Examining the Costs and Benefits of Family Rewards 2.0

A Conditional Cash Transfer Program in Two American Cities

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Overview

Family Rewards was an innovative approach to poverty reduction in the United States that was modelled on the conditional cash transfer (CCT) programs common in lower- and middle-income countries. The program offered cash assistance to poor families to reduce immediate hardship, provided they met certain criteria related to family health care, children's education, and parents' work, in the hope of reducing poverty over the long term. The first version of Family Rewards was evaluated in New York City in 2007. The lessons learned from that evaluation led to the next iteration of the model ("Family Rewards 2.0").

MDRC evaluated Family Rewards 2.0 through a randomized controlled trial involving about 1,200 families in each city, half of whom could receive the cash rewards and half of whom could not. This report presents the program's costs and the economic value of the estimated effects over four years.

Key Findings

Family Rewards 2.0 spent a little over a dollar ($1.07) to transfer one dollar ($1.00) to families in the form of a reward payment. These rewards produced positive effects on some outcomes, but left others unchanged. In the end, the program was beneficial for participating families but the economic value of these effects was typically less than the cost of the program to taxpayers.

- Over about three years, the program spent $13,459 on the typical participating family. Nearly half of this amount (48.3 percent) was for rewards paid to participants. The remainder paid staff to actively advise families on how to earn rewards as well as process rewards.
- The program was estimated to produce positive benefits for participating families, taxpayers, and society as a whole. These results were driven primarily by the conditional cash transfer value and a positive impact on the average self-rated health status.
- The program had a positive net present value for participating families and a negative net present value for taxpayers and society (meaning, the present value of benefits per family was less than the present value of program costs per family).
- A Monte Carlo analysis showed that if the results were repeated many times, the program produced positive benefits for society 73.9 percent of the time.
- The Monte Carlo analysis also indicated that the program's net present value for society (that is, the benefits less the program costs per family) was positive 10.9 percent of the time.
- As operated, Family Rewards 2.0 did not produce positive net present value for taxpayers. Key impacts would need to change dramatically in order to do so.

The findings show that the level of effort required to support participants and process rewards, as well as the value of potential impacts on targeted outcomes, are primary drivers of success for CCT programs. Conditional cash payments are more likely to produce benefits in excess of program costs for taxpayers and society when the level of effort required to administer reward payments is low and the potential value of impacts on targeted outcomes is high.

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The Authors

Conditional cash transfer (CCT) programs have been used in low- and medium-income countries in order to spur economic development and have generally been considered successful at reducing poverty and improving education and health care outcomes. This report analyzes the benefits and costs of Family Rewards 2.0, a CCT program launched in July 2011 in the Bronx, New York, and Memphis, Tennessee.[1] It is a refinement of an earlier model (Family Rewards 1.0).[2] Both iterations of Family Rewards sought to break the intergenerational cycle of poverty by offering cash assistance to families for three years to reduce immediate hardship, conditioned on families' efforts to complete activities related to children's education, family health care, and parents' employment, in the hope of reducing poverty over the longer term. The main adjustments to the model included offering fewer rewards in each domain, targeting education rewards to high school students, making rewards timelier by paying rewards earned each month, and providing guidance to participants.

The Social Innovation Fund of the Corporation for National and Community Service and private organizations funded Family Rewards 2.0. The Mayor's Fund to Advance New York City, New York City's Center for Economic Opportunity, and MDRC managed the demonstration. Children's Aid Society (CAS) operated the program in partnership with community-based organizations in each city. MDRC evaluated the program through a randomized controlled trial involving approximately 1,200 families in each city, half of whom could receive the cash rewards if they met the required conditions, and half of whom were assigned to a control group that could not receive the rewards.

The Program Model

The Family Rewards program was based on the assumption that for a variety of reasons families may underinvest in their own development, even though such investments can have long-term benefits. Financial incentives were designed to encourage families to make extra investments of time and energy in three domains: education, health care, and work-related activities. Additionally, the monetary rewards provided resources that might have made it more feasible for low-income people to undertake such efforts in the short term.

Family Rewards 2.0 included rewards for the following milestones:

[1]Families could earn rewards for activities through December 2014. The program was implemented as designed, as a three-year initiative. The program is no longer operating.

[2]For more information on the original Family Rewards model, see Riccio et al. (2013).

- **Education:** Students were rewarded for high attendance, good grades, performance on state core exams, and taking college entrance exams.
- **Health:** Families received payments for obtaining medical and dental check-ups for each family member.
- **Work and training:** Parents received payments for full-time work and for earning a high school equivalency credential.

The program targeted families with at least one child enrolled in ninth or tenth grade. All children in a family were eligible to earn health rewards but only high school students could earn education rewards. The program attempted to make the reward payments timely and salient to families by paying families monthly for rewards earned and by rewarding students for grades earned. The rewards for grades were structured in an attempt to engage less academically proficient students, with rewards offered for A, B, and C grades and larger rewards for higher grades.

The program also offered guidance to help families earn rewards. Specifically, designated staff members, or advisors, at the neighborhood partner organizations (NPOs) were expected to develop a Family Earning Plan with every family and meet with them twice per year to discuss their progress.[3] Additionally, the advisors were directed to reach out to families who were not earning rewards.

CAS managed the operations of the program, providing technical assistance and oversight as well as direct services in partnership with four NPOs, two in the Bronx and two in Memphis. The NPOs were charged with implementing core components of the program, recruiting and enrolling families into the research sample, orienting families to the program, and providing continuous guidance to help families earn rewards. The NPOs were the face of the program in the communities served. Families received payments for meeting reward milestones, in most cases by submitting "coupons," along with supporting documents if necessary, to CAS to verify that they met the benchmarks. Two of the rewards, for attendance and for passing state core exams, were automatically verified using school records, requiring no action on the part of the family to earn the payment. For additional information about the program's design, implementation, operation, and impacts, see Miller et al. (2016).

[3]Unlike Family Rewards 2.0, Family Rewards 1.0 did not include supports to help participants make and implement plans to earn their rewards. In the original program, case management and direct services were deliberately excluded from the model in order to test the effectiveness of the incentives alone. In contrast, Family Rewards 2.0 provided continuous guidance to help families earn rewards.

