

development

\$1.98

CollegeBound is projected to serve more than **85,000 children** through 2040

### The CollegeBound Journey



#### How We Predict Outcomes

The Social Return on Investment (SROI) analysis combines local demographics, costs of resources, and scientific evidence from similar programs across the country. We use these data sets to estimate the projected lifetime benefits to CollegeBound families and taxpayers.

This is a conservative estimate, and there are many other benefits of the program that are not captured in the SROI. As researchers confirm positive effects, the expected returns may increase.



to pay for **higher education** and career training expenses

#### **Societal Outcomes**



Reduce disparities in account-holding and savings



Increase tax revenues



Reduce crime

Save government funds via reduced spending on special education and grade retention programs





## PROSPECTIVE SOCIAL RETURN ON INVESTMENT

Author: Dr. Jose Y. Diaz

2023

## CollegeBound Saint Paul

# **EXECUTIVE** SUMMARY

CollegeBound is an upstream strategy of the City of Saint Paul, Minnesota to promote post-secondary enrollment for children born within the city. The intervention is based on evidence of the positive impact of publicly funded college saving accounts (CSAs) on future academic achievement and other positive outcomes. The program opens CSA accounts for every child born in the City of Saint Paul and makes seed deposits and other incentives during the children's early life and their academic careers. We use the best available evidence from top academic research to demonstrate the prospective economic returns of this intervention. We estimate that for every dollar invested in CollgeBound Saint Paul, society receives \$9 in benefits associated with increased income, improved health, additional tax revenues, and savings to the judicial and education systems. Taxpayers and the Government are expected to double their investment in the program with a public sector ROI of \$2:1. CollegeBound invests nearly \$1,000 per child over their participation in the program. The first cohort of participants of nearly 3,100 children is expected to generate at least \$28.8 million in societal benefits. CollegeBound is projected to serve more than 85,000 children through 2040. Children from economically disadvantaged backgrounds and from single-mother households reap most of the benefits, making the program an effective tool for reducing socioeconomic disparities. The SROI analysis combines the scientific evidence with local demographics such as the average lifetime income in the Twin Cities, graduation rates, actual per diem cost of incarceration and averaged cost per student as reported by Minnesota agencies.



# **METHODS**

The Benefit-Cost model we use in this study consists of the following steps: First, we collect the best available evidence on the outcomes associated with this type of program. Second, we identify which of these outcomes leads to measurable economic benefits to society - that is, participants, the government, and other agents in society. Then, we quantify these benefits and compare it to the cost of implementing the program and generate a benefit-cost ratio (BCR). The BCR is a number that represents the dollar value of benefits to society for every dollar invested in the program. A BCR larger than 1 indicates that the societal benefits associated with the program exceed the value of resources invested in the intervention. The proposed methodology has been vetted and used by the Washington State Institute for Public Policy, the Robin Hood Foundation, NY, and locally by Results First Minnesota, the Constellation Fund, and Wilder Research. The main result of the analysis is the average prospective SROI estimated using experimental evidence and assumes that CBSP would perform as the programs evaluated in the scientific literature. For completeness, we also estimate the SROI from quasi-experimental studies. Note that the results of this study are not a full representation of all the societal benefits of CBSP, but rather a subset of outcomes for which there is sufficient research evidence and data to estimate monetary benefits. In this regard, we use the term "Social Return on Investment" in a limited way to indicate benefits and costs accrued by participants and their mothers, the government, and potential victims of crime. We exclude the value of private deposits on the savings accounts, future tuition, or room & board costs. The analysis omits any indirect costs or benefits of the program such as positive externalities associated with increased academic achievement, peer-to-peer effects, etc. Finally, we do not include financial returns to these accounts and any resulting additional accumulation of assets.

# This report outlines the economic returns generated by CollegeBound Saint Paul

CollegeBound is an upstream strategy of the City of Saint Paul, Minnesota to promote post-secondary enrollment for children born within the city. The intervention is based on evidence of the positive impact of publicly funded college saving accounts (CSAs) on future academic achievement and other positive outcomes. The SROI analysis combines this scientific evidence with local demographics and costs of resources to estimate the projected lifetime benefits to CollegeBound families and taxpayers. The resulting Benefit-Cost Ratio shows that the value generated by the program exceeds the cost of the program.



For every dollar invested in CollegeBound Saint Paul, society receives \$9 in monetary benefits. The average return for taxpayers is \$2:1. These estimates are based on the average effects obtained using experimental evidence on the effect CSAs have on academic achievement, socio-emotional development, parental expectations, and mental health.

The first cohort of CollegeBound participants of nearly **3,100** children is expected to generate

### **\$28.8 million** in societal benefits

CollegeBound is projected to serve more than 85,000 children through 2040.

There are many other positive effects of the program that are not captured in the SROI. A number of these outcomes associated with CSAs are still being studied across the nation and locally.

As researchers confirm these positive outcomes and estimate their monetary benefits, the expected returns may also increase.



Cost per participant is estimated using projected deposits made by the Program and criteria for each type of incentive for the expected length of participation – including years during college enrollment. The estimate includes administrative cost per participant estimated by dividing total operating costs (not including deposits) by projected number of participants. Participation is based on projected births within the city.

## CollegeBound Outcomes:

#### **Standardized Test Scores**

High School Completion College Enrollment and Graduation

### Children's Social-Emotional Development

### Parental Academic Expectations

#### **Maternal Mental Health**

To estimate benefits, we start by identifying the effectiveness of CSAs in improving academic and other outcomes. The best available evidence on CSAs indicates that participating children are expected to experience improvements in academic achievement, post-secondary enrollment, child social-emotional functioning, mother's mental health, savings and financial behavior, student debt, among other outcomes. (Markoff, et al., 2018). Mothers of participating children also benefit from improved mental health (Markoff, et al., 2018).

From these outcomes, we identify those outcomes for which we can estimate monetary benefits using standard economic analysis. We use results from experimental research on each of these outcomes (Azzolini, et al., 2018; Kim, et al., 2015; Huang, et al., 2014, 2017). This type of evidence uses randomized control designs to isolate the effect of the program from other mediating factors. The use of experimental evidence strengthens the SROI estimation since it shows the causal effects of the program instead of correlational associations.

### Expected **Benefits:**

**Increased Lifetime Income Improved Health Increased Tax Revenues Savings from Reduced Special Education and Grade Retention Savings from Reduced Crime**  Next, we determine the monetary value of the effect of the program outcomes. We identify outcomes that lead to measurable economic benefits to society. Participating children and their mothers, taxpayers, and other individuals receive these benefits in the form of increased income, improved health, and other economic improvements. For example, using existing evidence we estimate that participating children are expected to experience an increase of 3 percentage points in their probability to graduate from high school because of improved socio-emotional development associated with CSAs. This improvement is associated with higher lifetime income and increased taxes paid. Improved socio-emotional skills also reduce the probability of committing crimes as an adult which leads to savings to the judicial system and reduced costs to victims of crime. The complete list of monetized outcomes is presented in the accompanying Technical Document.

**Total Benefits** Per Participant: \$9,155

ROI:

**S9** 

Society's ROI to **Taxpayers: S7** 

In the final step, we estimate the benefit-cost ratio, sometimes called social return on investment (SROI). An SROI larger than one indicates that the benefits of the program exceed the value of resources that society invests in the intervention. We present the SROI from the perspective of taxpayers, i.e., the SROI includes benefits received by the government; and from the perspective of the whole society which includes all the economic benefits and costs that were feasible to estimate.



## Economic Benefits Per Participant from Collegebound



## A Note of Gratitiude



Much gratitude is owed to the advisory group and reviewer who served as content experts for this prospective social return-on-investment study. Their decades of combined expertise made for rich deliberation and feedback that strengthened the social return-on-investment framework used for this study.

