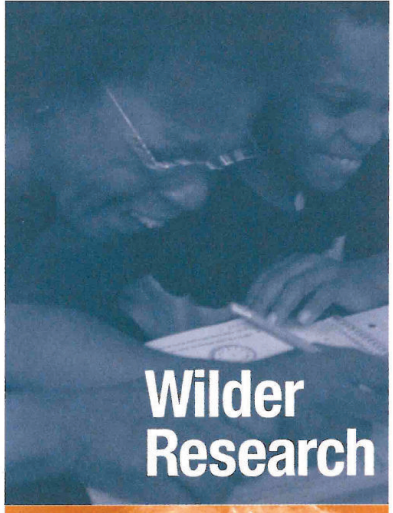

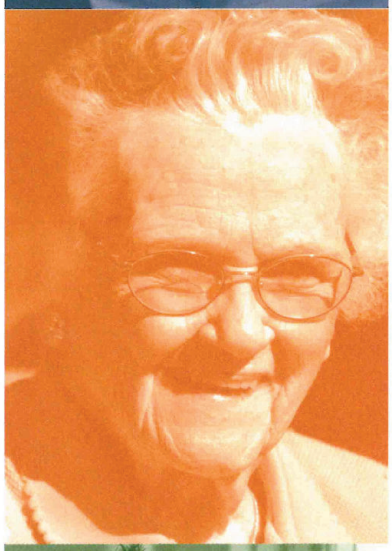

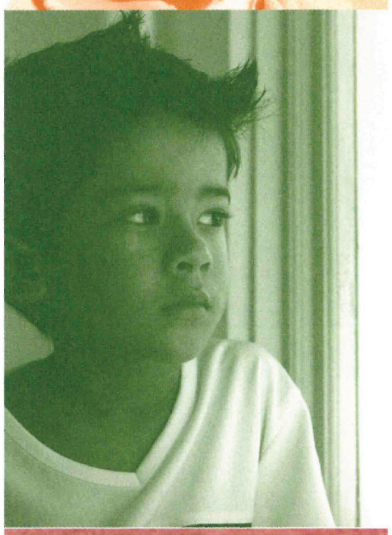

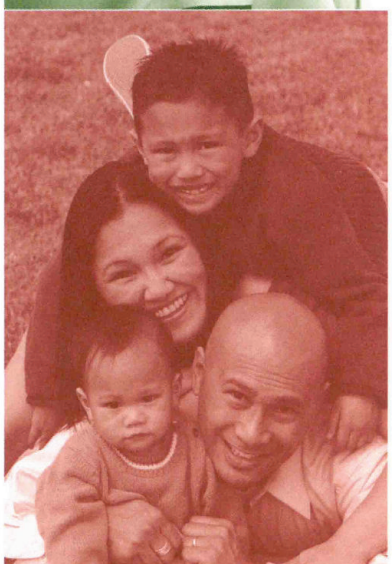

Return on investment in the Jeremiah Program

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Contents

Figures

Summary

This study consists of a social return on investment (ROI) analysis of Jeremiah Program, finding positive economic value for participants, private funders, taxpayers, and society as a whole. The benefit-cost ratios show returns of between $1.66 and $34.16 for every dollar invested in the program.

The whole society receives a minimum of nearly $164,000 in net benefits per participant in Jeremiah Program, with a return of $2.47 per dollar invested. Private funders invest approximately $63,000 per family during participants' nearly 30 months of stay in the program. This investment generates $185,486 in benefits and savings, or a return of $3.93 for every private dollar invested. The investment in the program by participating mothers is relatively low ($6,575), yet they accrue 81 percent of all benefits generated by the program, amassing $34.16 for every dollar invested. Taxpayers recover more than the full amount invested in the program, obtaining a return of $1.66 per dollar invested.

- First generation outcomes (dollar value per participant):
  - Increased lifetime earnings as a result of additional education ($213,987)
  - Increased taxes paid by participants ($27,807)
  - Savings to taxpayers due to reduced use of public assistance ($8,346)
- Second generation outcomes (dollar value per participant):
  - Savings from reduced use of special education ($1,439)
  - Increased lifetime earnings ($19,002)
  - Increased tax revenues ($2,838)
  - Savings from crime reductions ($11,549)

The total cost per participant is $112,057 for a 30-month average stay in Jeremiah Program.

We compared the benefits relative to the investment in the program, obtaining a return of $2.47 per dollar invested for society as a whole, as shown in Figure 1.

1. Return on investment, Jeremiah Program

	Funders	Participants	Taxpayers	Society (Participants + Taxpayers)
Additional personal income from increased educational attainment (after tax)	$213,987	$213,987		$213,987
Additional tax revenues for the state from increased lifetime income			$27,807	$27,807
Reduced public assistance payments		($8,346)	$8,346	
Second generation benefits	$34,828	$19,002	$15,826	$34,828
Total benefits	$247,815	$224,643	$51,978	$276,621
Total costs	$63,329	$6,575	$31,370	$112,057*
Net benefit (benefit – cost for each column)	$185,486	$218,068	$20,608	$164,564
ROI	**$3.93**	**$34.16**	**$1.66**	**$2.47**

**Total costs include all costs shown in table (Funders, Participants, and Taxpayers) and costs funded by the program (not shown in the table)*

These positive returns imply nearly $16 million in net benefits for society for every 100 graduates of Jeremiah Program. Private funders' investment plays a fundamental role in the generation of these returns. Funders' contributions represent 57 percent of the cost of serving a family, while the benefits of this investment are equivalent to 84 percent of the benefits accrued by society.

