families in the control group or to those not participating in the SEED OK experiment. A universal CDA policy implemented statewide or nationally would send frequent messages (e.g., via public service announcements on television, radio, and the Internet) and enlist multiple messengers (e.g., public officials, teachers, social workers, and businesses). These communications would supply information about the CDA program and encourage saving (Clancy & Sherraden, 2014; Gray, Clancy, Sherraden, Wagner, & Miller-Cribbs, 2012; Nam et al., 2013).

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<sup>1</sup> Participants who indicated that Spanish is their primary language receive information in that language.

### 3. Methods

#### 3.1. Data and sample

Data for this study come from the SEED OK experiment. The experiment's sample consists of the primary caregivers of infants who were randomly selected from the birth certificates of all infants born in Oklahoma during two 3-month periods in 2007 (April–June and August–October). The experiment employs a stratified random sampling method to oversample Blacks, American Indians, and Hispanics. This enables us to examine impacts on these subpopulations.

Out of 7,328 infants selected from birth certificates, SEED OK excluded 213 ineligible cases (e.g., ineligible due to the death of the infant or mother). Among the remaining 7,115 cases, caregivers of 2,704 infants agreed to participate in the experiment and completed the baseline survey via telephone interviews conducted from fall 2007 through spring 2008 (Marks et al., 2008; Nam et al., 2013).<sup>2</sup> After participants completed the baseline survey, SEED OK randomly assigned 1,358 of them to the treatment group and 1,346 of them to the control group, offering the described financial incentives only to treatment participants (Nam et al., 2013). In the spring of 2011, 2,251 of the 2,704 study participants completed a follow-up survey (83% response rate; Schreiner, 2012).

The SEED OK data come from several sources. First, birth certificate data provide demographic information on the infant, birth mother, and birth father. These data were collected at or shortly after the infant's birth. Second, baseline and follow-up survey data come from telephone interviews with study participants. As we describe, the baseline survey took place before random assignment; the follow-up survey occurred about 4 years after implementation of the intervention. In addition to information on demographic, socioeconomic, and family characteristics, both sets of survey data contain study participants' reports on their perceptions, knowledge, and behaviors. The follow-up survey collected information on treatment participants' knowledge of SEED OK incentives and rules. Last, account and savings data come from the OK 529 manager, TIAA-CREF, and are available because of an agreement between the OK 529 board and the SEED OK research team. These data include detailed information on every OK 529 account that identifies a SEED OK child as the beneficiary. Information on accounts includes account balances as well as quarter-to-date, year-to-date, and life-to-date deposits and withdrawals. The data also indicate the account owner's relationship to the beneficiary. Collected for the first 4 years of the SEED OK intervention, the data cover the period from January 1, 2008 (the date on which SEED OK notified participants of treatment status), through December 31, 2011 (the end of the savings match incentive).

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<sup>2</sup> The baseline participation rate (38%) is comparable to those for large-scale telephone surveys: 48% for the Survey of Consumer Attitudes in 2003 (Curtin, Presser, & Singer, 2005) and 25% for Pew Research Center's national survey (Keeter, Kennedy, Dimock, Best, & Craighill, 2006). Study design in SEED OK may have impeded participation by requiring participants to provide their infant's Social Security number, which is needed to open an OK 529 account; before SEED OK randomly assigned them to the treatment or control condition, participants had a 50% chance of receiving the \$1,000 seed deposit into infants' state-owned account, and SEED OK communicated this to them. That may have sounded too good to be true (Marks et al., 2008; Nam et al., 2013). Comparisons show that study participants do not differ significantly from nonparticipants on most of the characteristics indicated in birth certificate data. Specifically, the two groups do not differ on infant's race, ethnicity, gender, and birth weight or on mother's marital status and location of residency (Nam et al., 2013).

Our analyses for this study exclude control-group participants (1,346 of the 2,704 study participants) because SEED OK incentives are not offered to them; their knowledge of SEED OK program features would not affect their savings outcomes. We also omit 214 of the 1,358 treatment participants because they did not complete the follow-up survey, which posed questions on SEED OK program knowledge. We exclude five additional cases because the caregivers interviewed for the follow-up were not the same persons identified as primary caregivers in the baseline survey. The final analytical sample consists of 1,139 adults. All but eight are mothers of SEED OK children: Two are fathers, four are grandmothers or great grandmothers, one is an aunt, and one is a legal guardian. For simplicity, we often refer to participants as mothers.

### 3.2. Measures

This study has two dependent variables: account-holding status and individual savings amount. We create them with account and savings data on SEED OK participant-owned accounts. Account-holding status is a dichotomous variable (assigned a value of 1 if a study participant held a participant-owned account for a SEED OK child as of December 31, 2011, and 0 otherwise). Individual savings amount indicates the amount deposited by a study participant into her or his participant-owned account during the observation period (January 1, 2008, to December 31, 2011). The individual savings amount does not include the value of SEED OK incentives, such as the \$1,000 seed deposit, the \$100 account-opening incentive, and savings matches. For regression analyses, we use a logarithm of individual savings. Some participants had no savings in their participant-owned account. To retain these cases for regression analyses, we assign a value of 1 to the individual savings variable for each of those cases before we convert savings figures into logarithmic forms.

