Financial Outcomes in a Child Development Account Experiment: Full Inclusion, Success Regardless of Race or Income, and Investment Growth for All

By Margaret M. Clancy, Sondra G. Beverly, Mark Schreiner, Jin Huang, and Michael Sherraden

The SEED for Oklahoma Kids (SEED OK) experiment is a large-scale policy test of universal, automatic, and progressive Child Development Accounts (CDAs). An essential feature of the CDA in SEED OK is a state-owned Oklahoma 529 College Savings Plan (OK 529) account that was automatically opened for infants with an initial deposit of $1,000 in 2008. The CDA also provided other incentives, including an automatic, progressive deposit in 2019. Children in the treatment group (1,358) received the CDA; children in the control group (1,346) did not.

Figure 1 shows features of the research experiment and the CDA intervention from 2005 to the present. Figure 2 summarizes how the CDA in SEED OK models all ten of the essential statewide CDA policy design elements within the context of a long-running randomized social experiment.

Other Center for Social Development reports provide results from the first two survey waves of the SEED OK experiment, highlight impacts for financially vulnerable families, describe the third wave of this longitudinal research, and document initial Wave 3 survey results, when children are in middle school.

This research summary presents financial outcomes—OK 529 account holding and savings—as of December 31, 2019, when SEED OK children were about 12 years old. Examining outcomes at this point in time is important because children are nearing the age when they and their families will make decisions about high school curricula and, not long after, postsecondary education.

The findings summarized here use administrative data originating from TIAA-CREF Tuition Financing, the program manager for the OK 529 plan. Beginning in 2008, the Oklahoma State Treasurer’s office has electronically transmitted OK 529 account and savings data to CSD each calendar quarter. These data are delivered for the state-owned SEED OK accounts that were automatically opened for treatment children and for OK 529 accounts that were opened by individuals for treatment and control children.

While the essential feature of SEED OK is the universal, automatic, and state-owned account that receives the seed deposit at birth and progressive deposits, SEED OK also encouraged treatment families—through communications mailed by the Oklahoma State Treasurer’s Office—to open and save in their own OK 529 accounts. These materials were delivered primarily in the first year of the study, when SEED OK offered a $100 incentive to every treatment mother who opened an OK 529 account for her SEED OK child.1 (This incentive covered the OK 529 plan’s minimum opening contribution, which was $100 when the experiment began and was reduced to $25 in 2020.)

The OK 529 program manager mails quarterly account statements to families with sufficient contact information. Mail was also the predominant mode of communication between SEED OK and families, as state partnerships with hospitals and social service organizations were impossible because SEED OK families are geographically scattered. Research constraints prohibited any social media or other mass marketing or media campaigns because control families would have been exposed to part of the SEED OK treatment.2 In these ways, SEED OK is not typical of statewide CDA programs, due to its constraints as a research experiment designed to test a universal, scalable policy model. In the future, outside of the research context, SEED OK’s low-touch CDA model could be supplemented with a program-based intervention.3

To illustrate SEED OK, we provide an example of William, a hypothetical baby born to a low-income family in Oklahoma in 2007. Researchers randomly selected William’s name from state birth records, his mother agreed to participate in SEED OK, and then he was randomly assigned to the treatment group. The state automatically opened an OK 529 account with a $1,000 deposit for William. His parents can open their own OK 529 account to save for him, and SEED OK provided time-limited incentives for his mother to do so. If another relative or a friend of William opens an OK 529 account for him, their accounts are included in this study too. In 2019, William received an automatic, progressive deposit of $600. Control families receive none of the SEED OK treatment, but they can open an OK 529 account.

1 Researchers randomly assigned 2,704 Kentucky families with children under 3 years old to either the experimental or control group. The final number of SEED OK families was 1,358 (treatment group) vs. 1,346 (control group). William is a treatment child.

2 A control child in SEED OK is a child of a family who is randomly assigned to the control group. A control child is not necessarily born to a control family.