The Research Design

MDRC evaluated Family Rewards 2.0 using a randomized controlled trial — a methodology that provides practitioners and policymakers with a high degree of confidence in the results. Individuals who met the eligibility criteria were assigned, at random, to either a program group or a control group. Members of the program group were offered the program's rewards and services, while those in the control group could not enroll in Family Rewards 2.0 but were eligible for other services and supports in the community. Each city's control group thus represents the benchmark against which the Family Rewards approach was assessed.

Evaluation: Key Findings

Family Rewards 2.0 met its short-term goals of increasing income and reducing poverty, for all families and across a range of family types. The program also increased dental visits and adults' self-reported health status, particularly for those in poorer health at study entry. However, the program led to reductions in work and earnings for some participants. Moreover, the model did not affect students' progress in school through Year 4, either for the full sample of students or for the subgroup of academically proficient students.

Benefit-Cost Analysis: Main Questions

This benefit-cost analysis attempts to answer the following questions: How much did it cost to operate Family Rewards 2.0? Which components of the program were most and least expensive? What is the economic value of impacts on primary outcomes? Does the program produce a positive net present value? What is the benefit-cost ratio for the program? How do various types of uncertainty affect the benefit-cost conclusions?

Benefit-Cost Analysis: Key Findings

- Over approximately three years, Family Rewards 2.0 spent $13,459 on the typical participating family. Nearly half of this amount (48.3 percent) was in the form of rewards paid to participating families. The remainder was paid to program staff to process rewards and actively advise families on how to earn rewards.

- The program was estimated to produce positive benefits for participating families, taxpayers, and society as a whole. These results were driven primarily by the value of the cash reward payments and a positive impact on adults' average self-rated health status.

- The program had a positive net present value for participating families (the present value of benefits was greater than the present value of program costs) and a negative net present value for taxpayers and society (the present value of benefits was less than the present value of program costs).
- A Monte Carlo analysis examining the uncertainty of impact estimates showed that if the results were repeated 10,000 times, allowing the impact to vary randomly within the confidence interval, the program would produce positive benefits for society 73.9 percent of the time.
- The Monte Carlo analysis also indicated that the net present value of the program for society (that is, the present value of benefits per family less the present value of program costs per family) would be positive 10.9 percent of the time.
- As operated, Family Rewards 2.0 did not produce positive net present value for taxpayers. In order for it to produce a positive net present value for taxpayers, key impacts would need to change dramatically. For instance, the impact on graduation for each ninth- and tenth-grader would need to increase from 0.0 percentage points to roughly 16.3 percentage points. Or, the impact on self-rated health per family member would need to increase from a 0.1 point impact to an impact of approximately 1.7 points (on a five-point scale). Alternatively, the impact on earnings per head of household would need to increase from roughly -$2,000 to approximately $33,000.
- The level of effort required to support participants and process rewards and the value of potential impacts on targeted outcomes are primary drivers of success for CCT programs. Conditional payments are more likely to produce benefits in excess of program costs for taxpayers and society when the level of effort required to administer reward payments is low and the potential value of impacts on targeted outcomes is high.

Benefit-Cost Analysis: Methodology

This benefit-cost analysis compares the incremental costs and incremental benefits of Family Rewards 2.0 in order to estimate the "net present value" of the program.[4] It examines the benefits and costs from three perspectives:

[4]Unlike the impacts that are presented in the final impact report (Miller et al., 2016), the benefit-cost analysis incorporates positive and negative impact estimates even when they do not reach the level of statistical (continued)

- **Participants.** The "participant perspective" identifies net gains or losses for program group members, indicating how they fared as a result of the program relative to the control group. The program group derives a net gain if the program increases income (for example, from reward payments) by an amount that exceeds any income lost (for example, from lower earnings).
- **Taxpayers.** The "taxpayer perspective" measures whether the government realized a net increase or decrease in resources as a result of operating the program. Financial gains can occur from increases in tax revenues or decreases in public expenditures, while financial losses can occur from the cost of administering the program and providing incentive payments as well as from decreases in tax revenue or increases in public expenditures. This analysis uses the terms "taxpayers" and "government" interchangeably.
- **Society.** The "social perspective" measures the monetary effects of the program on society as a whole (program participants *and* taxpayers). Thus, it combines the costs and benefits of both participants and taxpayers.

Benefit-Cost Analysis: Outline

First, the analysis estimates the program costs. Second, it identifies main outcomes and the observed impacts. Next, it monetizes program impacts to estimate benefits and explains the methods used to do so. The analysis then ties costs to benefits to estimate the program's net present value and benefit-cost ratio. Last, it explores the sources of uncertainty to better understand the robustness of the findings.

Cost per Family

The "cost per family" describes the resources that were required to operate Family Rewards 2.0 for a typical family, among the 1,230 enrolled families in New York and Tennessee during the period from program launch in July 2011 through four years of research follow-up. As shown in Table 1, the program's direct cost per family was $13,459.[5] The cost estimate is based on

significance because they nonetheless represent the best estimates available. Thus, the financial estimates presented in this report should be considered approximations. As the analysis shows, the Monte Carlo analysis takes into account the level of statistical significance for the relevant impacts.

[5]This direct cost estimate does not capture indirect costs; for instance, it does not estimate for increases or decreases in costs due to changes in the use of other non-program services. The survey supports the belief that general service use outside the program was similar across the program and control groups. If other (unmeas-

(continued)

Table 1

Cost per Family
(in 2015 Dollars)

Cost Category	Cost ($)	Percentage of Total (%)
Reward payments to participating families		
Education rewards	3,030	22.5
Health rewards	1,713	12.7
Work rewards	1,764	13.1
Subtotal	6,507	48.3
Non-reward costs		
Central operations		
Staff salaries	2,452	18.2
Fringe benefits	617	4.6
Consultants	396	2.9
Other costs	1,200	8.9
Local operations		
Partner organizations	2,287	17.0
Subtotal	6,952	51.7
Total cost	13,459	100.0
Non-reward cost per dollar of reward payment	1.07	
Sample size		1,230

(continued)

program expenditure reports from 2011 to 2015. All costs have been adjusted into 2015 dollars using the Consumer Price Index for urban consumers.[6] Additionally, all costs have been discounted by the social discount rate of 3.5 percent.[7] The largest spending category was

ured) services were affected, they are not captured in this analysis. However, the program is relatively small, so it is possible that changes in demand for outside services could be absorbed by the existing operations (namely, through low marginal costs).