These results compare favorably with similar supportive housing ROI studies. It is estimated that supportive housing in Minnesota generates a return to society of $1.32 per dollar invested. Additionally, taxpayers obtain a return of 1.44 to 1 in public funding for supportive housing (Chase, Da'ar, & Diaz, 2012).

The returns shown in Figure 1 are based on conservative assumptions about expected outcomes, such as graduation rates and level of education achieved; however, if participants achieve outcomes above the expected, actual benefits may be considerably higher. For instance, a student who actually obtains a bachelor's degree and whose child(ren) actually (at least) graduates from high school would generate about $730,000 in total lifetime benefits for society; the returns for society would be around $7 for every dollar invested, while the returns for taxpayers would be nearly $2 per $1 invested. Private funders could realize a return of about $11 per every dollar invested in Jeremiah Program.

Introduction

Overview of the Jeremiah Program

Jeremiah Program began in 1993 with a founding vision to provide supportive housing and services to break the cycle of poverty for single mothers and their children. The program includes two campuses in the Twin Cities. The Minneapolis campus has served families since 1997 and currently has 39 affordable housing units, with space for 66 children. The Saint Paul campus opened in 2007 and has 38 housing units. Jeremiah Program is actively planning to expand to other cities regionally and nationally. The mission of the program is "to transform families beyond poverty toward long-term educational success and economic security, through the intersection of postsecondary education for single mothers and quality early childhood education for their children, and the development of life skills."

The program provides the following services:

Support for Career-Track Education: Each woman is required to be accepted to and enrolled in a postsecondary education program upon residency in the program. Program staff works directly with educational institutions to assist in guiding participants in a choice of career and academic program.

Early Childhood Education: Jeremiah Program's Child Development Centers provide convenient, consistent, high quality early childhood education for children from age infant through five years. Jeremiah Program surpasses State of Minnesota teacher qualification standards. The CDCs utilize the acclaimed High/Scope curriculum as well as the Ages & Stages Questionnaire to guide and evaluate children's development. With high numbers of special-needs children among the target population, community partners are actively engaged to ensure that each child's individual needs are met. The curriculum covers the main areas of learning: approaches to learning; social and emotional development; physical development and health; language, literacy, and communication; mathematics; creative arts; science and technology; and social studies. The Center provides meals to children, including breakfast, lunch, and afternoon snacks. All meals meet USDA's nutritional guidelines.

Safe, Affordable Housing: Jeremiah Program meets the need of single-parent families for safe, stable, affordable housing. Residents live in independent, fully furnished, 2-3 bedroom apartments in a campus community that features controlled key-card access, 24-hour security monitoring, community and meeting space, on-site Child Development Centers, playgrounds, laundry, and computer and Internet access. Residents pay for

utilities in addition to no more than 30 percent of their income for rent, averaging $135 per month. The Minneapolis campus (39 apartments) is located on the edge of downtown, near Minneapolis Community College. The Saint Paul campus (38 apartments) is located in the Rondo neighborhood with access to transportation to several postsecondary schools in Saint Paul.

Supportive Campus Community: Women encounter – and build – a supportive community at Jeremiah Program. The network of staff, volunteers, and fellow residents provides an alternative to destructive social environments and unhealthy relationships.

Empowerment Training: In partnership with Twin Cities RISE! (TCR), Jeremiah Program participants are introduced to the life-changing principles of Personal Empowerment. Participants are required to complete 16 weeks of Empowerment training during the preadmission to residency process.

Life Skills Education & Coaching: Volunteer facilitators with specific expertise work with residents in weekly "Life Skills" education sessions. The unique curriculum focuses on parenting and child development, health and wellness, career development, and economic independence.

Employment Readiness: Residents are required to engage in career development activities – including volunteering, internships or paid work during their tenure at Jeremiah Program with the ultimate goal of obtaining career employment at a livable wage with benefits upon graduation. Through Jeremiah Works!, residents focus on employment readiness and access employment opportunities with corporate and community partners.

Expected outcomes of the Jeremiah Program

The main outcomes of the program are: improved educational attainment and increased employment and financial stability of participating mothers. Economic stability is evidenced in the long run by increased lifetime earnings. These are the first generation outcomes.

Participating mothers' children are expected to achieve improvements in several outcomes as a result of receiving high-quality early childhood education. As the literature shows, early childhood education leads to better literacy skills, kindergarten readiness, and high school completion. Consequently, these outcomes are associated with economic benefits that include increased educational attainment, increased lifetime earnings, reduced crime, and reduced health care and public benefit expenditures. These are the second generation outcomes.