3 In the future, outside of the research context, SEED OK’s low-touch CDA model could be supplemented with a program-based intervention.
Figure 1
SEED for Oklahoma Kids Research Experiment Timeline 2005–2021

- **2005**
  - SEED Universal Model planning begun
- **2006**
  - Request For Proposal issued to states
  - Oklahoma selected with approval of SEED Advisory Board
  - SEED OK research and policy planning
- **2007**
  - Infant sample selected randomly from Oklahoma birth records
- **2008**
  - Mothers of infants completed baseline survey
  - Mothers assigned randomly to treatment or control group and notified of status
  - Account and savings data delivered from OK 529 plan to CSD
  - In-depth interviews conducted with subsample of SEED OK mothers
- **2009**
  - Mothers of infants completed Wave 2 survey
  - State-owned OK 529 account with $1,000 initial deposit automatically opened for treatment children
  - Low- and moderate-income treatment mothers eligible for savings matches on deposits into their own OK 529 accounts for SEED OK children
- **2010**
  - Treatment children receive quarterly OK 529 account statements
  - Treatment mothers received educational materials about college, saving for college, and OK 529 accounts
- **2011**
  - Half of treatment mothers eligible for time-limited, $100 incentive to open their own OK 529 accounts for SEED OK children
- **2012**
  - Treatment mothers eligible for time-limited, $100 incentive to open their own OK 529 accounts for SEED OK children
- **2013**
  - Treatment mothers received educational materials about college, saving for college, and OK 529 accounts
- **2014**
  - Mothers of infants completed Wave 3 survey
  - Treatment children receive automatic, progressive deposits into state-owned OK 529 account ($200 or $600)
- **2015**
  - Half of treatment children randomly assigned to receive progressive deposits
- **2016**
  - Mothers of infants completed Wave 2 survey
  - Mothers of infants completed Wave 3 survey
- **2017**
  - Half of treatment children randomly assigned to receive progressive deposits
- **2018**
  - Mothers of infants completed Wave 2 survey
  - Mothers of infants completed Wave 3 survey
- **2019**
  - Half of treatment children randomly assigned to receive progressive deposits
- **2020**
  - Mothers of infants completed Wave 2 survey
  - Mothers of infants completed Wave 3 survey
- **2021**
  - Mothers of infants completed Wave 3 survey
  - Half of treatment children randomly assigned to receive progressive deposits
  - Mothers of infants completed Wave 3 survey
The CDA in SEED OK Has Positive Impacts on OK 529 Assets

The most important financial outcomes in SEED OK relate to having OK 529 assets, regardless of the source of funds or the type of account. Assets include personal deposits minus personal withdrawals; investment earnings; and, for treatment children, SEED OK initial deposits, progressive deposits, and incentives. On December 31, 2019, when SEED OK children were about 12 years old, 100% (1,357) of treatment children had some OK 529 assets. This full inclusion is by design and was achieved through the automatic features of the CDA. In the control group—that is, under the existing OK 529 policy—just over 4% of children (60) had some OK 529 assets. The CDA in SEED OK has a very large impact—more than 95 percentage points—on OK 529 asset holding.

The CDA also has a very large impact on the value of OK 529 assets held for children. On December 31, 2019, the average value of OK 529 assets for treatment children was $3,243. This is 3.4 times the average value for control children ($952). The gap between treatment and control children in OK 529 assets has increased over time (Figure 3).

Figure 3
Average Value of OK 529 Assets: Treatment and Control Children

Note. The CDA policy design elements are identified and described in detail in Clancy & Beverly (2017); Clancy, Sherraden, and Beverly (2019); Sherraden, Clancy, and Beverly (2018).
The CDA in SEED OK Underscores the Importance of Early Deposits and Investment Growth

Figure 4 shows the value of the initial $1,000 investment in the state-owned OK 529 accounts of treatment children. During the Great Recession, the value dipped to just below $700; however, because the CDA is restricted to college or vocational school use, the money could not be withdrawn and grew to about $1,902 by the end of 2019. No other deposits or withdrawals are included in Figure 4, so the $902 increase in the initial investment shown is purely investment growth. The SEED OK funds were first invested in the OK 529 Balanced Fund Option. In 2018, these funds were reallocated to the Moderate Age-based Option, which becomes increasingly conservative as the beneficiary nears college age.

Figure 5 shows the average OK 529 assets for treatment children subdivided into deposits and investment earnings. As noted above, the average value of OK 529 assets for treatment children at the end of 2019 was $3,243. The largest portion of this comes from SEED OK deposits into the state-owned OK 529 account. Across all treatment children, deposits into state-owned accounts averaged $1,195. In addition to the automatic $1,000 initial deposit, about half of the treatment children (678) received a supplemental deposit in 2019, and some treatment children received matches for family deposits into OK 529 accounts opened by their mothers during the first 4 years of the study. Across all treatment children, these additional deposits averaged $195.

Investment earnings on SEED OK deposits in state-owned accounts is the second largest component of OK 529 assets. Of this $937, over $900 comes from the initial deposit alone (see Figure 4). The sum of deposits and earnings in state-owned accounts is $2,132, which is the average balance in these accounts.