The main independent variables measure treatment participants' SEED OK program knowledge. We create these variables from responses to three questions posed in the follow-up survey. The questions ask whether a treatment participant knows that (a) she could open her own OK 529 account without depositing her own money, (b) she could receive a \$100 account-opening incentive, and (c) she may have been eligible for a savings match. We create two sets of variables. For the first set, we generate three dichotomous variables, assigning a value of 1 for each affirmative response to a question and 0 otherwise. For the second set, we generate a summary variable by counting the program features known to the treatment participant. Values for this variable range from 0 to 3.

The variables for race and ethnicity are created from birth certificate data that follow the vital statistics protocol of the National Center for Health Statistics (Marks et al., 2008). We assign children to the racial or ethnic category that the birth certificate lists for their mother: White, Black, American Indian, and Hispanic (Marks et al., 2008; Mason, Nam, & Kim 2014). We categorize 26 Asian cases (e.g., Chinese or Japanese) as White, because the number of Asians is too small for separate analyses. We run supplemental analyses after excluding these Asians to test the robustness of our findings.

In addition, we generate several variables that capture the characteristics of the child, caregiver, household, and environment. We use birth certificate data to generate the variable for the child's gender (male or female) and baseline survey data to create the variables for caregiver's characteristics. Measured characteristics of the caregiver include age (categorized as 24 or younger, 25–34, and 35 or older), education (less than a high school degree, high school or general equivalency diploma, some

college, and bachelor's degree or higher), marital status (married or not), and nativity status (U.S. native or foreign born).

The variables for household characteristics are also generated from baseline data. Household size is measured with three categories (two or three members, four members, and five or more members), and the number of children is measured with four (one child, two children, three or more children, and a missing value). Household income is a continuous measure that captures total income before taxes and deductions for the 12 months prior to the baseline. To prevent a sizeable number of cases ( $n = 49$ ) from dropping out of the analyses, we create an indicator for missing income, assigning a value of 0 to the income variable for those cases. The homeownership variable is dichotomous (1 = *homeowners*; 0 = *nonowners*). To create the variable for financial asset ownership, we assign a value of 1 to households that own one or more types of the following assets: CDs, treasury bills, or corporate bonds; savings bonds; retirement accounts; other stocks or mutual funds; savings at home or with a trusted friend or family member; and other types of savings. We assign a value of 0 to all other households. We use three categories to capture the primary language spoken at home: English, Spanish, and other languages. We create an indicator to measure Internet service at home (1 = *yes*; 0 = *no*).

Finally, this study includes a survey-related variable: survey recruitment stage. The variable takes a value of 0 if SEED OK recruited the treatment participant between August and December of 2007 (Stage 1) and a value of 1 otherwise (Stage 2).

### 3.3. Statistical approach

We employ logit regressions for the dichotomous dependent variable of account-holding status and Tobit regressions for the continuous dependent variable of individual savings amount. We use Tobit regressions instead of ordinary least squares regressions because 83% of participants have no savings. Tobit regression is a statistical method for censored dependent variables (Greene, 2003). In our study, individual savings amount is censored at zero. As we describe, the distribution of individual savings is skewed, so we use the log of individual savings.

We run two models to test whether and how study participants' SEED OK program knowledge affects their savings outcomes and to assess whether racial and ethnic gaps in program knowledge explain racial and ethnic disparities in savings outcomes: The first is a simple model that does not include the program knowledge variables, and the second is a comprehensive model that includes them. The simple model is expressed as follows:

$$Y_i = \beta_{0s} + \beta_{1s} * \mathbf{R}_i + \beta_{2s} * \mathbf{X}_i + \epsilon_{is}, \quad (1)$$

where  $Y_i$  indicates the dependent variable (log-odds of holding a participant-owned account or log savings amount) for treatment participant  $i$ ,  $\mathbf{R}_i$  denotes a vector of the dummy variables for the race and ethnicity of SEED OK child  $i$ ,  $\mathbf{X}_i$  is a vector of control variables, and  $\epsilon_i$  indicates a random error.

The second (i.e., comprehensive) model, which includes program knowledge variables as well as the variables from the simple model, can be expressed as follows:

$$Y_i = \beta_{0c} + \beta_{1c} * \mathbf{R}_i + \beta_{2c} * \mathbf{X}_i + \beta_{3c} * \mathbf{K}_i + \epsilon_{ic}. \quad (2)$$

In this model,  $K_i$  denotes the program knowledge of participant  $i$ .

The coefficients of program knowledge variables ( $\beta_{3c}$ ) indicate whether a treatment participant's knowledge of SEED OK affects savings outcomes. Significantly positive coefficients suggest that the savings outcome of interest (account holding or individual savings amount) is higher among those who are more knowledgeable about SEED OK.