Study overview

The social ROI compares the estimated economic value of the outcomes of the program with their associated investments. First, we estimated the average cost per program participant based on actual financial data and average length of stay, disaggregating these costs according to funding sources (government, private funders, participants, volunteers, and Jeremiah Program). Next, we calculated the estimated dollar value of the first and second generation outcomes.

- First generation outcomes include:
  - Increased lifetime earnings as a result of additional education
  - Increased taxes paid by participants
  - Savings to taxpayers due to reduced use of public assistance
- Second generation outcomes include:
  - Savings from reduced use of special education
  - Increased lifetime earnings (from educational achievement: high school and college)
  - Increased tax revenues
  - Savings from crime reductions

Finally, we compared the benefits relative to the investment in the program. Additionally, the ROI is estimated from the perspective of private funders, participants, taxpayers, and society.

Some of the characteristics of this study are:

- It uses actual Jeremiah Program costs to calculate actual program expenses per participant
- It is based on 72 actual and active participants and their families for the year 2010. All these participants had ended their participation at the time data was collected, whether graduating or leaving the program before graduation
- It estimates participants' additional benefits based on actual educational attainment and other participant characteristics

- It includes an estimation of second generation benefits for children of participating mothers, based on effect sizes of these economic impacts from renowned studies, combined with program data and Minnesota demographic data

  - The second generation outcomes presented are based on presumed but not measured program outcomes; in those cases, the analysis should be considered prospective. The prospective ROI estimates the potential dollar value of additional benefits of Jeremiah Program using a combination of program data and data from evaluations of similar interventions (based on a review of the research literature). The potential benefits examined in this study are the second generation benefits due to early childhood education investments.

A previous study calculating the return on investment of Jeremiah Program has indicated similar returns: $1.50 per $1 invested (or 50 percent) to the community, four years after participants' graduation. This study relies completely on secondary data, using parameters and costs from another housing program and some actual costs of Jeremiah Program. Additionally, this secondary data is based on simulations of one case (one family), where the authors simulate the costs incurred by public assistance programs by this family, and compare these costs to the costs of the housing program.

Assumptions about costs, prices, and value of outcomes are made using conservative criteria, so that the resulting net benefit is always in the lower range of possible values. Detailed methods, calculations, and parameters are summarized in the Appendix.

Investment in Jeremiah Program

The total cost per participant of Jeremiah Program for the 2010 cohort is $112,057. This cost is calculated based on 72 active participants who were in the program in 2010 and who have left the program.[1] The cost side of the ROI considers all the resources invested by society in the operation of the program. This investment includes:

- Resources from taxpayers in the form of public grants and subsidies
- Private funders' contributions (e.g., corporate and foundation grants and individual contributions)
- Participants' contributions, through fees and rent
- Program contribution from its endowment and income from other investments
- Costs of volunteers

We estimate direct costs using information on program revenues. The information includes the sources and monetary amounts of these resources; thus, we can compute specific ROIs from the perspective of taxpayers, private funders, and participants (see Return on Investment section).

To calculate the direct costs of each of these sources, we first calculated the monthly cost for each source for 2010. We then calculated the monthly cost per participant. Since participants stay an average of 30 months in the program, we can calculate the net present value of their stay in the program, using the monthly cost previously mentioned. The investments per participant represent the present value of the resources devoted to each participant during 30 months, as shown in Figure 2 (more details in the Appendix).

We also include indirect costs. These are costs that are not included in the traditional financial statements, also called opportunity costs. The main indirect cost included in this ROI analysis is the value of volunteer work that Jeremiah Program receives. These costs come from the time volunteers have to give to the program; they spend time that could be used in a different activity, for example, working for a wage (see details of this calculation in the Appendix).

[1] The 2010 cohort of participants includes 102 families, with a total of approximately 122 children. We only consider as active participants the 72 families that left the program afterwards (by graduating or just leaving), since 30 of them were still in the program.

2. Investments in Jeremiah Program

Source of investment	Total 2010 Cohort (72 active participants)	Total investment per participant (30 months of stay)
Private	$4,559,688	$63,329
Taxpayers	$2,258,640	$31,370
Participants	$473,400	$6,575
Jeremiah Program	$373,320	$5,185
Cost of volunteers	$403,056	$5,598
Total costs to society	**$8,068,104**	**$112,057**

Benefits and savings generated by Jeremiah Program

First generation benefits

Jeremiah Program first generation benefits to participating mothers and their families come from the increased earnings of the mothers, as a result of enrolling in a postsecondary education program. Other benefits include less use of public assistance and increased taxes paid.

Increased net lifetime income from improved academic attainment

Each participating mother is required to be enrolled in a postsecondary education program upon residency in the program; therefore, we can relate their increased earnings after finishing the program to their participation in Jeremiah Program. To estimate the additional lifetime income as a consequence of Jeremiah Program, we compare participants' average annual income at time of entry with their expected income after graduating from the program.