Combining earnings on deposits in state-owned accounts and earnings on deposits in individual-owned accounts (the two shaded bars in Figure 5) reveals the importance of holding investments in the CDA. After 12 years, the combined earnings comprise 40% of OK 529 asset accumulation for treatment children. Together, Figures 4 and 5 illustrate the importance of early deposits and investment growth to asset accumulation in CDAs.

The CDA in SEED OK Has Positive Impacts on Parent-Owned OK 529 Accounts

Saving for college or trade school is optional, but for those treatment and control parents who choose to do so, there are benefits to saving in the OK 529 plan. Parents can choose their own OK 529 investment option (more or less conservative than that chosen for the state-owned account), receive a state income-tax deduction for contributions, and make qualified and nonqualified withdrawals. Over the course of the study, between December 2007 and December 2019, 18% of treatment children and 4% of control children had an OK 529 account opened by a parent. That is, by December 31, 2019, treatment children were about five times more likely than control children to have had an OK 529 account opened by a parent. This ratio is not exactly comparable to a higher ratio reported previously. Here, we examine OK 529 accounts opened by a SEED OK child’s mother or father.

Figure 6 shows the increase in parent-owned accounts over time for treatment and control children. The large increase for treatment children between 2007 and 2008 reflects the impact of the SEED OK account-opening incentive and the time-limited communications to treatment families from the Oklahoma State Treasurer’s office. The CDA in SEED OK motivated early OK 529 account opening by treatment parents. This is important because, as noted above, early deposits substantially increase asset accumulation through investment growth. Also opening accounts early may lead to more deposits for college. For example, family members and friends may make 529 contributions for gifts, especially within a statewide CDA that offers broad social media and other communication strategies, which can build awareness.

It is reasonable to expect the treatment–control difference in account holding to decrease somewhat over time, and Figure 6 shows that the gap has narrowed, if just a little. Still, at age 12, just 5 or 6 years before children make decisions about postsecondary education, the treatment advantage remains large.

Figure 4
Growth of the SEED OK $1,000 Initial Deposit: Early CDA Deposits and Investments Matter

Despite a loss at the Great Recession, the initial deposit into the CDA almost doubled over about 12 years.

$1,902

<table>
<thead>
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<th>Year</th>
<th>Value</th>
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The CDA in SEED OK Promotes Full Inclusion in Building OK 529 Assets

The universal, automatic features of the CDA in SEED OK include every child (making the CDA fully inclusive) and have the largest impacts for the most disadvantaged children (making the CDA progressive). To document the CDA’s impact on inclusion and progressivity, we use household income, mother’s education, and child’s race/ethnicity as indicators of advantage.²

In the SEED OK control group, at age 12, just 1% of low-income children, 1% of children with less-educated mothers, and 2% of children of color had any OK 529 assets. Because SEED OK provided OK 529 assets to every treatment child across the socioeconomic and geographic spectrum of the state, the CDA increased OK 529 asset holding by 1) 99 percentage points for low-income children, 2) 99 percentage points for children with less-educated mothers, and 3) 98 percentage points for children of color. Impacts this large are uncommon, occurring only when a policy has the characteristics of a public utility or public good—something put in place for the benefit of all.¹⁰

Another way to illustrate how the CDA in SEED OK promotes inclusivity and progressivity is to examine the demographic characteristics of OK 529 asset holders on December 31, 2019. The first columns of Figures 7–9 show characteristics of control children (no CDA in SEED OK, i.e., under existing OK 529 policy). The preponderance of purple in the first columns reveals how advantaged asset holders are under existing OK 529 policy. More than half of control children with OK 529 assets are very high-income, three-quarters have mothers with college degrees, and more than three-quarters are white.

The preponderance of purple in the first columns reveals how advantaged asset holders are under existing OK 529 policy.
The differences between the first and second columns in Figures 7–9 show how a universal, automatic CDA can achieve inclusion and progressivity.

The second columns of Figures 7–9 show characteristics of treatment children (with the CDA) who had OK 529 assets on December 31, 2019. Because SEED OK provided OK 529 assets to every treatment child, the characteristics of these children mirror the diversity of the state population. The differences between the first and second columns in Figures 7–9 show how a universal, automatic CDA can achieve inclusion and progressivity.

SEED OK research methods allow us to extrapolate from the sample of SEED OK children born in 2007 to the population of all children born in Oklahoma in 2007. This provides another way to illustrate how the CDA in SEED OK achieves inclusion and progressivity.