To assess roles of program knowledge in racial disparities in savings outcomes, we compare the simple model's coefficients for race and ethnicity with those from the comprehensive model. If racial and ethnic differences in program knowledge result in lower account-holding rates and individual savings among minority groups, the coefficients from the comprehensive model's race and ethnicity dummy variables should be significantly smaller than those from the simple model ( $\beta_{1c} < \beta_{1s}$ ). We run adjusted Wald tests to determine whether the coefficient sizes between the two models are significantly different from each other.

In every analysis, we use weighted data to adjust for nonresponse, attrition, and the oversampling of minority groups (Marks et al., 2008; Schreiner, 2012). Weighting is a commonly used postsurvey adjustment (Groves, 2006).

We also run supplemental analyses to check the robustness of our findings. Three sets of analyses test robustness with slightly different compositions of the analytical sample. The first composition only includes mothers of SEED OK children (i.e., excludes caregivers, such as grandparents, who are not mothers). The second only includes Oklahoma residents and excludes caregivers who moved out of Oklahoma after the SEED OK child's birth. The third set excludes Asians, so that the White category only includes Whites. In addition, we run one set of regressions with a different household income variable: the log average income of the baseline and follow-up surveys (the main model instead uses a baseline income variable). With a few exceptions, results from the supplementary analyses are substantively identical to those described in this paper. The Results section below discusses supplemental results that differ from those in the main model. (Full results from supplementary analyses are available from authors.)

## 4. Results

### 4.1. Sample characteristics by race and ethnicity

Table 2 reports the characteristics of children, mothers, and households by race and ethnicity. As we expected, Whites have socioeconomic advantages over their minority counterparts: Among White mothers, rates of marriage, postsecondary degree completion, homeownership, ownership of financial assets, and home access to the Internet are all higher, as is household income. Among the three minority groups, American Indians fare best on measured economic indicators: Their average household income, rate of homeownership, and rate of asset ownership are higher.

Table 2. Sample Characteristics by Race and Ethnicity

Characteristic	Whites	Blacks	American Indians	Hispanics	Total
Child's characteristics					
Male (%)	46.52	49.80	41.37	48.53	46.49
Mother's characteristics					
Age (%) <sup>+</sup>					
24 or younger	40.34	49.91	51.60	45.90	43.20
25–34	51.40	42.14	40.87	45.77	48.63
35 or older	8.27	7.95	7.53	8.33	8.16
Education (%)**					
Less than high school diploma	14.54	21.47	26.83	48.32	20.97
High school diploma	31.40	39.12	35.45	31.69	32.59
Some college	27.10	27.58	26.43	12.99	25.23
Bachelor's degree or more	26.95	11.83	11.28	7.00	21.21
Married (%)**	69.40	23.75	56.94	57.44	63.32
Native born (%)**	97.46	95.82	99.62	45.01	90.71
Household characteristics					
Household size (%)**					
2–3 people	31.44	45.38	29.18	21.96	31.19
4 people	35.42	30.67	30.95	33.50	34.23
5 or more people	33.15	23.96	39.88	44.53	34.57
No. of children (%)**					
1	32.35	31.66	35.44	22.70	31.38
2	37.44	35.83	28.60	33.92	35.83
3 or more	29.03	30.73	34.62	39.17	31.14
Missing	1.19	1.77	1.34	4.22	1.65
Household income (mean, dollars)**	50,746	21,638	31,982	21,281	42,346
Household income missing (%)**	3.53	3.80	3.22	10.25	4.40
Homeownership (%)**	51.50	18.37	35.18	28.63	43.69
Financial asset ownership (%)**	61.20	45.07	46.62	32.73	54.38
Internet service at home (%)**	71.04	40.38	42.89	32.99	60.12
Language at home (%)**					
English	98.87	98.08	98.53	41.16	91.23
Spanish	1.13	1.28	1.47	45.56	6.98
Other	0.00	0.64	0.00	13.28	1.79
Recruited at Stage 2 (%)	52.25	53.93	43.89	49.34	51.07
Weighted percentage (%)	49.08	16.59	18.79	15.54	100.00
Unweighted sample size	559	189	214	177	1,139

Note: M = mean. In statistical tests of group differences, we use Pearson's  $\chi^2$  for categorical variables and adjusted Wald tests for continuous variables.

+  $p < .10$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

#### 4.2. Racial and ethnic differences in program knowledge and savings outcomes

Table 3 presents program knowledge and savings outcomes by race and ethnicity. As the last column of Table 3 shows, study participants demonstrate a less than full awareness of SEED OK features. Only 49% report that they are aware of the \$100 account-opening incentive. Smaller percentages are aware that they can open an OK 529 participant-owned account without making a deposit (40%)

and that savings matches are available for those who are eligible (35%). On average, participants understand 1.24 program features.