The full amount of this additional income can be attributed to participation in Jeremiah Program only if the participant would not have earned the degree in the absence of the program. This assumption may not hold for those participants who, for example, may have been committed to attend college before entering the program, so they would have earned a degree regardless of Jeremiah Program's help. However, we cannot observe participants' income in the counterfactual state in which they are not in the program, nor do we have a suitable control group to perform a comparison.

On the other hand, Jeremiah Program's leaders argue that the program provides the necessary support system to help participants materialize this goal, making the program an essential ingredient of participants' academic success. Nevertheless, we do not have sufficient data to confirm and quantify this impact. Furthermore, we do not know if participants will actually achieve the average annual income reported in census data because we have not observed the incomes of participants as they grow older.

To account for these unknown states and factors, we compute the expected additional lifetime earnings associated with higher educational attainment using the percentage of participants of the 2010 cohort who earned bachelor's (17 percent) and associate degrees (33 percent). See the Appendix for a detailed explanation of methods and estimations.

In other words, we conservatively estimate an increase in salaries for only 50 percent of participating mothers. Any increase in earnings due to other characteristics of Jeremiah Program is not included. For example, mothers receiving postsecondary education but not finishing their studies (or finishing later) could increase their earnings, but we do not include this. Similarly, other characteristics of Jeremiah Program can help women to improve their monetary income in the long-run, such as having access to housing, trainings, coaching, or part-time work.

In addition, because we don't have data on a suitable comparison group of non-participants, this graduation rate is estimated using only participants' data. Therefore, it is only a conservative approximation of the actual rate of graduation. In fact, this rate may vary from cohort to cohort; the rate is expected will increase as the program quality improves due to more experienced staff and refinement of the delivery model. Therefore, it seems reasonable to compute some prospective scenarios in which the graduation rates is higher than the estimated 50 percent used in the main analysis. We present such scenarios in the appendix of this report.

For these reasons, we believe that these estimates are conservative and only represent the minimum potential impact of the program on the graduation rates of participants.

Figure 3 shows the resulting benefits from increased education of participants. The quantities shown in this figure are weighted averages of the additional income from increased educational attainment. The weights used are the proportion of participants that earned degrees applied to the average additional lifetime earnings for participants with bachelor's degrees ($680,636) and associate degrees, diplomas, or some college ($385,062).

3. Additional lifetime income from increased educational attainment

	Total 2010 cohort (before taxes)	Per participant (weighted) Before taxes	After taxes
Graduates with bachelor's degrees	$8,167,632	$113,439	$100,394
Graduates with associate degrees, diplomas, or partial completion	$9,241,485	$128,354	$113,593
Additional personal income from increased educational attainment	**$17,409,117**	**$241,793**	**$213,987**

Increased taxes paid

Participants who earn their academic degrees and accrue higher lifetime income also pay more taxes during their productive lives. To compute these additional taxes paid by

participants, we use the average effective tax rate of 11.5 percent, as estimated by the Minnesota Department of Revenue (2011). This rate includes income, sales, and property taxes. The present value of the additional lifetime tax revenues per participant reaches $27,807.

4. Additional lifetime tax revenues from increased educational attainment

	Total 2010 cohort	Per participant (weighted)
Additional tax revenues – Bachelor's degree	$939,312	$13,046
Additional tax revenues – Associate degree/some college	$1,062,792	$14,761
Additional lifetime taxes from increased educational attainment	**$2,002,104**	**$27,807**

Savings from reduced public benefits received by participants

Jeremiah Program participants are likely to reduce the amount of public assistance they receive by $8,346 per participant over a five-year stream of saving, as their incomes grow due to their increased education. For the government and taxpayers, this implies a stream of savings that would not have existed in the absence of the program.

More than 70 percent of participants in the 2010 cohort received at least one form of public assistance (mainly cash assistance from the Minnesota Family Investment Program – MFIP). Based on third-party income verification records of program applicants, Jeremiah Program participants receive an average $3,645 every year in direct public assistance. According to the Minnesota Department of Human Services, families can remain on MFIP until their gross earned income reaches $1,754 a month, or 115 percent of the 2009 federal poverty level.

Since we cannot observe how much public assistance participants receive after they leave the program, we can only assume that the average amount of public aid they receive at time of entry will be reduced over time by a fraction due to the expected increase in future income. We use graduation rates to estimate this fraction. We know that at least 50 percent of participants earn a higher education degree; these graduates are more likely to experience higher income and reduce the amount of public assistance they will receive in the future. This implies that a typical participant is likely to save taxpayers around $1,822 per year (50% of $3,645). Assuming a five-year stream of savings, these results in a present value of expected savings for taxpayers from reduced public assistance of $8,346 per participant. From the perspective of participants, this reduction in assistance represents a decrease in revenue or a loss. Consequently, the resulting benefit for society is zero, since the savings for taxpayers is compensated by the cost accrued by participants.

Our estimations of savings from reduced program assistance are conservative. We do not consider any other potential savings from reduced future investments as a consequence of the program. Unlike previous research on the economic impact of Jeremiah Program, savings from reduced use of subsidies, child care, or housing support is not included as potential savings. Another cost item that is not included in this analysis and that may be a significant source of savings for the taxpayers are reduced health care costs. However, data on these costs is not available for participants; neither is there a research study that can be used as benchmark for Jeremiah Program's participants.