### Advisory Group

**Dr. William Elliott**, University of Michigan – CSA expert and CollegeBound Saint Paul researcher

**Dr. Nicole MartinRogers**, Advance Consulting and Saint Paul Children's Collaborative and member of City of Saint Paul Financial Empowerment Community Council – Research Committee

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Many thanks are also given to the **McKnight Foundation** and the **Saint Paul and Minnesota Foundation** who financially supported the SROI study.

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#### Inquiries

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## Social Return on Investment of CollegeBound Saint Paul SROI

Technical Documentation

2023



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### **RESULTS**

### Summary ROI from Selected Sources of Benefits

Benefit Source	Benefit per-participant	Program Cost per-participant	SROI	ROI Government
Additional lifetime income via increased higher education achievement - Quasi-experimental evidence	\$34,977	\$1,046	\$33	\$7
Additional lifetime income via increased higher education achievement - Experimental evidence	\$14,149	\$1,046	\$14	\$3
Additional lifetime income mediated by parental expectations of children's college enrollment	\$7,187	\$1,046	\$7	\$1
Additional lifetime income mediated by SED and material hardship & single parents	\$6,128	\$1,046	\$6	\$2
Average from experimental evidence	\$9,155	\$1,046	\$9	\$2
All scenarios include benefits from improved maternal health and tax revenues. SED estimates include benefits to the government and other individuals from reduced special education, grade retention, reduced incarcerations, and savings to victims of crime.				

### Estimated Benefits from Higher Education Progress Using Quasi-Experimental Evidence.

Benefit Source	Benefit per-participant	
Expected Additional Lifetime Income from College Graduation - Bachelor's - Compared to "No account"	\$6,806	
Expected Additional Lifetime Income from College Graduation - Associates - Compared to "No account"	\$5,135	
Expected Additional Lifetime Income from College Graduation - Bachelor's - Compared to "Basic account"	\$6,276	
Expected Additional Lifetime Income from College Graduation - Associates - Compared to "Basic account"	\$4,737	
Expected Additional Lifetime Income from College Enrollment (Some college) - Compared to "No account"	\$4,608	
Improved mother's mental health - Depression leading to improved health (QALY)	\$150	
Improved mother's mental health - Depression leading to increased income	\$138	
Increased local taxes - City	\$1,145	
Increased local taxes - State	\$3,126	
Increased Federal taxes	\$2,856	
Benefits to participants	\$27,850	
Benefits to Taxpayers/Government	\$7,127	
Total benefits	\$34,977	

Note: The comparison groups for college progression vary depending on the availability and statistical significance of results in the reviewed research.

## Estimated Benefits from Higher Education Progress Using Experimental Evidence.

Benefit Source	Benefit per-participant
Expected Additional Lifetime Income from College Progression	\$10,996
Improved mother's mental health - Depression leading to improved health (QALY)	\$150
Improved mother's mental health - Depression leading to increased income	\$138
Increased local taxes - City	\$460
Increased local taxes - State	\$1,256
Increased Federal taxes	\$1,148
Benefits to participants	\$11,284
Benefits to Taxpayers/Government	\$2,865
Total benefits	\$14,149

Estimated Benefits from Improved Social-emotional Development (SED) Using Experimental Evidence.

Benefit Source	Benefit for Iow-income participants	Benefit from single parents	Total Benefit per-participant
Expected Additional Lifetime Income from College Progression and SED.	\$105	\$3,205	\$3,310
Improved mother's mental health - Depression leading to improved health (QALY)	\$150	\$150	\$150
Improved mother's mental health - Depression leading to increased income	\$138	\$138	\$138
Savings to the MN Department of Education from reduced special education	\$125	\$724	\$849
Savings to the MN Department of Education from reduced grade retention	\$11	\$67	\$78
Savings to the Justice System from reduced crime and incarcerations	\$52	\$284	\$362
Increased local taxes - City	\$10	\$138	\$148
Increased local taxes - State	\$27	\$377	\$404
Increased Federal taxes	\$25	\$345	\$370

Savings to victims of crimes	\$50	\$295	\$345
Benefits to participants	\$393	\$3,493	\$3,886
Benefits to Taxpayers/Government	\$250	\$1,935	\$2,185
Benefits to other individuals	\$50	\$295	\$345
Total benefits	\$693	\$5,723	\$6,416

## Estimated Benefits from Improved Parental Expectations about College Using Quasi-Experimental Evidence.

Additional lifetime income mediated by parental expectations	Benefit per-participant
Additional lifetime income mediated by parental expectations	\$5,459
Improved mother's mental health - Depression leading to improved health (QALY)	\$150
Improved mother's mental health - Depression leading to increased income	\$138
Increased local taxes - City	\$231
Increased local taxes - State	\$632
Increased Federal taxes	\$577
Benefits to participants	\$5,747
Benefits to Taxpayers/Government	\$1,440
Total benefits	\$7,187

### **General Framework and Scope**

This section summarizes the main methodological approach and the scope of the study. We start by describing the general benefit-cost analysis model and the estimation procedures. Then we map out the scope of the research evidence and how we incorporate it in the analysis. The remaining of this technical report contains the main metrics used to estimate the benefit-cost ratios.

The BCA model we use in this study consists in the following steps: First, we collect the best available evidence on the outcomes associated with this type of program. Second, we identify which of these outcomes leads to measurable economic benefits to society – that is, participants, the Government, and other agents in society. Then, we quantify these benefits and compare it to the cost of implementing the program and generate a benefit-cost ratio (BCR). The BCR is a number that represents the dollar value of benefits to society for every dollar invested in the program. A BCR larger than 1 indicates that the societal benefits associated with the program exceed the value of resources that society invests in the intervention. The proposed methodology has been vetted and used by the Washington State Institute for Public Policy, the Robin Hood Foundation, NY, and locally by Results First Minnesota, the Constellation Fund, and Wilder Research.

The main result of the analysis is the average SROI estimated using experimental evidence. For completeness, we also estimate the SROI from quasi-experimental studies.

### **General Model**

The main result of the study is the Benefit-Cost Ratio (BCR) or Social Return on Investment. This is depicted as:

$$BCR = \frac{Benefits}{Cost}$$

The BCR shows the benefit accrued by society for every dollar invested in the program. A BCR larger than one indicates that the program's expected benefits exceed the cost of the program. We consider standing from the perspective of participating children and their mothers and from the Government.

We estimate the expected benefits of a proposed program investment based on a general model of the value of the stream of expected future benefits for low-income families. The model is depicted as:

Benefits = N x 
$$\sum_{t=1}^{T} \frac{Q_{t} \times P_{t}}{(1 + Dis)^{t}}$$

Q<sub>t</sub> is our best estimate of the average per-participant impact on an outcome caused by the proposed program in the year t-years after the start of the program. It is the difference in the average outcome among potential participants between two possibilities: 1) if they all get the program and 2) if none of them get the program. Program impacts are estimated based on evidence from evaluation results of individual programs or average effect size from several evaluations. In this study, we use two main counterfactual or comparison groups for the estimation of benefits from increased probability of graduation from a higher education institution: children who are likely to have savings accounts on their names.

 $P_{t}$  is our best estimate of the monetary value of a unit change in the outcome Qt at year t as valued by participants and the Government.

D is the social discount rate, which we establish as 3 percent. This adjustment reflects the fact that a dollar today is worth more than a dollar in the future.

T is the number of years that any program effects are expected to last. This is estimated based on a combination of factors, including evidence from research literature and the assessment of the program. In this study, the general time frame for program participation is approximately 20-24 years. Lifetime earnings are from age 18 to 65 and discounted to age 1, and health benefits are estimated for 3 years.