Table 3 also shows disparities in program knowledge. Overall, knowledge of SEED OK program features is highest among Whites: 47% know that no deposit is required, 53% are aware of the \$100 account-opening incentive, and 39% know about match availability. These results are 5 to 15 percentage points higher than those for American Indians, the group with the next-highest levels of knowledge. Results from the summary knowledge variable also show low levels of program knowledge among treatment participants, especially among the minority participants. Almost 40% of Whites lack awareness of any of the three program features, and rates are similar or higher for most minorities. Although Whites are the most knowledgeable group, less than one third are aware of all three program features; 19% of Blacks, 22% of American Indians, and 11% of Hispanics are aware of all three. Thus, average awareness of program features is also low: 1.39 features among Whites, 1.09 among American Indians, 0.93 among Blacks, and 0.79 among Hispanics.

In addition, the table reports on savings outcomes. The last column shows that 17% of the sample opened a participant-owned OK 529 account during the first 4 years of the SEED OK intervention, and the average savings is \$125. Savings outcomes differ by race and ethnicity. The best savings outcomes are found among Whites, who have the highest account-holding rate (21%) and average savings amount (about \$170).

Table 3. Program Knowledge and Savings Outcome by Race and Hispanic Origin

Characteristic	Whites	Blacks	American Indians	Hispanics	Total
Awareness of SEED OK incentives					
Aware that no deposit required (%)**	46.52	29.13	31.91	20.14	39.85
Aware of \$100 account-opening incentive (%)**	53.11	37.39	43.14	38.57	48.67
Aware of availability of match (%)**	39.14	26.27	33.85	20.74	34.98
Summary: awareness of program features (%)**					
0 feature	39.09	56.69	50.42	57.86	44.41
1 feature	12.48	12.48	12.22	16.20	12.94
2 features	19.01	12.18	15.40	14.55	17.40
3 features	29.42	18.65	21.96	11.39	25.25
Summary: awareness of program features (mean)**	1.39	0.93	1.09	0.79	1.24
Savings outcomes					
Accounting holding (%)**	21.29	11.47	9.44	5.94	17.06
Savings amount (mean, dollars)**	169	15	79	16	125
Unweighted sample size	559	189	214	177	1,139

Note: In statistical tests of group differences, we use Pearson's  $\chi^2$  for categorical variables and adjusted Wald tests for continuous variables.

+  $p < .10$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

Table 4. *Level of Awareness and Savings Outcomes*

Element	Account holding (%)	Savings amount (mean in dollars)
Aware that no deposit required		
No	10.73**	120
Yes	26.62	132
Aware of \$100 account-opening incentive		
No	5.09 **	69*
Yes	29.69	184
Aware of availability of match		
No	7.01**	60**
Yes	35.74	246
Summary of awareness: no. of program features		
0-1	6.01**	63*
2-3	31.91	208

+  $p < .10$ .\*  $p < .05$ .\*\*  $p < .01$ 

### 4.3. Program knowledge and savings outcomes

Table 4 shows that savings outcomes are better among treatment participants who are knowledgeable about SEED OK features. The account-holding rate is 11% among those unaware that no deposit was required to open a participant-owned account and 27% among those aware of this program rule. The difference in account-holding rates between the two groups is statistically significant. On average, the two groups save \$120 and \$132, respectively, but the difference is not significant. Differences are more salient in the results on awareness of the \$100 account-opening incentive and of match availability. The rate of account holding and average savings amount are higher among those aware of the account-opening incentive than those unaware of it, and the gaps are statistically significant. The same is true of the difference between those who have and lack awareness of the savings match. The summary variable generates similar results: The account-holding rate and average savings amount are significantly higher among those aware of two or three SEED OK features than among those aware of none or one of the features; there is a 26-percentage-point gap in account holding and a \$145 difference in average savings.

### 4.4. Regression analysis results: SEED OK program knowledge and savings outcomes

Table 5 presents results from the regressions. The first three columns report results from three models of account holding, and the last three show results from models on savings amounts. Across these models, the results for most control variables are in the expected direction: Caregivers' age and education are positively associated with savings outcomes, as is access to Internet services at home. However, results for the primary language variable are somewhat unexpected: Compared with their English-speaking counterparts, those who speak Spanish or another non-English language at home are estimated to have a higher chance of holding a participant-owned account and save a larger amount.