Second generation benefits

Jeremiah Program's second generation benefits mostly come from the increased future earnings and reduction in crime of participating mothers' children, as a result of receiving early education. Other benefits include less use of special education and increased taxes paid.

One of the main objectives of Jeremiah Program is to improve kindergarten readiness of participating children. Jeremiah Program provides early childhood and child care services that are comparable to the highest quality and intensity early childhood education programs. Just in 2010, the program served 150 children. The average child attends the program's Child Development Center between 7 and 10 hours daily.

The literature on early childhood has shown economic impacts of this type of intervention on several outcomes, such as lifetime income, crime reduction, and savings on public benefits and health care. We use effect sizes of these economic impacts from renowned studies and combine them with program data and Minnesota demographic data to estimate second generation benefits. Therefore, the results in this section should be considered prospective.

Similarly, since the Jeremiah Program's Child Development Centers provide high quality early childhood education for the children, we can argue that the future improvements of these children can be related to their participation in Jeremiah Program.

Savings from reduced special education

Early childhood education has been shown to reduce the incidence of non-cognitive disabilities by 12 percent (Nores, Belfield, Barnett, & Schweinhart, 2005).[2] These types of disabilities are one of the main factors that determine that a child receives special education. By reducing the incidence of the disabilities and thus the likelihood of receiving

[2] For example, emotional or speech and language disabilities.

special education, the educational system (and therefore taxpayers) save resources that otherwise would have been devoted to these special and expensive services.

In 2010 the incidence of this type of disability among the 150 children served by the Jeremiah Program was 1.3 percent, which is fairly similar to Minnesota's incidence of 1.5 percent. Applying the effect size of 12 percent to this incidence, we estimate that the early education component of Jeremiah Program could potentially reduce the incidence by the equivalent of a quarter of one child (0.24 children).

The cost of special education in Minnesota is $1,091 per child (estimated using financial reports from the Minnesota Department of Education), so the annual savings per child are $262 ($1,091 x .24) and the present value of lifetime savings (assuming 5 years of special education not provided) reaches $1,199 per child. This is equivalent to $1,439 per participant (1.2 children per participant).

Increased income

We estimate that every child receiving early childhood education (ECE) at Jeremiah Program would earn $11,577 in additional lifetime income (after taxes). Children receiving ECE are expected to experience lower dropout rates from high school, allowing them to achieve higher educational attainment and consequently earn higher lifetime incomes. The difference in annual income between high school graduates and dropouts is $11,500, estimated from census data. The present value of this additional income is $327,037, assuming a work life of about 42 years (18 to 60). The effect of ECE on high school graduation rates is 4 percent (Sum, Khatiwada, & McLaughlin, 2008). Applying this rate to the difference in lifetime earnings of high school graduates and also to the proportion of possible college graduates, every child receiving ECE at the Jeremiah Program would earn $20,565 in additional lifetime income. The net additional income after taxes is $18,200 per child, or $21,840 per participant.

Increased tax revenues

Taxpayers benefit from the increased lifetime income of ECE participants in several ways. One of these benefits is the additional taxes that ECE participants would be able to pay. To estimate the future increased tax revenue for Minnesota taxpayers, we apply the effective tax rate on individuals to the additional lifetime income earned by ECE participants. The effective tax rate used is 11.5 percent (Minnesota Department of Revenue, 2011). The additional taxes paid by ECE participants during their working life would reach $2,365, or $2,838 per participant.

Savings from crime reduction

Savings from crime reduction are based on the avoided marginal cost of incarcerating an additional criminal in the future. The probability that children will commit crimes in the future is reduced 27 percent by ECE programs (Reynolds, Temple, White, & Ou, 2011; Schweinhart et al., 2005; Masse & Barnett, 2002). Consequently, applying this effect size to the expected present value cost of incarceration, we estimate that the potential lifetime cost savings from an additional conviction avoided for each child participating in Jeremiah Program reaches $9,624, or an equivalent of $11,549 per participant. See more details about measuring costs of incarceration in the Appendix.

Total second generation benefits

Figure 5 shows the total benefits from second generation outcomes produced by Jeremiah Program's early childhood education. The lifetime benefits per child are $23,904. The total benefits per Jeremiah Program participant are $28,685, based on 1.2 children per participant.

5. Total lifetime second generation benefits

	Total 2010 cohort	Benefits per child	Benefits per participant (based on 1.2 children per mother)
Savings from reduced special education	$103,608	$1,199	$1,439
Increased income (after taxes)	$1,368,162	$18,200	$21,840
Increased tax revenues	$204,336	$2,365	$2,838
Savings to taxpayers from crime reduction	$831,514	$9,624	$11,549
Total	**$2,507,618**	**$31,388**	**$37,666**

Return on investment

The return on investment in Jeremiah Program is the comparison of the economic value of the outcomes of the program to the actual investment in the program. The benefit-cost ratio shows the return of every dollar invested in the program. We present ROI estimations from the perspective of participants, taxpayers, private funders, and the whole society.