[6]The inflation adjustment accounts for the fact that the value of one dollar changes over time; inflation adjusting provides a common dollar metric for programs that operated in different time periods.

[7]Discounting converts dollars to their present value in order to account for the different opportunity costs of receiving a dollar at different points in time. Such adjustments reflect the principle that a dollar today is worth more than a dollar tomorrow. In other words, a dollar today can be invested and be worth more than a dollar tomorrow. All dollar amounts have been discounted by the social discount rate of 3.5 percent, which is a generally accepted value for discounting (Moore et al., 2004.).

Table 1 (continued)

SOURCES: Program expenditure reports from 2011 to 2015, MDRC calculations from management information system data, and phone interviews with program staff.

NOTES: Estimates have been adjusted for inflation and reflect discounting.

In each domain, the cash transfer value from reward payments is presented as a cost. In Tables 3 and 4, an amount equal to the reward payments is presented as a benefit to participants. These amounts cancel each other and are cost and benefit neutral from the perspective of society.

Description of cost categories:

Reward payments to participating families include the conditional cash transfer payments (education, health, and work), the Family Resource Fund (a discretionary fund intended to assist each family earn certain rewards), and small incentive payments for opening a savings account. The available expenditure reports combined the resource fund, enrollment incentive payments, and reward payments. Therefore, these payments are not separately itemized.

Non-reward costs include all resources required to operate the program beyond the reward payments to participating families. These costs include the services to inform participants of available rewards, support participants in earning rewards, and process reward payments.

Staff salaries are remuneration paid to senior managerial staff (presidents, directors, and senior managers), programmatic staff (program associates, coordinators, assistants, advisors, and reward specialists), and administrative staff (financial and business analysts, general counsels, and information technology and database staff). Staff were responsible for the development of a payment tracking system, processing administrative records to determine if automatically verified rewards had been earned, creating coupon books for reward payments that required families to submit documents showing that they earned the reward, verifying requirements for coupon payment rewards were met, maintaining up-to-date bank account information to make sure payments were disbursed to the correct accounts, issuing "earnings statements" each payment period to mail to families, creating and maintaining a helpline to answer questions, making payments to families who earned rewards, marketing the program, general program management, and oversight of nonprofit organizations.

Fringe benefits – Fringe benefits for central operations staff in New York and Tennessee.

Consultants – Additional administrative support for Children's Aid Society to help the sites with managing grants, advertising, supporting audits, and general temporary staffing.

Other costs – Costs other than expenditures for personnel services. These expenditures include the cost of travel associated with program staff meeting with participants near their places of residence. Other costs include supplies, outreach materials, insurance, rent for office space, and other indirect costs.

Partner organizations – All costs associated with the four partner organizations responsible for implementing Family Rewards, including Porter-Leath and Memphis HOPE in Tennessee, and Children's Aid Society and BronxWorks in New York. These costs include program orientations, refresher sessions, coupon book distribution, customer service, social events, and workshops.

rewards paid to participating families; it includes the cash reward payments in all three of the domains (education, health, and work), as well as expenses associated with the enrollment incentive paid to families and the family resource fund.[8] Rewards paid to families ($6,507) accounted for just under half (48.3 percent) of the program's total expenses. The remaining program costs (51.7 percent) were associated with the administration of rewards and support services provided by CAS and the NPOs. Staff salaries at CAS accounted for the largest administrative cost ($2,452). The cost associated with the NPOs in New York and Tennessee was the second largest administrative expense ($2,287). Table 1 includes a description of each spending category in the notes.

The bottom of Table 1 indicates that for every dollar transferred to families in rewards, a little over one dollar ($1.07) was spent on non-reward costs. Family Rewards 2.0 was small and novel. Both its small size and newness increased the amount of non-reward costs, especially the administrative cost of processing payments. Other research indicates that more established programs that serve more participants are more efficient. For example, Temporary Assistance for Needy Families (TANF) spends approximately 17 cents per dollar of payment, Supplemental Nutrition Assistance Program spends 20 cents per dollar of payment, and Medicaid pays 5 cents per dollar of payment.[9] However, these programs operate at a completely different scale, the payments are not conditional, and support is not provided to help recipients earn payments (though TANF is conditioned on work, efforts to find work, and related activities).

Outcomes To Be Monetized

Table 2 lists the outcomes that are monetized, by domain. Program and control group values are included, along with the difference between these two groups (or impact). The economic value of education is based on the impact on student graduation by Year 4. The economic value of health is based on the impact on adults' average self-rated health status. The economic value of work is based on two parent outcomes: total earnings over three years and earning a high school equivalency credential. Impacts for student graduation (0.0 percentage point impact) and parents earning a high school equivalency certificate (-0.3 percentage point impact) did not achieve statistical significance, while the impacts for self-rated health status (0.1 percentage

[8]The available expenditure reports combined the resource fund, enrollment incentive payments, and reward payments. Therefore, these payments are not itemized separately.

[9]Miller and Deitch (2016). Data on TANF costs and payments were obtained from the financial data that states submit to the Administration for Children and Families (data reporting form ACF-196). Food Stamp Program outlays and obligations data were obtained from the Food and Nutrition Service in the U.S. Department of Agriculture. Financial data on the Medicaid program were obtained from the Center for Medicare and Medicaid Quarterly Expense Report (CMS-64).

Table 2

Outcomes To Be Monetized

Program Component	Program	Control	Impact	P-Value	Standard Error	Sample Size
Education outcome						
Graduated by Year 4[a] (%)	66.1	66.1	0.0	0.995	1.9	2,676
Health outcome						
Average self-rated health (1 = poor; 5 = excellent)	3.2	3.0	0.1 ***	0.002	4.6	2,011
Work outcomes						
Total earnings, Years 1 to 3 ($)	27,684	29,718	-2,034 **	0.019	864.6	2,565
Earned a high school equivalency (%)	15.3	15.6	-0.3	0.840	1.6	2,015
Total participating families						1,230

SOURCES: The education outcome is based on MDRC calculations using data from New York City Department of Education and Memphis City Schools administrative records. The health outcome is based on MDRC calculations using data from the Family Rewards 24-month survey. Work outcomes are based on MDRC calculations using data from New York State unemployment insurance (UI) wage records and Tennessee Department of Labor and Workforce Development UI wage records and data from the Family Rewards 24-month survey.