Table 5. Regression Analysis Results: Account Holding and Savings Amount

Characteristic	Account holding			Log saving amount		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Child's characteristics						
Race						
Black	-.418 (.336)	-.172 (.348)	-.189 (.344)	-3.426 (2.112)	-2.223 (2.153)	-2.464 (2.162)
American Indian	-.519 <sup>+</sup> (.294)	-.527 <sup>+</sup> (.312)	-.460 (.311)	-1.39 (1.702)	-1.340 (1.548)	-.940 (1.683)
Hispanic	-1.378* (.701)	-1.082 (.727)	-1.100 (.708)	-5.968 <sup>+</sup> (3.484)	-4.372 (3.095)	-4.794 (3.232)
Male	-.305 (.195)	-.359 <sup>+</sup> (.199)	-.352 <sup>+</sup> (.200)	-.891 (1.124)	-.925 (1.036)	-.789 (1.08)
Caregiver's characteristics						
Age						
25–34	.137 (.262)	.157 (.265)	.188 (.267)	1.730 (1.641)	1.857 (1.469)	2.015 (1.564)
35 or older	1.038** (.350)	.962** (.366)	1.063** (.371)	6.459** (2.124)	4.896** (1.878)	6.370** (2.032)
Education						
High school diploma	.482 (.443)	.425 (.467)	.449 (.456)	5.510 <sup>+</sup> (2.885)	5.235 <sup>+</sup> (3.177)	4.976 <sup>+</sup> (2.986)
Some college	1.090* (.464)	.893 <sup>+</sup> (.503)	.930 <sup>+</sup> (.488)	7.445** (2.836)	6.108 <sup>+</sup> (3.172)	6.226* (2.956)
Bachelor's degree or more	2.018** (.514)	1.556** (.559)	1.613** (.541)	13.277** (2.963)	10.691** (3.308)	10.995** (3.077)
Married	.260 (.273)	.314 (.282)	.346 (.277)	.633 (1.732)	.919 (1.597)	.882 (1.671)
Native born	.800 (.533)	.808 (.589)	.808 (.533)	-1.266 (2.961)	-.604 (2.813)	-.703 (2.883)
Household characteristics						
Household size						
4 people	-.551 (.407)	-.543 (.440)	-.529 (.414)	-4.449* (2.179)	-3.783 <sup>+</sup> (2.081)	-3.938 <sup>+</sup> (2.020)
5 or more people	-.998 (.613)	-.963 (.645)	-.876 (.624)	-1.724 (3.128)	-1.268 (2.985)	-.985 (2.862)
No. of children						
2 children	.666 <sup>+</sup> (.395)	.715 <sup>+</sup> (.425)	.750 <sup>+</sup> (.402)	2.789 (2.154)	2.467 (2.083)	2.604 (2.017)
3 or more children	1.015 (.623)	.823 (.650)	.800 (.632)	-2.017 (3.247)	-3.144 (3.067)	-3.144 (2.995)
Missing	.143 (1.296)	-.139 (1.380)	-.024 (1.252)	2.050 (5.574)	.627 (5.966)	.822 (5.512)
Household income	.007 (.105)	-.002 (.112)	-.017 (.114)	-.078 (.612)	.003 (.560)	-.069 (.579)
Household income, missing	-1.377 (1.352)	-1.514 (1.472)	-1.617 (1.466)	-7.504 (7.701)	6.517 (7.343)	-7.442 (7.430)
Owens home	-.021 (.251)	.076 (.262)	-.009 (.256)	.405 (1.542)	.943 (1.463)	.481 (1.472)
Owens liquid assets	.376 (.242)	.312 (.253)	.316 (.247)	1.096 (1.493)	.701 (1.394)	1.000 (1.411)
Internet service at home	.303 (.269)	.307 (.290)	.257 (.278)	5.850** (1.862)	6.131** (1.769)	5.546** (1.780)
Primary language at home						
Spanish	1.976* (.269)	2.057* (.290)	2.108* (.278)	9.241* (1.862)	9.673** (1.769)	9.894** (1.780)

Table 5. Regression Analysis Results: Account Holding and Savings Amount

Characteristic	Account holding			Log saving amount		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	(.803)	(.883)	(.821)	(3.781)	(3.635)	(3.674)
Other	1.906 <sup>+</sup>	1.854*	1.816*	10.328*	10.707**	9.900*
	(.974)	(.941)	(.905)	(4.726)	(3.796)	(4.180)
Recruited at Stage 2	.446*	.345	.314	-.287	-.763	-1.069
	(.202)	(.217)	(.214)	(1.094)	(1.036)	(1.082)
Awareness of SEED OK						
No deposit required		-.184			-3.946*	
		(.243)			(1.221)	
\$100 account-opening incentive		1.068**			3.071	
		(.350)			-1.972	
Availability of match		1.000**			6.909**	
		(.309)**			(1.841)	
Summary: level of awareness			.650**			2.324**
			(.086)			(.439)
Constant	-4.339**	-5.138**	-4.991**	-23.948**	-27.049**	-26.745**
	(1.183)	(1.285)	(1.274)	(6.949)	(6.819)	(6.916)
Observations	1,139	1,139	1,139	1,139	1,139	1,139

Note: Standard errors in parentheses.

<sup>+</sup>  $p < .10$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

Results in the bottom panel of Table 5 tie participants' awareness of SEED OK program features to their savings outcomes. Results concerning the account-opening incentive and savings match are as expected: Awareness of these incentives is significantly associated with the likelihood of holding a participant-owned account; savings amounts are higher among those aware of the features, but the difference is statistically significant only for match availability. Some unexpected results emerge from analyses of the awareness that no deposit was required to open a participant-owned account: Compared with counterparts who are unaware of this feature, participants who are aware of it are less likely to hold a participant-owned account (though the difference is not statistically significant) and save a significantly smaller amount into the account. These results are contrary to those produced by bivariate analyses (see Table 4). The differences between the two sets of results (bivariate and regression) may stem from strong correlations between this and other program knowledge variables. Among participants who are aware that a deposit was not required, 83% report awareness of the \$100 account-opening incentive and 63% report awareness of match availability.