The whole society receives nearly $164,000 in net benefits per participant in Jeremiah Program, with a return of $2.47 per dollar invested. Private funders invest approximately $63,000 per family during participants' nearly 30 months of stay in the program. This investment generates $185,486 in net benefits, or a return of $3.93 for every dollar invested.[3] The investment in the program by participating mothers is relatively low ($6,575), yet they accrue 81 percent of all benefits generated by the program.[4] This makes participants' returns $34.16 for every dollar invested. Taxpayers recover the full amount invested in the program; they obtain a return of $1.66 per dollar invested.

These positive returns imply nearly $16 million in net benefits for society for every 100 graduates of the Jeremiah Program. Private funders' investment plays a fundamental role in the generation of these returns. Funders' contributions represent 57 percent of the cost of serving a family, while the benefits of this investment are equivalent to 84 percent of the benefits accrued by society.

These results compare favorably with similar supportive housing ROI studies. It is estimated that supportive housing in Minnesota generates a return to society of $1.32 per dollar invested. Additionally, taxpayers obtain a return of 1.44 to 1 in public funding for supportive housing (Chase, Da'ar, & Diaz, 2012).

[3] Funders' benefits do not represent a real cash flow that will be perceived by them. We assume that their benefits come from the satisfaction of seeing additional benefits perceived by mothers and their children. Funders' benefits cannot be added to Participants and Taxpayers; doing this would count the benefits twice.

[4] This is $227,879 over $270,479.

6. Comparison of estimated benefits and costs per participant of the Jeremiah Program

	Funders	Participants	Taxpayers	Society (Participants + Taxpayers)
Additional personal income from increased educational attainment (after tax)	$213,987	$213,987		$213,987
Additional tax revenues for the state from increased lifetime income			$27,807	$27,807
Reduced public assistance payments		($8,346)	$8,346	
Second generation benefits	$34,828	$19,002	$15,826	$34,828
Total benefits	$247,815	$224,643	$51,978	$276,621
Total costs	$63,329	$6,575	$31,370	$112,057*
Net benefit (benefit – cost for each column)	$185,486	$218,068	$20,608	$164,564
ROI	**$3.93**	**$34.16**	**$1.66**	**$2.47**

**Total costs include all costs shown in table (Funders, Participants, and Taxpayers) and costs funded by the program (not shown in the table)*

Recommendations

The results of this report are based on presumed but not verified effectiveness of the program on graduation rates and reduction in public assistance dependency. This implies that the resulting estimated benefits are expressed as "expected values"; that is, the results account for the possibility that some participants may not achieve the highest level of the outcome. For example, participants who graduate from college receive in average about $600,000 in additional earnings during their lives. The aspirational goal of Jeremiah Program is to be able to show that all these additional earnings are a consequence of the actions of the program; however, to show this impact more and better data on outcomes needs to be produced. Another example is the potential benefits from reduced public assistance. At this moment, the existing data on participation and amounts from public assistance programs such as food stamps, cash assistance, among others, for mothers and children, is limited. Our estimations do not include all these sources of savings and thus, may be underestimating benefits to society significantly. The following recommendations summarize the initial steps towards a more effective data collection strategy that can lead to a better understanding of the impact of Jeremiah Program, and a more accurate measure of the real benefits of the program.

- **Consider collecting public data on participants' earnings and public benefits to understand how they change after Jeremiah Program.** The ideal source for information on public assistance and wages of participants is official governmental agencies (e.g. the Minnesota Department of Human Services-DHS, and the Minnesota Department of Employment and Economic Development - DEED). To collect this type of data an administrative process needs to be followed, including a design and official approval of consent forms and other conditions determined by the state. The administrative data has to be purchased from the state. We recommend Jeremiah Program evaluate the possibility of initiating such administrative process and consider the investment in acquiring official administrative data for these outcomes.

- **We recommend the design of a new survey instrument to collect data at several points in time during the relationship of the participants with the program.** For instance, we recommend collecting data at least at four key moments: 1) when applying to the program, 2) when entering the program, 3) when graduating or exiting, and 4) at least one follow-up survey around 12 months after exiting the program. Additionally, a sample of drop outs and applicants in waiting list or rejected should also be surveyed at some point in time (these individuals can be used as a suitable comparison group.

- **We recommend the use of a unique electronic data base for all outcome records**. It would be advisable to process and store the data from the surveys and administrative data in a designated database (Excel, Access, or other specialized software) that can be easily exported to specialized statistical software for analysis.

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Appendix

Sensitivity analysis

The returns on investment estimations are sensitive to the parameters and assumptions used in this analysis. One of these parameters is the percentage of participants who graduate from college. In the 2010 cohort, this rate was estimated to be around 50 percent. However, this rate was estimated using data on participants; because we don't have data on a suitable comparison group of non-participants, this rate is only a conservative approximation of the actual rate of graduation. In fact, this rate may vary from cohort to cohort; furthermore, it is expected that this success rate will grow as the program quality improves due to more experienced staff and refinement of the delivery model. Therefore, it seems reasonable to compute some prospective scenarios in which the graduation rates is higher than the estimated 50 percent used in the main analysis. Figures A1 and A2 summarize the resulting net benefit and ROIs of such scenarios for society and private funders. We compute two additional scenarios with graduation rates of 75 and 100 percent.