NOTES: Sample sizes may vary because of missing values. A two-tailed t-test was applied to differences between outcomes for the program and control groups. The p-value indicates the likelihood that the difference between the program and control groups arose by chance. Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Estimates were regression-adjusted using ordinary least squares, controlling for pre-random assignment characteristics of sample members. Standard errors were adjusted to account for multiple observations per family.

Rounding may cause slight discrepancies in calculating sums and differences.

Dollar averages include zero values for sample members who were not employed.

Impacts on earnings have not been adjusted or discounted.

[a]Students enrolled in tenth grade at the time of random assignment had five years to complete graduation in this measure. Students enrolled in ninth grade at the time of random assignment had four years.

point impact) and total earnings (-$2,034 impact) did achieve statistical significance (though the impact on total earnings was negative). The main benefit-cost analysis uses impact estimates regardless of statistical significance since they represent the best estimate of the program's impact. This analysis differs from the impact analysis, in which impacts that fail to achieve statistical significance are considered to lack evidence of any impact. The certainty or uncertainty of the benefit-cost analysis, which is reflected by the lack of statistically significant impact estimates, is examined later using a Monte Carlo simulation.

It is possible that the program affected other outcomes other than and independent of these four outcomes. For example, additional money may have helped participants pay bills on time, which may have protected their credit and in turn helped them cover the cost of emergencies or make investments in the future. To the extent that this analysis omits other outcomes and their corresponding benefits (negative or positive), it either overestimates or underestimates the total benefits and thereby misstates benefits minus cost.

Methods of Monetizing — Converting Outcomes into Benefits

This section describes how outcomes are monetized. First, it identifies the outcome that is monetized in each domain. Then, it explains how the impact is converted to dollars. Finally, the section lists the specific values used to monetize the impacts and their sources. All benefits are discounted using a 3.5 percent discount rate.

Education

Education is monetized using the impact of Family Rewards 2.0 on graduation by Year 4 for focal students (ninth- and tenth-graders only). This impact is multiplied by the present value of increased projected lifetime earnings resulting from high school graduation, which then drives projected changes in tax revenues and government expenditures.

The monetary value of personal earnings for the participant (-$23) equals the impact on graduation by Year 4 for the focal students (see Table 2 for specific values) multiplied by the incremental present value of increased projected lifetime earnings resulting from graduating from high school — $206,773 (before taxes). The $206,773 value assumes 45 years of participation in the labor market,[10] and is based on the 2006-2008 American Community Survey, which looks at lifetime earnings by educational attainment.[11] Changes in personal earnings of participating families drives the monetary effect on taxpayers (-$2); specifically, the personal earnings for the participant is multiplied by 7.65 percent (6.20 percent employer Social Security tax plus 1.45 percent employer Medicare tax).

[10]United States Census Bureau (2014). Earnings are defined as the sum of wage or salary income and net income from self-employment. Earnings represent the amount of income received regularly for people 16 years old and over before deductions for personal income taxes, Social Security, bond purchases, union dues, Medicare deductions, and so on.

[11]United States Census Bureau (2014). The American Community Survey is an ongoing statistical survey by the U.S. Census Bureau. It regularly gathers information previously contained only in the long form of the decennial census, such as ancestry, educational attainment, income, language proficiency, migration, disability, employment, and housing characteristics. Many public-sector, private-sector, and nonprofit stakeholders use these data to allocate funding, track shifting demographics, plan for emergencies, and learn about local communities.

The monetary effect of changes in personal earnings on government revenue (-$4) is based on changes in income taxes and sales taxes. The change in income taxes equals the change in participant earnings multiplied by the federal income tax rate (10.00 percent for low-income persons) plus the average state income tax rate (2.25 percent) for New York and Tennessee.[12] The change in sales tax equals the change in participant earnings multiplied by the percent spent on general merchandise (39.6 percent) for those who made less than $70,000 annually multiplied by the average city sales tax (9.063 percent) for New York City and Memphis.[13]

The monetary value of government health and welfare expenditures (-$1) equals the change in health expenditures (Medicare, Medicaid, Veterans Affairs, Tricare, and other federal and state health expenses) plus the change in welfare income (Supplemental Security Income, housing subsidies, food stamps, and unemployment insurance compensation). It assumes a 3.4 cent decrease in health and welfare expenditures per additional dollar earned. These calculations are based on Levin and Garcia's previous work evaluating the lifetime reduction in costs to government (public health, welfare, and criminal justice expenditures) per associate degree earner.[14]

The monetary value of government criminal justice expenditures (-$2) equals the change in criminal justice system expenditures (corrections, judicial and legal costs, and police protection). It assumes a 9.0 cent decrease in criminal justice system expenditures per additional dollar earned (or conversely, a 9.0 cent increase in criminal justice system expenditures per fewer dollar earned). The change in the cost of crime affects government but not participants. These calculations are based on Levin and Garcia's previous work evaluating the lifetime reduction in costs to government (public health, welfare, and criminal justice expenditures) per associate's degree earner.

Health

Health is monetized using the Family Rewards 2.0's impact on adults' average self-rated health status. The impact on average self-rated health status is multiplied by the monetary value of a one-point change in the reported perceived health status using a five-point scale. A one-point change is estimated to be worth $1,031 for individuals in reduced health care expenses and $4,235 for the government in reduced Medicaid expenditures each year. These values are

[12]The rates for New York and Tennessee are 4.5 percent and 0 percent, respectively.

[13]The percent spent on general merchandise is based on the 2003 Consumer Expenditure Survey. The rates for New York City and Memphis are 8.875 and 9.25 percent, respectively. United States Department of Labor (2005).

[14]Levin and Garcia (2013).

based on the 2012 Medical Expenditure Panel Survey.[15] The benefits observed in the follow-up period are calculated by multiplying the impact observed at the end of the follow-up period (in the 24-month survey) by the value of a one-point change in average self-rated health status ($1,031 for the individual, $4,235 for government). The benefits projected beyond the follow-up period are computed by decreasing the estimated impact by 50 percent each year until the annual value falls below $1 from the taxpayer perspective.[16] Because there is no evidence in support of a 50 percent decay rate, two sensitivity tests are used to illustrate what the value of health benefits would be if the impact instead decayed by 25 or by 75 percent annually.