Results from regression analyses with the summary variable (Model 3) clearly show the roles of SEED OK program knowledge in savings outcomes. Participants with better program knowledge are significantly more likely to hold participant-owned accounts and save significantly larger amounts into those accounts.

#### 4.5. Regression results: SEED OK program knowledge and racial and ethnic disparities in savings outcomes

As we describe in the Methods section, each of the three models (the simple model and two comprehensive ones) produces coefficients from the dummy variables for race and ethnicity. We

compare those coefficients to examine whether differences in SEED OK program knowledge explain disparities in savings outcomes between Whites and minority groups. As Table 5 shows, the three race and ethnicity variables produce negative coefficients in all analyses. This suggests that Whites have better savings outcomes than the three minority groups do.

Comparisons across the three models show that the Model 2 and Model 3 coefficients for account holding among Blacks are less than half the size of the corresponding Model 1 coefficient. The differences between Model-1 and Model-2 coefficients are significant at the .05 level ( $F[1, 1,138] = 4.63$ ;  $\text{prob} > F = 0.023$ ), as are those between Model-1 and Model-3 coefficients ( $F[1, 1,138] = 4.95$ ;  $\text{prob} > F = 0.026$ ). In contrast, the coefficients for American Indians differ slightly across the simple and comprehensive models. The sizes of the coefficients for Hispanics decrease significantly between Models 1 and 2 ( $F[1, 1,138] = 3.38$ ;  $\text{prob} > F = 0.066$ ) as well as between Models 1 and 3 ( $F[1, 1,138] = 3.63$ ;  $\text{prob} > F = 0.057$ ). Both sets of differences are significant at the .10 level.

To illustrate the influence of program knowledge, we have constructed figure 1, which presents rates of account holding by race, ethnicity, and program knowledge. Figure 1 presents predicted account-holding rates by race, ethnicity, and knowledge of SEED OK program features. We calculate the predicted probabilities using the logit regression (results reported in Table 5 for Model 3) and the following assumptions: The child is male; his mother is aged 25 to 34, married, and native born, with a high school diploma; his household consists of four people (two children) and has an annual income of \$42,000; his household owns financial assets but not the home in which members reside; the household has Internet service at home, and its members speak only English; SEED OK recruited his caregiver at Stage 2.

As the figure clearly shows, the influence of program knowledge is evident across racial and ethnic groups: If other characteristics are taken into account, the predicted account-holding rates are higher among more knowledgeable participants. In general, differences in account holding by levels of program knowledge are larger among Whites than among minorities: The difference between the most and the least knowledgeable groups is 27 percentage points (34% versus 7%) among Whites, 24 percentage points among Blacks, 20 percentage points among American Indians, and 12 percentage points among Hispanics.

Figure 1 also demonstrates that disparities in program knowledge contribute to racial and ethnic disparities in account-holding status. Among those lacking knowledge of any of the three features (the largest group in each of the four racial and ethnic categories), the difference in predicted probabilities is 1 percentage point between Whites and Blacks, 2 percentage points between Whites and American Indians, and 4 percentage points between Whites and Hispanics. These estimates are much lower than the account-holding differences reported in Table 3: 10 percentage points, 12 percentage points, and 15 percentage points, respectively. Although White–minority disparities in predicted account-holding rates increase as program knowledge improves, they are narrower than actual differences observed in the data. One exception is the 19-percentage-point gap in account-holding rates between Whites with knowledge of all three features and Hispanics with the same. That gap in Figure 1 is 4 percentage points higher than the observed difference. The observation that differences between racial and ethnic groups are higher among more knowledgeable participants suggests that minorities may face unobserved barriers to SEED OK program participation even if they acquire the same level of program knowledge held by Whites with comparable characteristics.