N is the projected number of participants. In this study, all estimates are 'per-participant', thus N=1. We include benefits accrued by taxpayers or the government in the form of additional tax revenues derived from the increased income of participants. We estimated the value of improved health using Quality-Adjusted-Life-Years (QALY). This is a common way of evaluating a state of health in economics. One "QALY" is equivalent to one year in perfect health.

Program Costs are estimated using program projections for the direct deposits and administrative costs of the program during the expected number of years a child is in the program. Total expenditures are then divided by the expected number of participants estimated by the program using population trends and official records. The stream of future costs is discounted using the assumed 3% rate.

<sup>&</sup>lt;sup>1</sup>For more details see the following sources and examples:

https://constellationfund.org/impact/metrics/

http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf

### Scope of evidence

## Markoff, et al., (2018) provides a brief inventory of outcomes associated with CSAs that have been studied.

Outcomes associated with CSAs
Academic achievement: standardized test score
Post-secondary enrollment and completion
Youth psychological well-being: sense of security, better outlook, etc.
Child developmental and social-emotional functioning
Positive parenting
Mother's psychological wellbeing (decreased depression)
Program effect on savings behaviors: <ul> <li>Participation/Enrollment/opt-in</li> <li>Additional deposits</li> <li>Accumulation</li> </ul>
Other stated outcomes of CSAs <ul> <li>Reduced lower student debt.</li> <li>Improved general economic well-being.</li> <li>CSA combined with financial education leading to improved financial capability among elementary students.</li> <li>Improved connection to mainstream financial institutions.</li> </ul>

• Increased savings account ownership as adults.

#### From these outcomes, we identify those for which we can estimate monetary benefits.

CDA evidence on monetizable outcomes				
Outcome	Type of Evidence/Source	Target Population benefited		
College Progression	Experimental (Azzolini, et al., 2018) Quasi- experimental (Elliot, 2011, 2013).	General population/Low Income		
Parental Expectations	Experimental (Kim, et al., 2015),	General Population.		
Children's Social-emotional Development (SED)	Experimental (Huang, et al., 2014, 2017)	Children in households with higher material hardships and from single/unmarried mothers.		

#### From this evidence, we identify the following monetary outcomes:

Monetizable Outcomes	CSA Evidence
Additional lifetime income via increased higher education achievement	Experimental (Azzolini, et al., 2018) Quasi-experimental (Elliot, 2011, 2013)
Additional lifetime income mediated by parental expectations	Experimental (Kim, et al., 2015)
Additional lifetime income mediated by SED and material hardship	Experimental (Huang, et al., 2014)
Additional lifetime income mediated by SED maternal marital status	Experimental (Huang, et al., 2017)
Improved mother's mental health - Depression - QALYs	Experimental (Huang, et al., 2014)

Improved mother's mental health - Depression - Increased income	Experimental (Huang, et al., 2014)	
Increased tax revenues by Government level (City, state, federal)	Experimental (Huang, et al., 2014, 2017)	
Savings to the government via reduced spending on special education	Experimental (Huang, et al., 2014, 2017)	
Savings to the government via reduced spending from grade retention	Experimental (Huang, et al., 2014, 2017)	
Savings to the government via reduced crime and incarcerations	Experimental (Huang, et al., 2014, 2017)	
Benefits to other individuals from reduced costs to victims of crime	Experimental (Huang, et al., 2014, 2017)	

#### We estimate benefits from social-emotional development using the following framework:

Economic Benefits of CSAs via Social-Emotional Development <sup>1</sup>					
Stage 1 College Savings Accounts leading to Social-emotional Development (SED)	CSA impact on SED mediated by material hardship (Only for low-income participants). Experimental evidence from Huang, et al., (2014) [Standardized ES = -0.025] CSA impact on SED mediated by mother's marital status (Only for single mothers) Experimental evidence from Huang, et al., (2017) [Standardized ES = -0.20]				pants). ners)
			Outcome (Standa	urdized Effect Size)	
	SED characteristic	High School Graduation	Grade Retention	Special Education	Crime
Stage 2 SED characteristics	Externalizing Behavior / Conduct disorders & ADHD	-0.225		0.398	0.340
leading to selected outcomes <sup>2</sup>	Delinquency/Disruptive Behavior	-0.432	0.273	0.398	0.340
	Internalizing/Depressive symptoms	-0.117	0.266		
	Drug use				0.304
	Alcohol use < 18 years of age	-0.039			0.034
	Average effect of SED	-0.203	0.270	0.398	0.255
		Economic outcome			
Stage 3 Selected outcomes from SED leading to Economic Benefits <sup>4</sup>	Perspective	High School Graduation	Grade Retention	Special Education	Crime
	Benefits to Participants	Lifetime Income, Increased Health (QALYs)			Increased HS graduation <sup>3</sup>
	Benefits to Government	Increased Tax Revenues	Savings to Educational System	Savings to Educational System	Savings to Justice System
	Benefits to others				Reduced costs to victims

	<sup>1</sup> There is abundant evidence of the impact of SED on other outcomes not shown here. However, we only include outcomes with monetizable benefits. <sup>2</sup> All effect sizes in Stage 2 from <u>WSIPP (2019).</u>
	<sup>3</sup> Not included in final estimation to avoid duplication of benefits. <sup>4</sup> Estimates in Stage 3 based on local demographics, cost of resources, and local counterfactuals. See detailed estimations and sources in the Metrics section.
Stage 4 Estimation of Economic Benefits of CSA via SED	See Benefit Metrics for details

#### **Section References**

Azzolini, D., Martini, A., Romano, B., & Vergolini, L. (2018). Affording college with the help of asset building: First experimental impacts from Italy. Economics Letters, 169, 27–30. https://doi.org/10.1016/j.econlet.2018.05.006

Elliott, W., & Beverly, S. G. (2011). The role of savings and wealth in reducing "wilt" between expectations and college attendance. Journal of Children and Poverty, 17(2), 165–185. <u>https://doi.org/10.1080/10796126.2011.538375</u>

Elliott, W. (2013). Small-dollar children's savings accounts and children's college outcomes. Children and Youth Services Review, 35(3), 572–585. <u>https://doi.org/10.1016/j.childyouth.2012.12.015</u>

Huang, J., Sherraden, M., & Purnell, J. Q. (2014). Impacts of Child Development Accounts on maternal depressive symptoms: Evidence from a randomized statewide policy experiment. Social Science and Medicine, 112, 30–38. https://doi.org/10.1016/j.socscimed.2014.04.023

Huang, J., Kim, Y., & Sherraden, M. (2017). Material hardship and children's social-emotional development: Testing mitigating effects of Child Development Accounts in a randomized experiment. Child: Care, Health and Development, 43(1), 89–96. https://doi.org/10.1111/cch.12385

Kim, Y., Sherraden, M., Huang, J., & Clancy, M. (2015). Child development accounts and parental educational expectations for young children: Early evidence from a statewide social experiment. Social Service Review, 89(1), 99–137. https://doi.org/10.1086/680014

Markoff, S., Loya, R., & Santos, J. (2018). Quick Guide to CSA Research and Overview of Evidence on Children's Savings Accounts.