Work

Earnings from formal work are based on three years of unemployment insurance data. The impact is already expressed in dollars. The impact measures the earnings of the average participant over three years, compared with the average control group member over the same period. Hence, the impact is only counted for the three years that were observed. Changes in earnings are not projected beyond the follow-up period. In other words, the decay rate is assumed to be 100 percent. This assumption is made because the estimated impact, which is negative, is not expected to persist beyond the period during which work rewards were offered.

High school equivalency credential completion is estimated using the impact on high school equivalency credential receipt from the 24-month survey. The analysis assumes that high school equivalency credential completion has the same economic value as high school graduation. Thus, the impact on high school equivalency credential receipt is multiplied by the incremental present value of projected increased lifetime earnings based on a projected 45 years of employment ($206,773) equal to that of a high school graduate. The method to assign the value of changes in high school equivalency credential completion to a particular perspective is the same as the method used for high school graduation in the education domain.

Benefits per Family by Domain

Table 3 reports the estimates of the benefits of Family Rewards 2.0. This section only estimates the value of benefits. The following section considers costs as well as benefits. Benefits in this

[15]United States Department of Health and Human Services (2016). The Medical Expenditure Panel Survey is a family of surveys intended to provide nationally representative estimates of health expenditure, utilization, payment sources, health status, and health insurance coverage among the noninstitutionalized, nonmilitary population of the United States. This series of government-produced data sets can be used to examine how individuals interact with the health care system in the United States.

[16]With a 50 percent decay rate, it takes nine years for the annual value of the impact to fall below $1 from the taxpayer perspective.

Table 3

Present Value of Benefits per Family by Domain (in 2015 Dollars)

Program Component ($)	Perspective: Participating Families	Perspective: Taxpayers	Perspective: Society
Education benefits			
Cash transfer value	3,030	0	3,030
Personal earnings	-23	-2	-24
Government revenue (income and sales tax): transfers	4	-4	0
Government health and welfare expenditures: transfers	1	-1	0
Government crime expenditures: savings	0	-2	-2
Subtotal	3,012	-8	3,004
Health benefits			
Cash transfer value	1,713	0	1,713
Medical expenditures: observed health impact	156	640	796
Medical expenditures: projected health impact	145	596	741
Subtotal	2,014	1,236	3,250
Work benefits			
Cash transfer value	1,764	0	1,764
Personal earnings			
from employment	-2,126	-163	-2,289
from high school equivalency certificate	-692	-53	-745
Government revenue (income and sales tax): transfers			
from employment	337	-337	0
from high school equivalency certificate	110	-110	0
Government expenditures (health and welfare): transfers			
from employment	72	-72	0
from high school equivalency certificate	23	-23	0
Government expenditures (crime cost): savings			
from employment	0	-191	-191
from high school equivalency certificate	0	-62	-62
Subtotal	-512	-1,011	-1,523
Total benefits	4,513	217	4,730
Sample Size			1,230

(continued)

Table 3 (continued)

SOURCES: Program expenditures reports, estimates from impact analysis, and research on the economic value of various estimates.
NOTES: Estimates reflect discounting.

The benefits to participants in each domain presents the cash transfer value from reward payments as positive. Table 1 presents an amount equal to the reward payments as a cost. These amounts cancel each other and are cost and benefit neutral from the perspective of society.

Education - The monetary value of personal earnings for the participant equals the impact on four-year graduation of the focal student, ninth- and tenth-graders only (see Table 2 for specific values), multiplied by the incremental present value of increased projected lifetime earnings, $206,773, which assumes 45 years of participation in the labor market. The value is based on the 2006-2008 American Community Survey, which looks at lifetime earnings by educational attainment. The monetary value of personal earnings for the taxpayer equals the monetary value for the participant multiplied by 7.65 percent (6.20 percent employer Social Security tax plus 1.45 percent employer Medicare tax).

The monetary value of government revenue for taxpayers equals income taxes plus sales taxes. Income tax equals the change in participant earnings multiplied by the federal income tax rate (10.00 percent) plus the average state income tax rate (3.225 percent) for New York State (4.50 percent) and Tennessee (0.00 percent). Sales tax equals the change in participant earnings multiplied by the percent spent on general merchandise (39.6 percent) for those who made less that $70,000 annually based on the 2003 Consumer Expenditure Survey multiplied by the average city sales tax (9.063 percent) for New York City (8.875 percent) and Memphis (9.25 percent).

The monetary value of government expenditures (health and welfare) equals the change in health expenditures (Medicare, Medicaid, Veterans Affairs, Tricare, and other federal and state health expenses) plus the change in welfare income (Supplemental Security Income, housing subsidies, food stamps, and unemployment compensation). It assumes a 3.4 percent decrease in health and welfare expenditures per additional dollar earned. This work is based on Levin and Garcia's previous work evaluating the lifetime reduction in costs to government (public health, welfare, and criminal justice expenditures) per associate's degree earner. This value is a transfer from participants to government.

The monetary value of government expenditures (crime cost) equals the change in criminal justice system expenditures (corrections, judicial and legal costs, and police protection). It assumes a 9.0 percent decrease in criminal justice system expenditures per additional dollar earned. The value is a cost-savings to government with no effect on participants. This work is based on Levin and Garcia's previous work evaluating the lifetime reduction in costs to government (public health, welfare, and criminal justice expenditures) per associate's degree earner.

(continued)

case refer to the lifetime economic value of the program's impacts on four primary outcomes (student graduation by Year 4, adults' average self-rated health status, families' total earnings, and parents' earning a high school equivalency credential) across the three domains (education, health, and work).[17] The time horizon over which the effect on each outcome is expected to

[17]All projected benefits are discounted at 3.5 percent when calculating the present value of the estimates.

Table 3 (continued)

Health - The health domain is monetized using the impact on average self-rated health status. The impact on average self-rated health status is multiplied by the monetary value of a one point change in the reported perceived health status using a five-point scale. A one-point change is estimated to be worth $1,031 for an individual and $4,235 for government (in reduced Medicaid expenditures) each year. These values are based on the 2012 Medical Expenditure Panel Survey. The value of the observed health impact is calculated by multiplying the impact observed at the end of the follow-up period (in the 24-month Family Rewards survey) by the value of a one-point change in average self-rated health status ($1,031 for an individual, $4,235 for government) and this value is multiplied by the number of adults who could earn health rewards (1,286) and divided by the number of families in the program (1,230). The value of the projected health impact is calculated by summing the projected benefits over the next nine years. Specifically, the impact on average self-rated health status is assumed to have an annual decay rate of 50 percent, meaning that the impact on self-rated health status decreases by 50 percent each year. (The monetary value is also discounted by 3.5 percent.) The projection stops after nine years as the value of benefits becomes small and unimportant (falls below $1 for government) beyond that point.