A1. Sensitivity analysis of returns to society based on graduation rates

	Graduation rates		
	50%	**75%**	**100%**
Total benefits	$276,621	$395,593	$520,385
Total costs	$112,057	$112,057	$112,057
Net benefit	$164,564	$283,535	$408,328
ROI	$2.47	$3.53	$4.64

**This scenarios include expected graduation rates from college of second generation participants as in the main report.*

A2. Sensitivity analysis of returns to private funders based on graduation rates

	Graduation rates		
	50%	**75%**	**100%**
Total benefits	$248,815	$367,786	$492,579
Total costs	$63,329	$63,329	$63,329
Net benefit	$185,486	$304,457	$429,249
ROI	$3.93	$5.81	$7.78

**This scenarios include expected graduation rates from college of second generation participants as in the main report.*

Another factor associated with the economic performance of the program is the type of degree earned. In the following tables we develop a scenario based on the assumption that participants earn a bachelor degree (Figure A3), and a second scenario in which we assume that the participant earns an associate degree (Figure A4). We still compute the benefits and ROIs for different levels of graduation rates.

A3. Sensitivity analysis of returns to society based on graduation rates for potential bachelor degree earners

	Graduation rates		
	50%	**75%**	**100%**
Total benefits	$389,907	$556,663	$730,225
Total costs	$112,057	$112,057	$112,057
Net benefit	$277,850	$444,605	$618,168
ROI	$3.48	$4.97	$6.52

**This scenarios include expected graduation rates from college of second generation participants.*

A4. Sensitivity analysis of returns to society based on graduation rates for potential associate degree earners

	Graduation rates		
	50%	**75%**	**100%**
Total benefits	$240,404	$334,745	$432,935
Total costs	$112,057	$112,057	$112,057
Net benefit	$128,347	$222,687	$320,878
ROI	$2.15	$2.99	$3.86

**This scenarios include expected graduation rates from college of second generation participants.*

Other assumptions and parameters

- Investment in the program refers to the calendar year 2010, and benefits refer to outcomes that can be reasonably attributed to the investment made in the program during that year. Most benefits and savings materialize in the future. In those cases, the amounts are projected using standard economic assumptions. The net present values are discounted using a 3 percent discount rate.
- This study uses individual data on demographics characteristics, participants' academic attainment, and participants' income collected by the program.
- Investments in the program are estimated using official financial data of the program.

- Participants' expected future income is estimated using census data on annual income for populations with a demographic profile similar to participants' characteristics.
- The 2010 cohort of participants includes 102 families with a total of approximately 122 children. Since 30 of them were still in the program at the time the research was conducted, we only consider as active participants 72 families that were in the program in 2010 but that left the program by graduating or just leaving.
- Approximately 17 percent of participants in the 2010 cohort earned bachelor's degrees, and 33 percent earned associate degrees or some college credits.
- The average length of stay in the program used in the calculations is 30 months. This parameter is computed from individual data on dates of entry and graduation from the program.
- The average age of participants is 27 years.

Estimation of investments

Since the program operates almost at the break-even point, the program's income is a good approximation of its direct investment and the sources of these funds. The costs to each relevant sector of the society are described in Figure A5.

A5. Detailed investment

	Total investment 2010	Monthly investment per participant (Total monthly investment / Total participants)	Net present value per participant (30 months in the program)
PRIVATE FUNDERS	**$1,895,418**	**$2,194**	**$63,329**
Total Annual Fund	$599,247	$694	
Total Special Events	$536,112	$621	
Total Grants	$760,058	$880	
GOVERNMENT FUNDS	**$938,874**	**$1,087**	**$31,370**
Government Grants/Contracts	$33,328	$39	
Child Care - County Assistance	$690,866	$800	
USDA food reimbursement	$68,273	$79	
Housing Subsidies & Grants	$146,408	$169	
PARTICIPANTS' CONTRIBUTIONS	**$196,793**	**$228**	**$6,575**
Child Development Center Billings	$70,471	$82	
Housing Rents/Subsidies	$126,322	$146	
JEREMIAH PROGRAM'S SUBSIDIES	**$155,195**	**$180**	**$5,185**
Child Care Scholarships	$35,502	$41	
Other Income	$7,461	$8	
Interest/Dividend Income	$112,233	$130	
COST OF VOLUNTEERS	**$167,531**	**$194**	**$5,598**
TOTAL COSTS TO SOCIETY	**$3,353,811**	**$3,882**	**$112,057**

The present value of the investment per participant (IC) from each source is calculated using the following formula:

$$IC_s = \sum_{t=1}^{T} \frac{MI_t}{(1+r)^t}$$

Where, MI is the monthly investment per participant in period t, and r is the discount rate. The subscript "s" refers to the three sources from which the analysis is made: participants, taxpayers, and funders. Society's investment is the sum of the investments from all perspectives plus the indirect cost of volunteers.