Washington State Institute for Public Policy. (December 2019). Benefit-cost technical documentation. Olympia, WA: Author. Retrieved from: https://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf

### **Benefit Metrics**

<b>Metric 1</b> - A education ins	Additional lifetime income from increased graduation from higher stitutions - Bachelor's Degree - Comparison: No savings accounts
Equation	(# Participants) x (Q: Increased probability of graduation from higher education) x (\$ Additional expected lifetime income from higher education degree) x (% Proportion of children expected to have no savings account)
Value per-participant	(1) x (0.189) x (\$108,217) x (0.55) x (Discount Factor to age 1) = \$6,806
	This metric assesses the expected additional income for CBSP's participants from the increased probability of earning a bachelor's degree. The metric compares graduation rates of CBSP and children who are expected to have no savings account in their names. Metric Components:
	(cohorts or subgroups). For per-participant estimations use "1". Q: Increased probability of college graduation - bachelor's Degree: [0.189]. Q is the estimated increase in the graduation rate of children with college-savings accounts measured in percentage points.
	We estimate this outcome as: Q = (e^((PE*1.65)) * Base%)/((1-Base%) + (Base%*e^((PE*1.65))))-Base%
Explanation	This formula converts the original program effect (PE) reported by Elliott (2013) as odds ratios into standardized mean differences, via a Cox transformation, i.e. [e^ (PE*1.65)], (Lipsey, & Wilson, 2001). The Formula allows the use of a customized counterfactual base rate for the outcome (Base%) to estimate a percentage point change in that base rate. In this formula, PE is the odds ratio of the graduation rates of children with college-savings accounts vs those without any type of savings account [2.394] (Elliot, 2013). The Base% is the college graduation rate in Minnesota for 4-year institutions (MN Department of Education, 2019) contingent on high school graduation and enrollment in college [0.23].
	\$ Additional expected lifetime income from higher education degree: [\$145,033]. This is the difference in lifetime income between those with a 4-year higher education degree and those with only a high school diploma. These estimates are adjusted by the rates of high school graduation and enrollment (MN Department of Education, 2021). Lifetime income is estimated from the U.S. Census data on income by educational level in Minnesota. Results are present value discounted at 3% from age 65 to age 18 and are net of federal and state taxes. The gross differences in income are adjusted by a causation factor of educational achievement on earnings. This factor accounts for the fact that not all the difference in income across educational levels comes from educational achievement (WSIPP, 2021). For per-participant estimation, we weigh benefits by the proportion of children who are expected to earn a bachelor's degree.
	<ul> <li>Other assumptions used in the estimation of increased income:</li> <li>Calculations are based on the 5-Year ACS PUMS Data (2019) (American Community Survey - Public Use Microdata Sample)</li> <li>Calculations are for the Twin Cities Metropolitan Area</li> <li>The earnings include wages and self-employment incomes</li> <li>All the earning values are rounded to the nearest dollar, and adjusted to 2021 US Dollars using the average CPI for all urban consumers as available on this link: https://data.bls.gov/timeseries/</li> </ul>
	<ul> <li>CUUR0000SA0</li> <li>The estimated gross difference in lifetime earnings of individuals with a bachelor's degree vs. high school with no further education = \$1,120,254</li> <li>% causation factor of bachelor's degree on earnings = 0.42</li> <li>% counterfactual rate of college graduation - bachelor's contingent on enrollment and high school graduation = 0.31</li> </ul>

Explanation	Expected increased lifetime income f Proportion of children without any so Discount Factor to age 1: [0.605], Li to the age of the program start using	from associate degree = (\$1,120,254 avings account: [0.55] (PSID, 2019). ifetime income estimates are from ag g the discount factor = 1/ (1.03)^17	4) x (0.42) x (0.23) = \$108,217 e 18 to 65, so values are discounted	
	Elliott, W. (2013). Small-dollar childr Youth Services Review, 35(3), 572–55 Lipsey, M. W., & Wilson, D. B. (2001	ren's savings accounts and children's 85. https://doi.org/10.1016/j.childyc ). Practical meta-analysis. Sage Public	college outcomes. Children and outh.2012.12.015 cations, Inc.	
	Minnesota Compass (2020). Educati income. Retrieved from http://www.r	ion: High school graduation. High scl nncompass.org/	hool students graduating on time by	
References	Minnesota Office of Higher Education. http://www.ohe.state.mn.us/sPages/GraduationRateTrends.cfm			
	Panel Study of Income Dynamics, pu Institute for Social Research, Universi	blic use dataset. Produced and distrik ity of Michigan, Ann Arbor, MI (2019)	outed by the Survey Research Center,	
	U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.			
	Source	Quality of evidence	Comments	
Strength Of Evidence	Quality of evidence	Quasi-experimental design. Controls for individual and family demographics and other covari- ates. Highly disaggregated results based on several counterfactual states related to account doses, i.e., account ownership and types.	Note that in Elliott (2013) the intervention refers to owning a savings account for college pur- poses while SPCB is a more com- prehensive program that includes not only the savings account but other programmatic elements such as outreach, incentives, and complementary services, including that the account is open auto- matically for the eligible children. We assume that the gap between the treatment in the paper and the Program would in most cases lead to underestimation of the results. This is assuming that the Program's more comprehensive intervention may lead to higher effects. We include results from a range of available evidence to show potential results under dif- ferent assumptions and method- ological designs.	
	Comments		The author's calculations of rates of savings accounts are direct fre- quency estimates that do not use individual weights or any other sampling adjustments.	

### **Metric 2** - Additional lifetime income from increased graduation from higher education institutions - Associate's Degree - Comparison: No savings accounts

Equation	(# Participants) x (Q: Increased probability of graduation from higher education) x (\$ Additional expected lifetime income from higher education degree) x (% Proportion of children expected to have no savings account)
Value per-participant	((1) x (0.18) x (\$85,723) x (0.55) x (Discount Factor to age 1) = \$5,135
Explanation	This metric assesses the expected additional income for CBSP's participants from the increased probability of earning an associate's degree. The metric compares graduation rates of CBSP and children who are expected to have no savings account in their names. <b>Metric Components:</b> Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". Q: Increased probability of college graduation - bachelor's Degree: [0.18]. Q is the estimated increase in the graduation rate of children with college-savings accounts measured in percentage points. <b>We estimate this outcome as:</b> Q = (e^ ((PE*1.65)) * Base%)/((1-Base%) + (Base%*e^ ((PE*1.65))))-Base% In this formula, PE is the odds ratio of the graduation rates of children with college-savings accounts vs those without any type of savings account [2.394] (Elliot. 2013). The Base% is the college graduation rate in Minnesota for 2-year institutions (MN Department of Education, 2019) contingent on high school graduation and enrollment in college [0.21]. \$ Additional expected lifetime income from higher education degree: [\$85,723]. This is the difference in lifetime income between those with a 2-year higher education degree and those with only a high school diploma. This is settimated using the same sources and methods explained in Metric 1. <b>Other assumptions specific to this metric:</b> • The gross difference in lifetime earnings of individuals with a bachelor's degree vs. high school with no further education = \$728,936 • % causation factor of any higher education degree on earnings = 0.56 • % counterfactual rate of college graduation - associate's contingent on enrollment and high school graduation = 0.21 • Expected increased lifetime income from associate degree = (\$728,936) × (0.56) × (0.21) = \$85,723 • Discount Factor to age 1: [0.605], Lifetime income estimates are from age 18 to 65, so values are discounted to the age of the program start using the disc
References	<ul> <li>Elliott, W. (2013). Small-dollar children's savings accounts and children's college outcomes. Children and Youth Services Review, 35(3), 572–585. https://doi.org/10.1016/j.childyouth.2012.12.015</li> <li>Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/</li> <li>Minnesota Office of Higher Education. http://www.ohe.state.mn.us/sPages/GraduationRateTrends.cfm</li> <li>Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI (2019)</li> <li>U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.</li> </ul>
Strength Of Evidence	See Metric 1.