Work - Earnings from formal work are based on three years of unemployment insurance (UI) data. The impact is already expressed in dollars. The data considers the earnings of the average participant over three years compared with the average control group member. This impact is only counted for the three years observed. No benefits are projected beyond the follow-up period as the observed change in earnings is assumed to have a 100 percent decay rate, meaning there is no impact expected beyond the period in which work rewards were offered. High school equivalency certificate completion is estimated using the impact on high school equivalency certificate receipt from the Family Rewards 24-month survey. The impact on high school equivalency certificate receipt is multiplied by the incremental present value of projected increased lifetime earnings based on a projected 45 years of employment ($206,773) equal to that of a high school graduate. This projected increase in earnings increases tax revenues and decreases expenditures for government the same amount as high school graduation for the education domain. These values are multiplied by the number of adults who could earn work rewards (1,286) and divided by the number of families in the program (1,230).

persist is unique to the outcome, but all the estimates aim to capture the lifetime value. The values presented in Table 3 are not precise because many of the outcomes affected by the program are difficult to monetize. However, the analysis attempts to derive the best estimates possible using the available information. The right three columns in Table 3 present the benefits per family from three perspectives: those of participating families, taxpayers, and society.[18] This analysis highlights these three perspectives because policymakers or practitioners may differ in terms of which perspective they consider to be most important.

[18]This analysis assumes that all benefits accrue to the family as a unit. It is unknown how the rewards were actually distributed among or used by particular family members. It is possible that benefits accrue disproportionally to some family members and not to all. Also, some benefits are estimated for up to 45 years. Over that time period, family composition is likely to change.

The first panel of Table 3 presents the economic value of the impacts on education. First, it shows that the cash transfer provided a benefit to participants of $3,030 per family. Next, the analysis estimates the economic benefit resulting from the impact on high school graduation. Since the estimated impact is very small and slightly negative (0.0 when rounded to the nearest tenth), the corresponding value of benefits are also very small and slightly negative. Specifically, students' personal earnings are projected to decrease by $23 per family (based on 45 years of changed income). The government is anticipated to experience a very slight loss in tax revenue per family — a decrease of $2 from changes in employer taxes on Social Security and Medicare and a decrease of $4 from changes in income and sales tax payments. Moreover, government expenditures will very slightly increase. Specifically, public health and welfare costs will increase by $1 per family and crime costs will increase by $2 for taxpayers. The total societal value of education rewards is estimated to be $3,004. If a discount rate of 7 percent is used, instead of the generally accepted 3.5 percent, the total societal value of education rewards would increase by less than 1 percent (since benefits are driven by the value of the cash transfer, which is received early on and hence not subject to the discounting).

The second panel of Table 3 presents the economic value of the impacts on health. First, it shows that the cash transfer provided a benefit of $1,713 per family. Next, the analysis estimates that the monetary benefit from changes in average adults' self-rated health status observed in the follow-up period has an estimated value of $156 for participating families, $640 for taxpayers, and a total value of $796 for society as a whole. The analysis also projects that the benefits associated with changes in average self-rated health status beyond the follow-up period is $145 for participating families, $596 for taxpayers, and $741 for society. Therefore, the total estimated benefits from the health domain are $2,014 for participating families and $1,236 for taxpayers, totaling $3,250 for society as a whole. As noted earlier, the analysis uses a decay rate of 50 percent, which means that after nine years the annual present value of health benefits received by the taxpayers falls below $1. Sensitivity tests of the decay rate show that if a decay rate of 25 or 75 percent is used instead of 50 percent, it would take 19 and 5 years, respectively, for the annual present value to taxpayers to fall below $1. Moving from a 50 percent decay rate to a 25 percent decay rate would increase the value of benefits for society by nearly $1,340. Moving from a 50 percent decay rate to a 75 percent decay rate would decrease the value of benefits for society by $488.

The bottom panel of Table 3 presents the economic value of the impacts on work. First, it shows that the cash transfer provided a benefit of $1,764 per family. Second, it presents estimates of the value of changes in personal earnings. From the participant perspective, there was a negative impact on earnings from employment of -$2,126, which resulted in a negative benefit from the taxpayer perspective (-$163) because of a decrease in tax revenue from employer contributions to Social Security and Medicare. Because of the decrease in earnings observed in the follow-up period for participating families, government revenue from income

and sales taxes decreased by $337, government expenditures on social services decreased by $72, and the cost of the criminal justice system decreased by $191. These estimates assume that program-induced decreases in earnings do not persist beyond the follow-up period.

The work benefits panel also includes the benefits of earning a high school equivalency credential. The impact on high school equivalency credential receipt is not statistically significant, though it is slightly negative (-0.3), which results in an estimated negative benefit of -$559 for participating families and a negative benefit of -$248 for taxpayers (due to less tax revenue from employer taxes, lower income and sales taxes, and increases in government expenditures on public health, welfare, and crime). Therefore, the total economic value of work rewards is estimated to be -$512 for participating families, -$1,011 for taxpayers, and -$1,523 for society.

Across the three domains, the impacts of Family Rewards 2.0 are estimated to have a total positive economic value of $4,513 for participating families, $217 for taxpayers, and $4,730 for society. These values exclude program costs and only describe benefits. The previous section provided estimates of costs. The following section combines the costs and benefits in order to calculate the program's net present value.

Net Present Value per Family

Table 4 presents Family Rewards 2.0's benefits and costs. The first of three panels breaks costs out by reward payments to participating families and non-reward costs; the second panel breaks benefits out by domain; and the third summarizes results by stating the net present value and the benefit-cost ratio.

The first panel of Table 4 restates the present value of program costs per family. As presented in Table 1, the cost of the reward payments to taxpayers and society was $6,507, with no cost to participants since families did not incur any cost by participating in the program.[19] The non-reward cost of the program was $6,952 per family, a little over half of the total cost. Therefore, the total program cost per family incurred by taxpayers and society as a whole was $13,459.