We estimate that, on December 31, 2019, about 450 low-income 12-year-old children in Oklahoma had OK 529 assets (owned by parents or other individuals). If the CDA in SEED OK had been automatically provided to all children born in 2007, more than 36,000 low-income 12-year-old children would have had OK 529 assets at the end of 2019. For a single birth-year cohort, Figure 10 shows the estimated impact of a universal, automatic, and at-birth CDA after 12 years.

The CDA in SEED OK Promotes Inclusion in Parent-Owned OK 529 Accounts

The CDA in SEED OK also increased the socioeconomic and racial diversity of families with parent-owned OK 529 accounts. Figures 11–13 show demographic characteristics of children whose parents opened OK 529 accounts between December 2007 and December 2019. As noted above, 18% of treatment children and 4% of control children had OK 529 accounts opened by their parents. In these graphs, neither of the two columns mirrors the state population because parents self-selected into (or, opted into) the OK 529 plan. Still, the second columns show more socioeconomic and racial diversity than the first columns.

By extrapolating from the sample of SEED OK children born in 2007 to the population of all children born in Oklahoma in 2007, we estimate that, on December 31, 2019, about 400 low-income 12-year-old children in Oklahoma had an OK 529 account opened by a parent. If the CDA in SEED OK had been automatically provided to all children born in 2007, about 3,800 low-income 12-year-old children would have had a parent-owned OK 529 account at the end of 2019. For a single birth-year cohort, Figure 14 shows the estimated impact of the CDA after 12 years.

The CDA in SEED OK Increases Total College Savings in Parent-Owned OK 529 Accounts

Turning from individual OK 529 account ownership to individual family savings, on December 31, 2019, when children were about 12 years old, 10% of treatment children had a parent-owned account with family deposits. Another 7% of treatment children had a parent-owned account with no deposits other than the $100 account-opening incentive from SEED OK (which the parent owns and which continues to grow in value). Less than 1% of treatment parents had opened an OK 529 account but had withdrawn all deposits, including any account-opening incentive, by the end of 2019.

For the 10% of treatment children who had a parent-owned OK 529 account with family deposits (i.e., children with “parent savers”) on December 31, 2019, the average balance (“saving savers”) was $9,820. At the end of 2019, 3% of control children had parent savers, and the average balance in their parent-owned OK 529 accounts was $10,000 higher ($19,837). Still, the CDA in SEED OK increased total college savings by parent savers in OK 529 accounts in two ways. First, the average balance for the top 3% of treatment savers ($24,175) exceeded the average balance of the top 3% of control savers ($19,837). In other words, the CDA increased the savings of treatment parents who, without the CDA, would have saved in an OK 529 anyway. Second, the CDA more than tripled the number of treatment savers. The new savers—those with

Figure 10
OK 529 Assets for Low-Income Children in OK: Estimates for a Single Birth-Year Cohort

Under existing OK 529 policy, fewer than 450 low-income 12-year-old children in Oklahoma have OK 529 assets.

Under a universal, automatic, at-birth CDA, more than 36,300 low-income 12-year-old children in Oklahoma would have OK 529 assets.

Note: Extrapolation estimates for a single birth-year cohort after 12 years. 1 = 100 children.
positive balances below the top 3%—would not have saved anything in OK 529 accounts without SEED OK, so their entire balances are CDA impacts. On top of this, Figures 11–13 show that treatment savers are more socioeconomically and racially diverse than savers under existing OK 529 policy. Thus, the CDA in SEED OK increased total college savings in parent-owned OK 529 accounts while also increasing the diversity of parent savers.

...the CDA in SEED OK increased total college savings in parent-owned OK 529 accounts while also increasing the diversity of parent savers.

Extrapolating this CDA impact on parent savings in SEED OK to the population of Oklahoma newborns in 2007, we estimate that a universal, automatic, and at-birth CDA would increase parent-owned OK 529 account balances for 12-year-old children in a given birth-year’s cohort by about $17,510,000.

Figure 15 summarizes some of the key financial impacts of the CDA in SEED OK by presenting concise facts about all OK 529 assets, parent-owned OK 529 assets, and inclusion.

Conclusions

Over 13 years ago, 1,358 treatment children received the CDA in SEED OK with a $1,000 deposit in the OK 529 plan, and 1,346 control children did not, the beginning of a long-running CDA experiment. We made modest additional deposits for treatment children, but, beyond the early stages of SEED OK, the “treatment” was limited (see Figure 1). SEED OK nevertheless serves to demonstrate that a successful CDA policy can be put in place and sustained. Moreover, the randomized experimental design has simply and cleanly revealed positive outcomes.