### **Metric 3** - Additional lifetime income from increased graduation from higher education institutions - Bachelor's Degree - Comparison: Basic savings accounts

Equation	(# Participants) x (Q: Increased probability of graduation from higher education) x (\$ Additional expected lifetime income from higher education degree) x (% Proportion of children expected to have basic savings account) x (Discount Factor to age 1)
Value per-participant	(1) x (0.213) x ( $\$108,217$ ) x (0.45) = $\$6,276$
Explanation	This metric assesses the expected additional income for CBSP's participants from the increased probability of earning a bachelor's degree. The metric compares graduation rates of CBSP and children who are expected to have basic savings accounts on their names. <b>Metric Components:</b> Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". Q: Increased probability of college graduation - bachelor's Degree: [0.213]. Q is the estimated increase in the graduation rate of children with college-savings accounts measured in percentage points. <b>We estimate this outcome as:</b> $Q = (e^{(PE*1.65)) * Base%)/((1-Base%) + (Base%*e^{(PE*1.65))))-Base%$ In this formula, PE is the odds ratio of the graduation rates of children with college-savings accounts vs those with basic savings accounts [2.643] (Elliot. 2013). The Base% is the college graduation rate in Minnesota for 4-year institutions (MN Department of Education, 2019) contingent on high school graduation and enrollment in college [0.23]. \$ Additional expected lifetime income from higher education degree: [\$108,217]. This is the difference in lifetime income between those with a 4-year higher education degree and those with only a high school diploma. This is estimated using the same sources and methods explained in Metric 1. Proportion of children without any savings account: [0.45] (PSID, 2019).
References	<ul> <li>Elliott, W. (2013). Small-dollar children's savings accounts and children's college outcomes. Children and Youth Services Review, 35(3), 572–585. https://doi.org/10.1016/j.childyouth.2012.12.015</li> <li>Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/</li> <li>Minnesota Office of Higher Education. http://www.ohe.state.mn.us/sPages/GraduationRateTrends.cfm</li> <li>Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI (2019)</li> <li>U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.</li> </ul>
Strength Of Evidence	See Metric 1.

## **Metric 4** - Additional lifetime income from increased graduation from higher education institutions - Associate's Degree - Comparison: Basic savings accounts

Equation	(# Participants) x (Q: Increased probability of graduation from higher education) x (\$ Additional expected lifetime income from higher education degree) x (% Proportion of children expected to have basic savings accounts)
Value per-participant	(1) x (0.20) x (\$85,723) x (0.45) x (Discount Factor to age 1) = \$4,737
Explanation	<ul> <li>This metric assesses the expected additional income for CBSP's participants from the increased probability of earning an associate's degree. The metric compares graduation rates of CBSP to children who are expected to have basic savings accounts on their names.</li> <li>Metric Components:</li> <li>Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1".</li> <li>Q: Increased probability of college graduation - associate's Degree: [0.064]. Q is the estimated increase in the graduation rate of children with college-savings accounts measured in percentage points.</li> <li>We estimate this outcome as:</li> <li>Q = (e ^ ((PE*1.65)) * Base%)/((1-Base%) + (Base%*e ^ ((PE*1.65))))-Base% In this formula, PE is the odds ratio of the graduation rates of children with college-savings accounts vs those without any type of savings account [2.643] (Elliot. 2013). The Base% is the college graduation and enrollment in college [0.21].</li> <li>\$ Additional expected lifetime income from higher education degree: [\$86,448]. This is the difference in lifetime income between those with a 2-year higher education degree and those with only a high school diploma. This is estimated using the same sources and methods explained in Metric 2.</li> <li>Proportion of children without any savings account: [0.45] (PSID, 2019).</li> </ul>
References	Elliott, W. (2013). Small-dollar children's savings accounts and children's college outcomes. Children and Youth Services Review, 35(3), 572–585. https://doi.org/10.1016/j.childyouth.2012.12.015 Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/ Minnesota Office of Higher Education. http://www.ohe.state.mn.us/sPages/GraduationRateTrends.cfm Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI (2019) U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.
Strength Of Evidence	See Metric 1.

## **Metric 5** - Additional lifetime income from increased enrollment in higher education institutions - Some College - Comparison: No savings accounts

Equation	(# Participants) x (Q: Increased probability of enrolling in higher education) x (\$ Additional expected lifetime income from "some college") x (% Proportion of children expected to have no savings account) x (Discount Factor to age 1)
Value per-participant	$(1) \times (0.234) \times (\$59,187) \times (0.55) \times (0.605) = \$4,608$
Explanation	This metric assesses the expected additional income for CBSP's participants from the increased probability of earning a bachelor's degree. The metric compares graduation rates of CBSP and children who are expected to have no savings account on their names. Metric Components: Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use '1''. Q: Increased probability of college graduation - bachelor's Degree: [0.234]. Q is the estimated increase in the graduation rate of children with college-savings accounts measured in percentage points. We estimate this outcome as: Q = (a^ ([PE*1.65]) * Base%)/((I1-Base%) + (Base%* a^ ((PE*1.65))))-Base% In this formula, PE is the odds ratio of the enrollment rates of children with college-savings accounts vs those without any type of savings account [3.065] (Elliot. 2011). The Base% is the college enrollment rate in Minnesota (MN Department of Education, 2019) contingent on high school graduation, college enrollment but not graduating [0.20]. S Additional expected lifetime income from higher education and those with only a high school diploma. These estimates are adjusted by the rates of high school graduation and enrollment (MN Department of Education, 2021). Lifetime income is estimated from the U.S. Census data on income by education factor of educational chievement on earnings. This factor accounts for the fact that not all the difference in income across educational chieves come sfrom educational achievement (WSIPP, 2021). For per-participant estimation, we weight benefits by the proportion of children who are expected to earn a bachelor's degree. Other assumptions used in the estimation nicemes: • Calculations are based on the 5:Year ACS PUMS Data (2019) (American Community Survey - Public Use Microdata Sample) • Calculations are based on the 5:Year ACS PUMS Data (2019) (American Community Survey - Public Use Microdata Sample) • Calculations are

References	<ul> <li>Elliott, W. (2013). Small-dollar children's savings accounts and children's college outcomes. Children and Youth Services Review, 35(3), 572–585. https://doi.org/10.1016/j.childyouth.2012.12.015</li> <li>Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/</li> <li>Minnesota Office of Higher Education. http://www.ohe.state.mn.us/sPages/GraduationRateTrends.cfm</li> <li>Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI (2019)</li> <li>U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.</li> </ul>
Strength Of Evidence	See Metric 1.

## **Metric 6** - Child Development Accounts (CBSP) leading to reduced maternal depression and increased quality-adjusted life years (QALY)