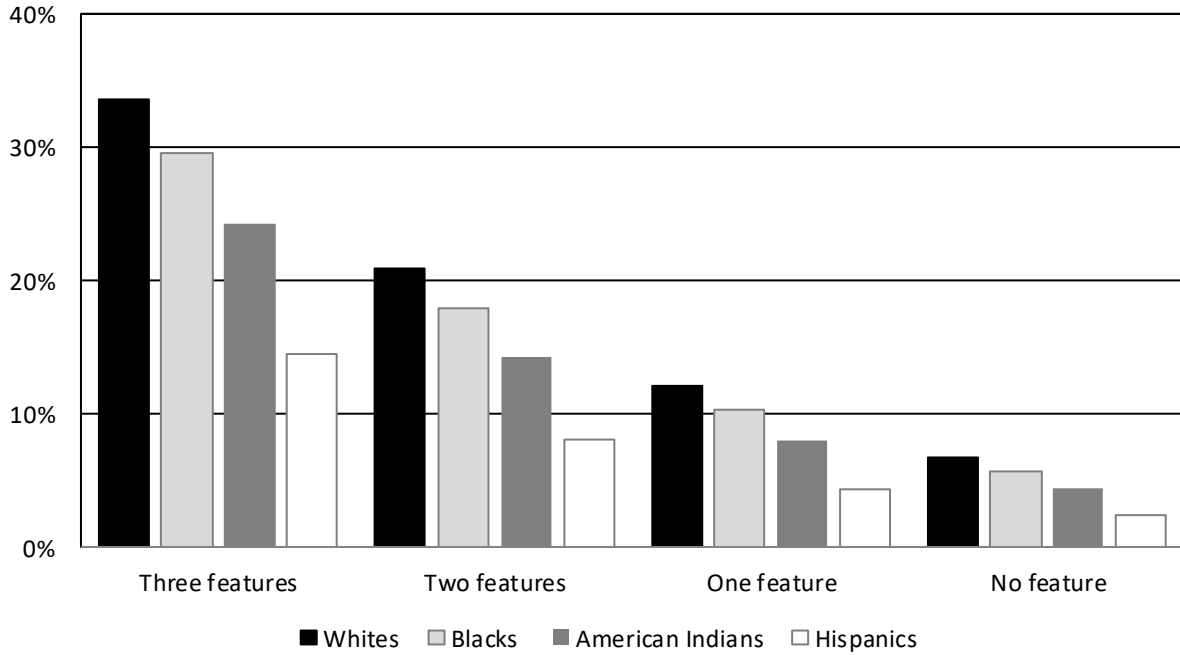


Figure 1. Predicted OK 529 account holding rates by race, ethnicity, and program knowledge.

*Note:* These calculations assume that the child is male, the mother is aged 23–34, married, and native born, with a high school diploma; the household consists of four people (two children), has annual income of \$42,000, owns financial assets but not the home in which members reside, and has Internet access at home; household members speak only English, and SEED OK recruited the primary caregiver at Stage 2.

Results on savings amounts also show the importance of program knowledge in racial disparities. The size of the coefficient for savings among Black participants changes from  $\approx 3.426$  in Model 1 to  $\approx 2.223$  in Model 2, but the difference is not statistically significant at the .10 level ( $F[1, 1138] = 2.67$ ;  $\text{prob} > F = .103$ ). Table 5 also shows that the coefficient in Model 3 ( $\approx 2.464$ ) is statistically significant ( $F[1, 1,138] = 4.09$ ;  $\text{prob} > F = 0.043$ ). That is to say, if participants’ program knowledge is not taken into account, the savings amount among Blacks is only 3.25% (exponential of  $\approx 3.426$ ) of that among Whites with comparable characteristics. The ratio of the savings among Blacks to that among Whites increases to 10.83% (exponential of  $\approx 2.223$ ) in Model 2 and 8.51% (exponential of  $\approx 2.464$ ) in Model 3, suggesting that differences in individual savings amounts would decline if Blacks and Whites had comparable knowledge of SEED OK program features. The size of the coefficient for savings among American Indians changes little between Models 1 and 2, but the difference between Models 1 and 3 is not negligible. Although the difference between the size of the Model-1 and Model-3 coefficients is not statistically significant ( $F[1, 1138] = 1.48$ ;  $\text{prob} > F = 0.22$ ), the size of the Model-3 coefficient is only two thirds that of the coefficient for Model 1. Results for Hispanics are similar to those for Blacks: The size of the coefficient for savings among Hispanics changes between Models 1 and 2, but the change is not significant ( $p = .12$ ); the change between Models 1 and 3 is significant at the .10 level.

## 5. Conclusions

This study examines the influences of program knowledge on savings outcomes in a CDA program and investigates whether differences in program knowledge explain racial disparities in those outcomes. Results from these analyses of data collected for the SEED OK experiment show that many treatment participants are not knowledgeable about SEED OK incentives and rules but that knowledge of SEED OK is positively associated with both measured savings outcomes: holding a participant-owned account and the amount of individual savings. These findings are consistent with previous research on retirement savings programs. Such research finds that those who are more knowledgeable about program incentives and rules are more likely to take advantage of economic incentives in savings programs by opening accounts and by making contributions up to the match thresholds (Agnew et al., 2012; Choi et al., 2011). This study also shows that lower levels of program knowledge among racial and ethnic minority groups explain lower rates of account holding and smaller savings amounts in these groups.

Findings in this study are also consistent with the results of an analysis of SEED OK data from in-depth interviews. That qualitative study suggests that SEED OK incentives may improve savings outcomes if treatment participants are aware of and understand SEED OK features. However, in-depth interviews show that not every treatment participant is aware of SEED OK incentives or understands the SEED OK program rules. Some of those who did not open participant-owned accounts report that they did not receive or “really did not read” the program information mailed to them by SEED OK (Gray et al., 2012, p. 67). Other interviewees mistakenly think that a \$100 initial deposit was required to open a participant-owned account or that regular contributions are required (Gray et al., 2012).