The second panel shows the present value of benefits for the program by domain (as exhibited in Table 3). The present value of benefits for education rewards are $3,012 for participating families, -$8 for taxpayers, and $3,004 for society. The present value of benefits for health rewards are $2,014 for participating families, $1,236 for taxpayers, and $3,250 for

[19]This analysis does not consider opportunity costs (for example, forgone earnings to students).

Table 4

Net Present Value per Family (in 2015 Dollars)

Program Component	Participating Families	Perspective Taxpayers	Society
Costs for all rewards			
Reward payments to participating families	0	6,507	6,507
Non-reward costs	0	6,952	6,952
Subtotal	0	13,459	13,459
Benefits by domain			
Education	3,012	-8	3,004
Health	2,014	1,236	3,250
Work	-512	-1,011	-1,523
Subtotal	4,513	217	4,730
Net present value = benefits minus costs	4,513	-13,241	-8,728
Benefit-cost ratio = benefits divided by costs	0.34	0.02	0.35
Sample size			1,230

SOURCES: Program expenditures reports, outcomes from impact analysis, and research on the economic value of outcomes.
NOTES: The value of cash transfers are presented as benefits to the participants and as costs to taxpayers. Although not visible in this table, these amounts cancel each other and are cost and benefit neutral from the perspective of society.
The benefit-cost ratio for the perspective of participating families is calculated using the benefits to participating families and the cost to government.

society. The present value of benefits for work rewards is negative across the three perspectives — -$512 for participating families, -$1,011 for taxpayers, and -$1,523 for society. Overall, the positive benefits of education and health exceeded the negative benefit of work, resulting in positive total benefits for participating families, taxpayers, and society.

The third panel provides two summary measures of Family Rewards 2.0's costs and benefits. The first measure is net present value, which is the difference between the benefits and costs of the program for each of the three perspectives. While this value was positive for participating families, it was negative for both taxpayers and society. Specifically, the program produced an estimated positive net present value of $4,513 for families, but yielded a negative net present value for taxpayers of -$13,241 and society of -$8,728. The second measure is the benefit-cost ratio, which illustrates how much benefit the program produced per dollar of cost by perspective. The benefit-cost ratio is computed by dividing the benefits for each perspective

by the corresponding cost.[20] The benefit-cost ratio was 0.34 for participants, 0.02 for taxpayers, and 0.35 for society. Thus, participants gained 34 cents for each dollar taxpayers invested in the program, taxpayers gained 2 cents for each dollar they invested, and society gained 35 cents for each dollar taxpayers invested.

Monte Carlo Analysis

The Monte Carlo analysis shows how sensitive the findings of the benefit-cost analysis are to uncertainty in impact estimates. (This uncertainty arises because the impacts are estimated for a sample of the total target population and the nature of drawing a sample creates uncertainty, which is reflected in the standard error, and is at times described as "noise" that occurs from sampling.) The Monte Carlo analysis illustrates this uncertainty by repeating the results many times. It is particularly important to consider in this analysis since only two of the four outcomes that are monetized have statistically significant impacts.[21] The Monte Carlo analysis, however, does not address other types of uncertainty. For example, it does not address the uncertainty associated with estimating the economic value of graduating from high school.

The Monte Carlo analysis conducts 10,000 separate benefit-cost analyses based on the statistical uncertainty of each outcome used in the benefit-cost analysis. For each of the 10,000 analyses, the program's impact estimates were replaced by random estimates each within the confidence interval based on the normal distribution implied by the impacts' standard error. After the random generation of new impact estimates, the benefit-cost analysis was rerun from the participant, taxpayer, and social perspectives. The values of the benefits, which could be positive or negative, were calculated 10,000 times.[22]

Figure 1 presents the probability that Family Rewards 2.0 produced positive benefits for society. The x-axis measures net benefits in 2015 dollars for each trial. Plotted along the y-axis is the frequency, or number of trials, with results corresponding to the net benefit value. The graph designates the trials with negative benefits using white bars with a black border and trials

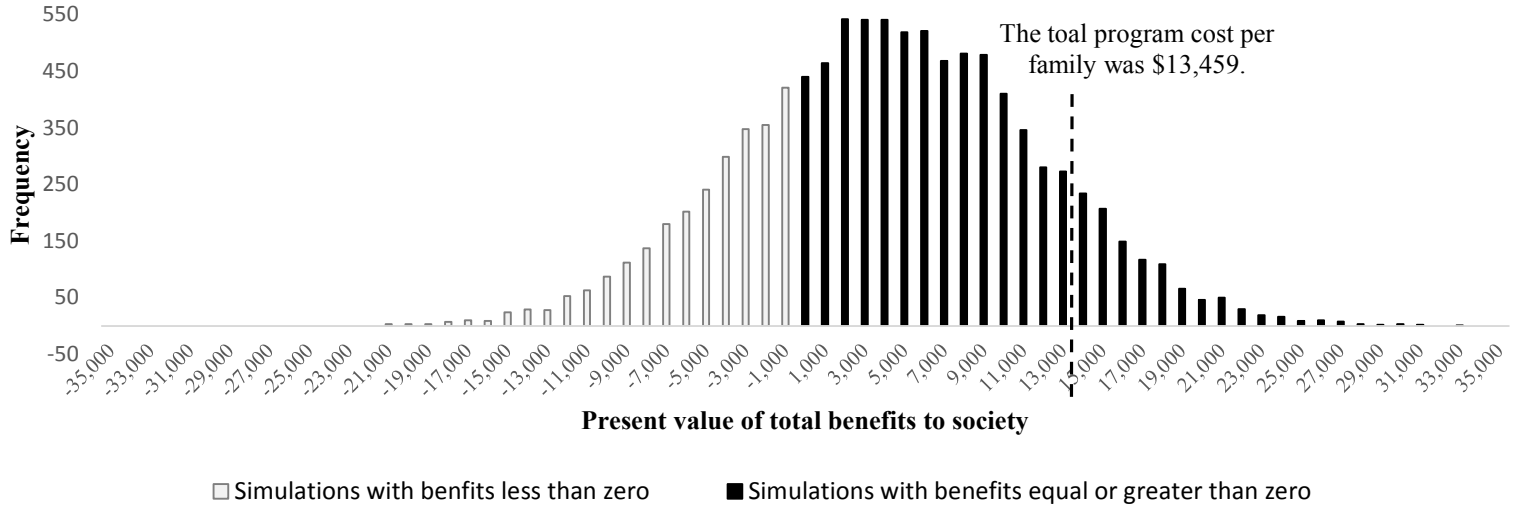
[20]The benefit-cost ratio for participating families is estimated using the benefits to participating families and the cost to taxpayers since the families did not themselves contribute to the cost of the program.