Equation	(# participants) x (Q1: Reduction of maternal depression due to the intervention) x (QALY increase) x (\$ QALY) x (Duration)
Value per-participant	(1) x (0.007) x (0.15) x (\$50,000) x (3 years) = \$150
	This metric estimates the impact of Child Development Accounts on maternal depression and the subsequent value from increased health. Reduced depression is usually not the explicit intention of these programs, but evidence shows that this is an indirect outcome. We value increased health using Quality Adjusted Life Years (QALY). We assign a value of \$50,000 per QALY.
	Metric Components:
	Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". Q1: Reduction of maternal depression due to the intervention: [0.007].
	This is estimated using the following formula:
Explanation	Q = ES * Base In this formula, ES is the standardized effect size estimated from Huang, et al., (2014): [-0.09]. The base is the standard deviation of mothers with postpartum depressive symptoms in Minnesota [0.0807] (Centers for Disease Control and Prevention, 2016).
	$Q = (0.09) \times (0.0807) = 0.007$
	QALY increase: [0.15]. This is the QALY value of the relief symptoms of PTSD or depression due to best- practice therapeutic or pharmacological care (Revicki et al., 2005; Rost, Pyne, Dickinson & LoSasso, 2005). Note that this QALY value already accounts for probabilities of treatment response.
	\$ value per QALY: [\$50,000].
	Duration of benefits (T): [3 years]. We assumed 3 years of disease untreated with or without treatment (Putnick, et al., 2014). The final result is the present discounted value to child's age 1.
	Centers for Disease Control and Prevention (CDC), (2022). Selected 2016 Through 2020 Maternal and Child Health (MCH) Indicators by Site. Retrieved from: https://www.cdc.gov/prams/prams-data/selected- mch-indicators.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fprams%2Fprams-data%2F2019- selected-mch-indicators.html#print
References	Huang, J., Sherraden, M., & Purnell, J. Q. (2014). Impacts of Child Development Accounts on maternal depressive symptoms: Evidence from a randomized statewide policy experiment. Social Science and Medicine, 112, 30–38. https://doi.org/10.1016/j.socscimed.2014.04.023
	Putnick, D. L., Sundaram, R., Bell, E. M., Ghassabian, A., Goldstein, R. B., Robinson, S. L., Vafai, Y., Gilman, S. E., & Yeung, E. (2020). Trajectories of Maternal Postpartum Depressive Symptoms. Pediatrics, 146(5). https://doi.org/10.1542/peds.2020-0857
	Revicki, D., Siddique, J., Frank, L., Chung, J., Green, B., Krupnick, J., Prasad, M. & Miranda, J. (2005). Cost- effectiveness of evidence-based pharmacotherapy or cognitive behavioral therapy compared with community referral for major depression in predominantly low-income minority women. Archives of General Psychiatry, 62(8), 868-875
	Rost, K., Pyne, J., Dickinson, L. M. & LoSasso, A. T. (2005). Cost-effectiveness of enhancing primary care depression management on an ongoing basis. Annals of Family Medicine, 3(1), 7-14.
Strength Of Evidence	Evidence of the impact of CSA on maternal health from Huang, et al., 2014) based on experimental design. Estimations of QALY refer to post-natal depression, whereas the effect of CSA may include broader types of depression.

## **Metric 7** - Child Development Accounts (CBSP) leading to reduced maternal depression and increased earnings

Equation	(# participants) x (Q1: Reduction of maternal depression due to the intervention) x (% reduction in earnings as a result of depression symptoms) x (\$ average annual earnings) x (Duration)
Value per-participant	(1) x (0.007) x (0.1) x (\$69,166) x (3 years) = \$138
Explanation	This metric estimates the impact of Child Development Accounts on maternal depression. Reduced depression is usually not the explicit intention of these programs, but evidence shows that this is an indirect outcome. <b>Metric Components:</b> Number of Participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". Q1: Reduction of maternal depression due to the intervention: [0.007]. In this formula, ES is the standardized effect size estimated from Huang, et al., (2014): [-0.09]. The base is the standard deviation of mothers with postpartum depressive symptoms in Minnesota [0.0807] (Centers for Disease Control and Prevention, 2016). Q = (0.09) x (0.0807) = 0.007 % reduction in earnings because of depression symptoms: [0.1]. The estimated 10 percent increase in earnings because of depression treatment is based on the work of Kessler (2000), which shows that depression reduces days worked per month by about 2.2 days, or about 26 days per year, representing about 10 percent of the work year. This estimate of lost wages is very conservative because it does not consider the more structural aspects of lost opportunity and unstable employment. Average annual earnings general population: [\$69,166]. Counterfactual earnings are calculated from ACS 5-year estimates (U.S Census Bureau, 2019). For all earners and non-earners in the Twin Cities population. Duration of benefits (T): [3 years]. We assumed 3 years of disease with or without treatment (Putnick, et al., 2014).
References	<ul> <li>Centers for Disease Control and Prevention (CDC), (2022). Selected 2016 Through 2020 Maternal and Child Health (MCH) Indicators by Site. Retrieved from: https://www.cdc.gov/prams/prams-data/selected- mch-indicators.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fprams%2Fprams-data%2F2019- selected-mch-indicators.html#print</li> <li>Huang, J., Sherraden, M., &amp; Purnell, J. Q. (2014). Impacts of Child Development Accounts on maternal depressive symptoms: Evidence from a randomized statewide policy experiment. Social Science and Medicine, 112, 30–38. https://doi.org/10.1016/j.socscimed.2014.04.023</li> <li>Putnick, D. L., Sundaram, R., Bell, E. M., Ghassabian, A., Goldstein, R. B., Robinson, S. L., Vafai, Y., Gilman, S. E., &amp; Yeung, E. (2020). Trajectories of Maternal Postpartum Depressive Symptoms. Pediatrics, 146(5). https://doi.org/10.1542/peds.2020-0857</li> <li>Revicki, D., Siddique, J., Frank, L., Chung, J., Green, B., Krupnick, J., Prasad, M. &amp; Miranda, J. (2005). Cost- effectiveness of evidence-based pharmacotherapy or cognitive behavioral therapy compared with community referral for major depression in predominantly low-income minority women. Archives of General Psychiatry, 62(8), 868-875</li> <li>Rost, K., Pyne, J., Dickinson, L. M. &amp; LoSasso, A. T. (2005). Cost-effectiveness of enhancing primary care depression management on an ongoing basis. Annals of Family Medicine, 3(1), 7-14.</li> </ul>
Strength Of Evidence	Evidence of impact of CSA on maternal health from Huang, et al., 2014) based on experimental design

## **Metric 8** - Child Development Accounts (CBSP) leading to improved SED and savings in incarceration costs due to fewer incarcerations (Adult justice system only)

Equation	(# participants) x (% Target population) x (% Effect of CDA on SED leading to reduced crime) x (Quantity of resource used) x (\$ Per diem cost of incarceration)
Value per-participant	Low-income families: (1) x (0.052) x (0.198) x (0.11) x (\$42,871) = \$52 Single mothers: (1) x (0.326) x (0.185) x (0.11) x (\$42,871) = \$284
	This metric assesses the impact of CSAs on future crime due to improved social-emotional development of participating children and the associated savings in incarceration costs. The metric is used to estimate benefits that result from two paths: reduced crime resulting from the improve £5 skills of children in low-income families and benefits from children born to single mothers. The benefits estimated in this metric refer to a complex since there are many potential outcomes linked through the process from committing an offense of a particular yne, the probability of being caught by law enforcement, the probability of being charged, the probability of receiving a particular sentence of a particular sentence. During this process, several public resources are used, law enforcement, the motobaltilly of being charged, the probability of receiving a particular sentence of a particular sentence. During this process, several public resources are used, law enforcement, and the probability of the agence effect size, the estimated benefits are based on the probability that a crime results in incarceration of an average length and its associated average cost of incarceration. Number of participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations user 1''. This metric is used independently for participants in this metric (and be children born to single mothers. "% Target population: For benefits to low-income participants, we use [5.2%]. To determine the percentage of low-income participants we use the percent of individuals below the federal poverty level in the Twin Cities 7-county region, Minnesota, and U.S. (1989-2021, (MN compass, 2022), we then subtract the percentage of births to unmarried mothers in Minnesota [0.326] (CDC, 2020). "% Effect of CDA on SED leading to reduced crime is (USPP, 2019). For low-income children from single mothers: endardizad effect size of these characteristics of SEDs on crime is [0.255]. We character