To estimate volunteers' investment we used the same formula from above. The volunteer positions at the program include a variety of tasks and levels of expertise. These volunteer positions include: administrative interns, speakers, maintenance and cleaning, and event coordinators and supporters, among other jobs. We value the volunteer time at an average hourly wage of $7.45. This rate does not account completely for volunteers' opportunity costs, (i.e., the value of the work from the perspective of the volunteers). During the year 2010, members of the community contributed 22,487 hours of volunteer work with a total value of $167,531 per year. This is equivalent to a monthly cost $13,961, or a monthly cost per participant of $194 (13,961 / 72). Since the average length in the program is 30 months, we can estimate the net present value of this cost ($5,598).

A6. Parameters used in the estimation of investment

Average length of stay (months)	30
Number of participants	72
Hours of volunteer work	22,487
Wage rate of volunteer work	$7.45/hr
Discount rate	3%

Estimation of additional lifetime income from increased educational attainment

The additional lifetime income is the sum of the difference between the expected income with a degree and the income at entry for all productive years of life of the participant after obtaining the degree. This amount depends on the age at which the participant obtains the degree (younger graduates will experience more productive years), an assumed rate of growth of earnings due to increased productivity (2%), the type of degree obtained (bachelor's degree holders earn more on average than associate degree holders), and a discount rate (3%), that reflects the opportunity cost of the investment.

The following formula is used to estimate this benefit:

$$Y = \sum_{t=1}^{T} \frac{(YED_t - YED_0) \cdot (1+g)}{(1+r)^t}$$

Where, YEDt is the annual income of females with a college degree (we estimate benefits for bachelor's degree holders and associate degrees or some college separately), YED0 is the annual income with a lower educational degree (we assume this to be high school or the income at time of entering the program), g is the annual rate of growth of earnings due to improved productivity and experience, and r is the discount rate. T is the year of retirement of the participant; the work life of the participant (T– t) is the difference between the age at which the participant earned the degree (at t=1) and age 65, the assumed age of retirement. We use actual data on participants' ages and degrees earned from the 2010 cohort to compute these present value lifetime earnings, and data from the Census Bureau on the average income of females with higher educational degrees. We compute the present value of the additional lifetime earnings of participants getting a degree.

We compute average earnings by type of degree obtained and apply the graduation rates to account for effectiveness of the program. We can only assume that if the participants would not have entered the program, their future income would grow due to increased productivity, at the same rate as of growth for participants in the program (2%).

All Jeremiah Program's participants are high school graduates (or GED holders). Their average annual income at the time of entering the program is $11,443. Participants are expected to obtain a college degree with the help of the program. A higher educational attainment is associated with higher lifetime income; women with college degrees in Minnesota earned on average $40,703 in 2012, compared with average annual earnings of

$28,628 for an associate degree or some college credits, according to data from the U.S. Census Bureau.

The average additional lifetime earnings for participants with bachelor's degrees can reach $680,636, while an associate degree or attending some college can give $385,062 in additional earnings.

A7. Parameters used in the income estimation

	Earnings 2012
High school	28,923
Some college/Associate	35,526
Bachelor	51,476
Growth rate	2%
Discount rate	3%
Effective tax rate 2013 (includes all taxes: income, sales and local)	11.5%
Participants with bachelor's degrees	12
Participants with some college or associate degrees	24
Participants with bachelor's and associate degrees and some college	36
Total participants in 2010 cohort	102
Still in program	30
Probability of success bachelor	17%
Probability of success some college or associate degrees	33%

For the ROI estimation, the relevant amount to be accounted is the net income after taxes. This is because from the perspective of the society, we include additional tax revenues as a benefit, thus the income of participants, who are paying these additional taxes, needs to be reduced by the amount paid in taxes to avoid double counting of the benefits. From the perspective of participants, it is obvious that the additional taxes paid are a cost.

Estimation of savings from crime reduction

The savings from crime reduction of participating children are based on the avoided marginal cost of incarcerating an additional criminal in the future. First, we estimate the marginal cost of incarceration using a 10-year series of total expenses in prisons and the population of inmates in Minnesota. Using an average length of incarceration of 4 years, the resulting cost of an additional incarceration is $153,469. We then multiply this present value by the probability of committing a crime at juvenile and adult ages (0.016 for adults and 0.011 for juveniles). We also apply an assumed probability of conviction to convert

the unit of analysis from arrests to incarcerations of 0.5 (this implies that about 50 percent of arrests result in incarceration). The result is a series of expected costs of incarceration of a typical individual in Minnesota during his hypothetical life as a criminal (12 to 65 years of age).

The savings from crime reduction of participating children are based on the avoided marginal cost of incarcerating an additional criminal in the future. The probability that children will commit crimes in the future is reduced 27 percent by Early Childhood Education programs (Reynolds et al., 2011; Schweinhart, et al., 2005; Masse & Barnett, 2002). Consequently, applying this effect size to the expected present value cost of incarceration, we estimate that the potential lifetime cost savings from an additional conviction avoided for each child participating in the Jeremiah Program reaches $9,624.