The finding that program knowledge is important for program outcomes calls into question the validity of two assumptions in neoclassical economics: that rational individuals base decisions and actions on cost–benefit calculations and that rational individuals have full information on all available options. Accordingly, those assumptions lead proponents to expect that individuals will participate in and save into savings programs when the benefits of doing so outweigh the costs (Beverly et al., 2008; Stone, 2012). Our findings suggest that this is not always the case: Members of target populations may not be aware of program incentives and thus may be prevented from taking advantage of the incentives. Even if the program provides information, some participants may not receive it (due to delivery problems), others may not read the delivered information, and still others may read but misunderstand what is sent. This study and other empirical research (Agnew et al., 2012; Gray et al., 2012) indicate that program knowledge is a critical element to be considered in designing public policy.

Our study also shows that levels of program knowledge are lower among racial and ethnic minority groups than among Whites. The finding raises the possibility that such differences may generate disparities in savings outcomes. Because this is the first empirical study to consider race and ethnicity in examining the relationship between program knowledge and savings outcomes, we cannot directly compare our findings with results from other studies. However, the current findings are consistent with evidence accumulated in the literature. In general, members of racial and ethnic minority groups have poorer financial knowledge than do Whites (Perry & Morris, 2005; Zhan, Anderson, & Scott, 2006). Financial knowledge is closely correlated with prudent financial decisions and savings outcomes (Howlett, Kees, & Kemp, 2008; Huang, Nam et al., 2013).

This study is not free from limitations. First, the sample consists of caregivers of children born in Oklahoma. Accordingly, this sample is not representative populations in other states or of the U.S. population as a whole. We recommend caution in generalizing these findings. Second, the 38% participation rate in SEED OK is relatively low and may raise questions about the study's external validity; however, empirical evidence indicates that low participation rates do not automatically result in biased samples (Groves, 2006). We cannot rule out the possibility that study participants differ from nonparticipants in terms of propensity to save and other unobserved characteristics. Third, we cannot rule out the possibility of endogeneity. This study assumes that participants' program knowledge affects their savings outcomes. However, it is possible that holding the participant-owned account may improve the account owner's program knowledge. Fourth, the structure of the SEED OK experiment is more complex than would be any fully adopted public policy. Therefore, our findings may differ from the outcomes of fully adopted and implemented public policies. For example, SEED OK rules differ from (and conflict with) the rules of OK 529 (e.g., whether participants should make \$100 initial deposits to open an account). In addition, SEED OK has a multiple-account structure (e.g., participant-owned and state-owned accounts) instead of one that combines individual college savings with public and other incentives. Although necessary for the experiment, the complicated program design may have confused some treatment participants. Furthermore, the experimental nature of SEED OK prevents the widespread use of communications tools (e.g., media campaigns and promotion by community leaders) available for fully adopted public policies. That is, use of those tools might compromise the experiment's validity by exposing control participants to treatment components. If universal and progressive CDAs were adopted as state or federal policy, eligible individuals would likely have an easier time understanding the incentives and rules.

Findings from this study have several implications for future research. First, the findings suggest a need for further investigation of the effect of program knowledge. Although this study expands our understanding of the roles of program knowledge in improving savings outcomes, we know very little about other policy outcomes. As we indicate, the policy goal of universal and progressive CDAs is to promote lifelong development by encouraging saving and asset accumulation. That is to say, individual saving outcomes should not be the only criterion used to evaluate CDAs. Progress toward other policy goals should be considered. For example, it seems relevant to assess whether CDAs improve financial management skills, parents' hope for children's future, parenting practices, children's developmental outcomes, and children's educational attainment. Other research documents SEED OK's positive impacts on social-emotional development among disadvantaged young children (Huang, Sherraden, Kim, & Clancy, 2014) and the intervention's role in reducing maternal depressive symptoms (Huang, Sherraden, & Purnell, 2014). Future research into the impacts of program knowledge on various outcomes may facilitate our understanding of how CDAs affect the target population. If program knowledge and individual saving performance are not associated with other outcomes, and if simply having a CDA (e.g., having an automatically opened state-owned account) generates positive impacts, future CDA policy should focus on program designs that will expand account ownership (e.g., plans requiring participants to opt out instead of ones requiring them to opt in). However, if program knowledge is associated with various outcome measures as well as individual savings, it will be necessary to develop additional communications tools.

Second, we need further understanding of intersections between program knowledge and racial disparity. Specifically, we lack answers to several key questions. First, why are levels of program

knowledge lower among members of racial and ethnic minorities than among Whites? Second, does the effectiveness of communication tools and mechanisms differ by the race or ethnicity of the target population? Third, how does program knowledge (or lack thereof) contribute to racial disparities in savings outcomes?

Our findings also have implications for public policy development. First, findings concerning the roles of program knowledge in savings outcomes justify our attention to policy design as a way to promote potential beneficiaries' understanding of incentives and rules. Although increasing individual savings is not the only goal of CDAs, saving for children's future may benefit children and the family. Savings and assets have strong associations with children's educational attainment and other developmental outcomes (Conley, 2001; Lerman & McKernan, 2008; Nam & Huang, 2009). As we show, economic incentives alone may not promote savings if eligible individuals are unaware of the incentives or associated requirements. Policymakers and program developers should simplify program features to improve program knowledge among the target population, especially groups with low levels of financial knowledge. We also recommend incorporating effective communications in policy designs and implementation plans.

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