References	Center for Disease Control and Prevention (2020). Minnesota. Key Health Indicators. Retrieved from: https:// www.cdc.gov/nchs/pressroom/states/minnesota/mn.htm#print Kent, A., & Urban Institute, the. (n.d.). Youth from Low-Income Families. http://pubdb3.census.gov/ macro/032008/pov/new02_200_01.htm Measures for Justice (2023). Measures for Justice Data Portal (Data Release: 3.11.0). Retrieved from https:// measuresforjustice.org/portal/ on March 22, 2023. MN compass, (2022). https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2021_ ACSSubjectDefinitions.pdf Minnesota Department of Corrections (2022). Adult Prison Population Summary. Retrieved from: https:// mn.gov/doc/assets/Adult%20Prison%20Population%20Summary%201-1-2023_tcm1089-561955.pdf Minnesota Department of Public Safety, Bureau of Criminal Apprehension, Minnesota Justice Information Services (2021). Uniform Crime Report. Retrieved from: https://dps.mn.gov/divisions/bca/bca-divisions/ mnjis/Documents/2021-Minnesota-Uniform-Crime-Report.pdf Washington State Institute for Public Policy. (2019). Benefit-cost technical documentation. Olympia, WA: Author. Retrieved from: https://www.wsipp.wa.gov/TechnicalDocumentation/ WsippBenefitCostTechnicalDocumentation.pdf
Strength Of Evidence	As noted in the introduction of the metric, this simplified model omits several probabilities of events associated with crime. This omission may lead to an overestimation of the impact of the intervention. On the other hand, several resources that are affected by crime are also omitted, resulting in an underestimation of benefits. In addition, there are slight mismatches between the years of data for the rates of crimes and the probability of arrests due to limited availability of data. Also, counterfactual rates of crime used for both groups are not technically probabilities but rates of crime. The metric does not include savings from avoided juvenile crime.

## **Metric 9** - Child Development Accounts (CBSP) leading to improved SED and benefits to victims of crime

Equation	(# participants) x (% Target population) x (% Effect of CDA on SED leading to reduced crime) x (\$ Expected Cost to victims)		
Value per-participant	Low-income families: (1) x (0.052) x (0.198) x (\$4,890) = \$50 Single mothers: (1) x (0.326) x (0.185) x (\$4,890) = \$295		
Explanation	This metric assesses the impact of CSAs on future crime due to improved social-emotional development of participating children and the associated benefits to victims of crime. The metric is used to estimate benefits that result from two paths: reduced crime resulting from improved SE skills of children in low-income families and benefits from children born to single mothers. The estimates refer only to tangible costs.		
	Number of participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". This metric is used independently for participating children of low-income families and children born to single mothers.		
	% Target population: For benefits to low-income participants, we use [5.2%]. To determine the percentage of low-income participants we use the percent of individuals below the federal poverty level in the Twin Cities 7-county region, Minnesota, and U.S., 1989-2021. (MN compass, 2022), we then subtract the percentage of births to single mother to avoid duplication. For benefits for children born to single mothers, we use the percentage of births to unmarried mothers in Minnesota [0.326] (CDC, 2020).		
	% Effect of CDA on SED leading to reduced crime: [Low-income: -0.198; Children from single mothers: -0.185].		
	We characterize SED using the following behaviors or outcomes: Externalizing Behavior / Conduct disorders & ADHD, Delinquency/Disruptive Behavior, Internalizing/Depressive symptoms, Drug use, Alcohol use < 18 years of age. The average standardized effect size of these characteristics of SEDs on crime is [0.255]. We define crime as any type of crime leading to an arrest. (WSIPP, 2019). For low-income children, the effect size of CSA on SED and SED on crime are multiplied and then used in the dichotomous outcome equations using a counterfactual probability of a crime for low-income children of 20% (Kent, n.d.). For children born to single mothers, the linked effect sizes are combined with the crime rate from the general population in Minnesota [2%] (Minnesota Department of Corrections, 2022)		
	\$ Expected Cost to victims: [\$4,890]. We estimate the average cost per crime victim across all types of possible offenses from McCollister, et al., (2010) weighted by the number of offenses of each type reported by the Minnesota Department of Public Safety (2021). See the section on crime parameters for details.		
References	Center for Disease Control and Prevention (2020). Minnesota. Key Health Indicators. Retrieved from: https:// www.cdc.gov/nchs/pressroom/states/minnesota/mn.htm#print		
	Kent, A., & Urban Institute, the. (n.d.). Youth from Low-Income Families. http://pubdb3.census.gov/ macro/032008/pov/new02_200_01.htm		
	Measures for Justice (2023). Measures for Justice Data Portal (Data Release: 3.11.0). Retrieved from https:// measuresforjustice.org/portal/ on March 22, 2023.		
	MN compass, (2022). https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2021_ ACSSubjectDefinitions.pdf		
	Minnesota Department of Corrections (2022). Adult Prison Population Summary. Retrieved from: https://mn.gov/doc/assets/Adult%20Prison%20Population%20Summary%201-1-2023_tcm1089-561955.pdf		
	Minnesota Department of Public Safety, Bureau of Criminal Apprehension, Minnesota Justice Information Services (2021). Uniform Crime Report. Retrieved from: https://dps.mn.gov/divisions/bca/bca-divisions/ mnjis/Documents/2021-Minnesota-Uniform-Crime-Report.pdf		
	Washington State Institute for Public Policy. (2019). Benefit-cost technical documentation. Olympia, WA: Author. Retrieved from: https://www.wsipp.wa.gov/TechnicalDocumentation/ WsippBenefitCostTechnicalDocumentation.pdf		
Strength Of Evidence	This metric does not include intangible costs such as pain and suffering and risk-of-homicide costs.		

### **Metric 10** - Child Development Accounts (CBSP) leading to improved SED and Reduced Cost of Special Education

Equation	(# participants) x (% Target population) x (Q: Effect of CDA on SED leading to reduced need of special education) x (\$ Average Per Pupil Annual Cost of Special Education)			
Value per-participant	Low-income families: (1) x (0.052) x (0.155) x ( $$15,614$ ) = $$125$ Single mothers: (1) x (0.326) x (0.142) x ( $$15,614$ ) = $$724$			
per-participati	This metric assesses the impact of CSAs on the future need for special education due to improved social- emotional development of participating children. The metric is used to estimate benefits that result from two paths: reduced crime resulting from improved SE skills of children in low-income families and benefits from children born to single mothers.			
	Metric Components:			
	Number of participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". This metric is used independently for participating children of low-income families and children born to single mothers.			
	% Target population:			
Explanation	For benefits to low-income participants, we use [0.083]. To determine the percentage of low-income participants we use the percent of individuals below the federal poverty level in the Twin Cities 7-county region, Minnesota, and U.S., 1989-2021. (MN compass, 2022) we then subtract the percentage of births to single mother to avoid duplication. For benefits to single mothers, we use the percentage of births to unmarried mothers in Minnesota [0.326] (CDC, 2020).			
	Q: Effect of CDA on SED leading to reduced need of special education: [Low-income: -0.155; Children from single mothers: -0.142]. Q is the estimated increase in the probability that a student uses one year of special education.			
	We estimate this outcome as:			
	Q = (e^((ES*1.65)) * Base%)/((1-Base%) + (Base%*e^((ES*1.65))))-Base%			
	In this formula, ES is the combined standardized effect size of CSA on SED [0.025-low income, 0.2-single mothers] (Huang, et al., 2014, 2017), and SED on Special Education [0.398] (WSIPP, 2019). The Base% is the proportion of students receiving special education in Minnesota (MN Department of Education, 2022).			
	\$ Average Per Pupil Annual Cost of Special Education: [\$15,614] This is estimated using the total expenditure in special education in 2022 [\$2.3 billion] and the number of students receiving special education in that year. All estimates from the MN Department of Education, (2022)			
References	Huang, J., Sherraden, M., & Purnell, J. Q. (2014). Impacts of Child Development Accounts on maternal depressive symptoms: Evidence from a randomized statewide policy experiment. Social Science and Medicine, 112, 30–38. https://doi.org/10.1016/j.socscimed.2014.04.023			
	Huang, J., Kim, Y., & Sherraden, M. (2017). Material hardship and children's social-emotional development: Testing mitigating effects of Child Development Accounts in a randomized experiment. Child: Care, Health and Development, 43(1), 89–96. https://doi.org/10.1111/cch.12385			
	Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/			
	MN Department of Education (2022). Retrieved from: https://education.mn.gov/mde/data/ U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.			
	Washington State Institute for Public Policy. (December 2019). Benefit-cost technical documentation. Olympia, WA: Author. Retrieved from: https://www.wsipp.wa.gov/TechnicalDocumentation/ WsippBenefitCostTechnicalDocumentation.pdf			
Strength Of Evidence	None.			