This summary covers financial impacts in SEED OK, showing that all children can have an asset-building account with resources that grow over time. In particular, the CDA greatly increases the likelihood that disadvantaged children have assets accumulating for their future education. In addition, the CDA in SEED OK has motivated additional OK 529 account opening by treatment parents, additional savings by parents, and greater representation in the ownership of OK 529 accounts by parents from diverse and less advantaged backgrounds.
Even though the improved well-being for children and families in SEED OK is important, the most important benefit of the experiment is the knowledge that SEED OK has generated and its influence on policy. The evidence summarized here adds to a record of positive CDA impacts that has shaped CDA policies in U.S. states and in other countries, multiplying the positive impacts of SEED OK on very large numbers of children and families.

Yet there is more work to do. The CDA in SEED OK ultimately aims to increase the completion of college or other postsecondary training. These impacts will not be determined until age 18 (for postsecondary enrollment), until several years after enrollment (for completion of a degree or certificate), and until decades have passed (for increases in lifetime income and wealth and decreases in socioeconomic inequality). SEED OK may already be the longest-running social experiment in the United States, and we intend to continue, following children beyond high school into postsecondary education, and eventually into their adult years to learn how CDAs affect their career and family development and for whom the impacts are greatest. As always, the aim is to inform the design of lifelong asset-building policy.

In this very meaningful sense, a well designed and implemented social experiment is itself like a good investment, with continuing payoffs in knowledge that informs policy change, which may benefit future generations.

The CDA greatly increases the likelihood that disadvantaged children have assets accumulating for their future education.

<table>
<thead>
<tr>
<th><strong>FINANCIAL FACTS: Age 12</strong></th>
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<tr>
<td><strong>All OK 529 Assets</strong></td>
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<tr>
<td>100% Treatment children with OK 529 savings for college or vocational school</td>
</tr>
<tr>
<td>40% Share of total OK 529 assets from investment earnings for the average treatment child</td>
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<tr>
<td><strong>Parent-Owned OK 529 Assets</strong></td>
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<tr>
<td>18% Treatment children whose parent opened an OK 529 account (versus 4% for control children)</td>
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<tr>
<td><strong>Inclusion via the SEED OK CDA</strong></td>
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<tr>
<td>99 percentage points Increase in OK 529 asset holding for low-income children</td>
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1. SEED OK communications to treatment families continued for about 4 years, ending in 2011, when the opportunity to receive a savings match expired (Gray, Clancy, Sherraden, Wagner, & Miller-Cribbs, 2012). In the context of Pennsylvania’s statewide CDA, State Treasurer Torsella emphasized the importance of statewide outreach and awareness (Leiker, Clancy & Sherraden, 2020).

2. Over time, SEED OK has lost contact with about half of the families because the study could not implement broad outreach and awareness campaigns and did not have financial resources for intense sample maintenance efforts. SEED OK does not offer online viewing of the balance or contact updating for the state-owned OK 529 accounts.


4. Some children are the beneficiaries of multiple accounts. Averages are computed by finding the total balance across all OK 529 accounts for each child and averaging these sums across all children.

5. For research purposes, SEED OK provided the supplemental deposit to just half of the treatment children (randomly assigned).


7. Using SEED OK financial data from December 31, 2014, Beverly, Clancy, and Sherraden (2016) reported that treatment children were almost eight times more likely to have individual savings in a mother-owned OK 529 account (8.4% vs. 1.1%).

8. Treatment parents did not always understand that SEED OK incentives were for accounts opened only by mothers; SEED OK incentives may have motivated parents to open accounts, but fathers may have opened accounts instead of mothers. Also, in the control group, there were no incentives for mothers to open accounts, and fathers may have been more likely to take on this task. Examining accounts opened by either parent accommodates those phenomena.

9. All three of these characteristics were reported by mothers in the SEED OK baseline survey. Low-income children lived in households with incomes below 200% of the federal poverty line. Less-educated mothers had less than a 4-year college degree. Children of color include non-Hispanic Black, non-Hispanic American Indian, non-Hispanic Asian, Hispanic, and multiracial children.

10. We begin to develop this thinking in Huang, Sherraden, & Sherraden (2021).

11. Also relevant is the fact that funds in state-owned accounts cannot be withdrawn until children enroll in postsecondary education and the fact the SEED OK sample is representative of the population of newborns born in Oklahoma in 2007. SEED OK achieved representativeness by using stratified random sampling and sample weights.

12. SEED OK used stratified random sampling, a form of random sampling that allows intentional oversampling of particular groups. At the analysis stage, sample weights that adjust for oversampling are used to make the sample representative of the population.

13. Balances in the parent-owned accounts of treatment children include the $100 account-opening incentive from SEED OK and earnings on this deposit.


References


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