[21]Some researchers suggest that impact uncertainty should be explored by excluding outcomes in which the impact is not statistically significant. Such an approach in practice is the same as assuming the value of the impact is $0, which is simply an arbitrary value. By comparison, the Monte Carlo approach is more comprehensive in that it takes into consideration all the available statistical information related to the impact estimates.

[22]It is important to note that when the benefit-cost analyses were rerun, the impact estimates changed values between each of the 10,000 trials. The reward payments were not recomputed because their values are known with certainty. Therefore, the same reward payment was used in each of the 10,000 trials. The administrative costs were also not recomputed, in part because the Monte Carlo focuses on the variation in benefits due to outcomes, and because there is not any statistical uncertainty associated with the administrative costs.

Figure 1

Monte Carlo Present Value of Total Benefits to Society Histogram (in 2015 Dollars)



SOURCE: MDRC calculations based on cost information from Table 1, impact estimates from Table 2, and benefit estimates from Table 3.
NOTES: The Monte Carlo analysis reruns the impacts 10,000 times using the statistical uncertainty of each outcome. Specifically, the impact estimates of each outcome were replaced by random estimates based on the normal distribution in tandem with the impacts' standard of error. The benefit-cost analysis was rerun for each of the 10,000 sets of new impacts. Of the simulations, 26.1 percent have benefits less than zero, 73.9 percent have benefits equal or greater than zero, and 10.9 percent have benefits equal or greater than the total program cost per family.

with zero benefit or positive benefits using black bars. Specifically, 73.9 percent of the 10,000 simulations resulted in positive benefits to society, while 26.1 percent of simulations resulted in negative benefits. It also shows that 10.9 percent of simulations were cost beneficial. (That is, benefits were equal to or exceeded the costs.) This 10.9 percent value represents the probability that Family Reward 2.0 was cost beneficial.

Break-Even Analysis

While Family Rewards 2.0 may not have "paid for itself" from the taxpayer or social perspective, families in the program did experience a positive net present value, which is estimated at $4,513 (Table 4). A series of break-even analyses were conducted to see how large the impacts in education, health, and work would need to be in order for Family Rewards 2.0 to pay for itself from the taxpayer perspective, or in other words for the program to have a $0, instead of negative, net present value for taxpayers.

The current net present value of the program, from the taxpayers' perspective is -$13,241. The break-even analysis considers what size impacts Family Rewards 2.0 would need to have in order to raise the net present value to taxpayers from -$13,241 to $0, the break-even point. The analysis explores this question by considering one domain (and one outcome) at a time, while holding the other domains constant. In order for Family Rewards 2.0 to produce a positive net present value to taxpayers, the impact on graduation for ninth- and tenth-graders would have to increase to 16.3 percent from the observed 0.0 percent, holding health and work outcomes constant. Similarly, if education and work were held constant, the impact on adults' average self-rated health status would have to be about 1.7 percentage points, as compared with the current 0.1 point impact. Lastly, the work rewards would have to increase head of household earnings by nearly $33,000 in order for taxpayers to break even on the cost of Family Rewards 2.0, rather than the observed negative impact of -$2,034, while holding the education and health benefits constant.

Conclusion

This analysis investigated the costs and benefits of Family Rewards 2.0, the second iteration of one of the only CCT programs implemented in a higher-income country. It showed that throughout the life of the program $13,459 was spent on average per participating family. Just under half of this cost, 48.3 percent, was direct cash transfers paid to participating families across three reward domains (education, health, and work). The remaining 51.7 percent covered all non-reward costs associated with the program, including the cost to provide support to the families and verify and process payments. It cost the program a little over a dollar ($1.07) to transfer one dollar ($1.00) to families in the form of a reward payment.

Overall, the program is estimated to have produced benefits for participating families, taxpayers, and society. These benefits were driven by the education and health benefits, which produced $3,004 and $3,250 in estimated benefits to society, respectively. Work benefits were negative. The benefit of changes in earnings and likelihood to earn a high school equivalency credential was estimated to be -$1,523 to society.

Family Rewards 2.0 had a positive net present value for participating families of $4,513, a negative net present value to taxpayers of -$13,241, and a negative net present value to society of -$8,728. The benefit-cost ratio of the program shows that for every dollar spent on the program 35 cents of social benefit were generated. Additionally, Monte Carlo simulations were used to examine the uncertainty surrounding the impact estimates as a driver of the benefit-cost conclusions. From the social perspective, 73.9 percent of these simulations produced positive benefits and 10.9 percent of them produced benefits equal to or greater than the cost of the program (namely, positive net present value).

The benefit-cost analysis of Family Rewards 2.0 sought to answer the question of whether the benefits exceeded the cost of such a program, as well as provide deeper insights into the effectiveness of the program. The analysis not only showed that participating families tended to earn education and health rewards, while possibly reducing their work effort, but also suggested that even modest positive impacts in education and health could have significant projected lifetime benefits for families. Policymakers and practitioners looking to replicate the program may be tempted to do away with work rewards, since it was the only domain that caused negative benefits to participants and taxpayers. Future CCT programs could instead focus on educational and health outcomes, which have the potential for larger benefits and increased alignment with traditional CCT programs in lower-income countries. However, the education and health rewards may have caused the negative impacts on earnings (the additional money from education and health rewards may have caused participants to work less), so simply dropping a work reward is unlikely to eliminate the negative impact on earnings.

The benefit-cost analysis shows that future CCT programs should target high-value outcomes and minimize program administrative costs in order to maximize the net present value of the program. It may be possible to lower administrative costs by embedding the CCT program within existing administrative systems (such as schools), whereby existing permanent staff could guide participants and process reward payments without dramatically increasing their level of effort and the corresponding need for new staff. Similarly, structuring rewards around outcomes that program staff can automatically verify would also help limit the workload and control program costs.

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- Promoting Family Well-Being and Children's Development
- Improving Public Education
- Raising Academic Achievement and Persistence in College
- Supporting Low-Wage Workers and Communities
- Overcoming Barriers to Employment

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