## **Metric 11** - Child Development Accounts (CBSP) leading to improved SED and Savings from reduced grade Retention

Equation	(# participants) x (% Target population) x (Q: Effect of CDA on SED leading to reduced grade retention) x (\$ Average Per Pupil Annual Cost)			
Value per-participant	Low-income families: (1) x (0.052) x (0.012) x ( $$18,520$ ) = $$11$ Single mothers: (1) x (0.326) x (0.011) x ( $$18,520$ ) = $$67$			
	This metric assesses the impact of CSAs on grade retention due to improved social-emotional development of participating children. The metric is used to estimate benefits that result from two paths: reduced crime resulting from improved SE skills of children in low-income families and benefits from children born to single mothers.			
	Metric Components:			
	Number of participants: This metric can be applied in per-participant terms or to groups of participants (cohorts or subgroups). For per-participant estimations use "1". This metric is used independently for participating children of low-income families and children born to single mothers.			
	% Target population:			
Explanation	For benefits to low-income participants, we use [0.083]. To determine the percentage of low-income participants we use the percent of individuals below the federal poverty level in the Twin Cities 7-county region, Minnesota, and U.S., 1989-2021. (MN compass, 2022) we then subtract the percentage of births to single mother to avoid duplication. For benefits to single mothers, we use the percentage of births to unmarried mothers in Minnesota [0.326] (CDC, 2020).			
	Q: Effect of CDA on SED leading to reduced grade retention: [Low-income: -0.012; Children from single mothers: -0.011]. Q is the estimated increase in the probability that a student uses one year of special education.			
	We estimate this outcome as:			
	Q = (e^((ES*1.65)) * Base%)/((1-Base%) + (Base%*e^((ES*1.65))))-Base%			
	In this formula, ES is the combined standardized effect size of CSA on SED [0.025-low income, 0.2-single mothers] (Huang, et al., 2014, 2017), and SED on grade retention [0.27] (WSIPP, 2019). The Base% is the proportion of students retained in Minnesota [0.012], (MN Department of Education, 2022).			
	\$ Average Per Pupil Annual Cost of Special Education: [\$18,520] This is the per pupil expenditure reported by the MN Department of Education, (2022).			
References	Huang, J., Sherraden, M., & Purnell, J. Q. (2014). Impacts of Child Development Accounts on maternal depressive symptoms: Evidence from a randomized statewide policy experiment. Social Science and Medicine, 112, 30–38. https://doi.org/10.1016/j.socscimed.2014.04.023			
	Huang, J., Kim, Y., & Sherraden, M. (2017). Material hardship and children's social-emotional development: Testing mitigating effects of Child Development Accounts in a randomized experiment. Child: Care, Health and Development, 43(1), 89–96. https://doi.org/10.1111/cch.12385			
	Minnesota Compass (2020). Education: High school graduation. High school students graduating on time by income. Retrieved from http://www.mncompass.org/			
	MN Department of Education (2022). Retrieved from: https://education.mn.gov/mde/data/ U.S. Census Bureau. (2016). American Community Survey 5-year estimates – public use microdata sample, 2012-2016. Generated using Public Use Microdata Area (PUMA) in the Seven-County Twin Cities Metropolitan Area.			
	Washington State Institute for Public Policy. (December 2019). Benefit-cost technical documentation. Olympia, WA: Author. Retrieved from: https://www.wsipp.wa.gov/TechnicalDocumentation/ WsippBenefitCostTechnicalDocumentation.pdf			
Strength Of Evidence	None.			

### **Tax Parameters**

Benefits from increased tax revenues are estimated using "Effective Tax Rates" at different levels of government.

Mn Tax%: Average incidence rate for deciles of individuals with at least \$50,000/year.	0.093
Federal Tax %: Average incidence rate for deciles of individuals with at least \$50,000/year.	0.085
Local Tax%: Total Local Residential and non-residential effective tax rate	0.034

Source: 2021 Minnesota Tax Incidence Study. Table 1-6. Minnesota Effective Tax Rates for 2018. https://www.revenue.state. mn.us/sites/default/files/2022-07/2021%20Tax%20Incidence%20Study.pdf Tax Incidence - https://home.treasury.gov/system/files/131/Distribution-of-Tax-Burden-Current-Law-2019.pdf

### **Costs Parameters**

Total deposits per-participant are estimated using projections and criteria for each type of incentive. Administrative cost per-participant are estimated by dividing total operating costs (not including deposits) by projected number of participants. The total cost per-participant is based on projected births within the city. Costs do not include participant's contributions to accounts, investments in college expenses. These estimates do not include the probability of death of participants before age 21.

Deposit Projections	Amount	Criteria	
SEED Deposits	\$50	100% of annual enrolled	
Equity bonus	\$50	42% of annual enrolled	
Opt-in Bonus	\$50	100% of opt-in enrolled	
Free or Reduced Lunch Bonus	\$50	65% of Birth Cohort	
Log into portal	\$10	11% of annually enrolled	
Enrollment Survey	\$25	50% of logged in	
1st Birthday bonus	\$25	100% of annual enrolled	
Finishing Kindergarten	\$25	100% Birth Cohort	
Elementary School Graduation	\$25	100% Birth Cohort	
High School Graduation	\$25	80% Birth Cohort	
Childhood Wellness bonus	\$50	16% annual enrollment +100 each year 1-5	
Financial Aid Seminar Bonus	\$50	50% year 18-20 from 1 class each year	
FAFSA Completion Bonus	\$50	50% year 18-20 from 1 class each year	
Youth Financial Education bonus	\$10	25% of school-age enrolled, starting grades 4 - 8	
Youth Financial Health Bonus	\$50	10% of HS enrolled, starting Year 14	
Family Financial Health bonus	\$50	5% growth each year, starting 2023	
PPP or GI Monthly Bonus	\$10	150 PPP participants	
Total Expected Deposits per-participant	\$831		
Average Administrative Costs per-participant	\$41		
Present Value of Total Cost per-participant	\$1,046		

### **Demographic and Participation Parameters**

Birth Assumptions	Number	Take up assumptions for participation projections	
Annual Saint Paul Births	4,352	100% of PBR	
Public Birth Records (PBR)	2,752	25% of CBR + 10% of the previous year 100% of CBR not enrolled at birth	
Confidential Birth Records (CBR)	1,600		

Source: CBSP

### **Crime Parameters**

Type of crime	Victim Cost (2022 dollars)	Number of offenses Reported
Murder	\$1,002,485	201
Rape	\$7,552	2019
Aggravated assault	\$11,826	10967
Robbery	\$4,484	3991
Motor vehicle theft	\$8,311	14829
Arson	\$15,566	716
HH Burglary	\$1,851	14429
Larceny	\$652	69593

Sources: Minnesota Department of Public Safety (2021). Bureau of Criminal Apprehension, Minnesota Justice Information Services Uniform Crime Report. Retrieved from: https://dps.mn.gov/divisions/bca/bca-divisions/mnjis/Documents/2021-Minnesota-Uniform-Crime-Report.pdf. McCollister, K. E., French, M. T., & Fang, H. (2010). The cost of crime to society: New crime-specific estimates for policy and program evaluation. Drug and Alcohol Dependence, 108(1–2), 98–109. https://doi. org/10.1016/j.drugalcdep.2009.12.002