

EXCEPTIONAL RETURNS

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**Economic, Fiscal, and Social
Benefits of Investment in Early
Childhood Development**



Robert G. Lynch

ECONOMIC POLICY INSTITUTE

About the Author

Robert G. Lynch is an associate professor and chairman of the department of economics at Washington College, where he has taught since 1998. Previously, he taught at the State University of New York at Cortland, where he served as chair of the department of economics from 1991 to 1993. His areas of specialization include public policy, public finance, international economics, economic development, and comparative economics. In the past he has evaluated the adequacy and effectiveness of various state and local government economic policies, reviewed economic growth strategies, and analyzed the efficiency, fairness, and stability of state and local tax systems. Professor Lynch is also the author of several papers that have analyzed the effectiveness of state and local government economic policies in promoting economic development and creating jobs. He graduated with a B.A. degree in international and development economics from Georgetown University in 1979, earned a master's in economics from the State University of New York (SUNY) at Stony Brook in 1981, and received a Ph.D. in economics from SUNY Stony Brook in 1984.

His most recent book for the Economic Policy Institute was *Rethinking Growth Strategies – How State and Local Taxes and Services Affect Economic Development* (2004).

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ECONOMIC POLICY INSTITUTE
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Table of contents

Executive summary	vii
INTRODUCTION	1
CHAPTER 1: Overview of the benefits of early childhood development programs	3
Estimates of benefit-cost ratios for ECD investment	6
CHAPTER 2: The effects of ECD investment on future government finances, the economy, and crime	9
Budget effects of ECD investment	9
Economic effects of ECD investments	12
Crime effects of ECD investments	14
The validity of extrapolating from the Perry Preschool Project and issues raised by increasing the scale of ECD investment	15
CHAPTER 3: The potential impact of ECD investment on the solvency of the Social Security system	19
CONCLUSION	21
APPENDIX 1: Case studies of the benefits of investments in early childhood development programs	23
APPENDIX 2: Explanation of the methodology for estimating the budget, economic, and crime effects of investments in ECD	35
Endnotes	37
Bibliography	41

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Executive summary

The youngest and most vulnerable children suffer the highest poverty rates of any age group in the United States. Nearly one in five children under age six lives in poverty, and the number is rising.

The problems for children and society that result from childhood poverty cry out for effective policy solutions. Poor children often have inadequate food, safety, shelter, and health care. In school, poor children too often fall far short of achieving their academic potential, making them more likely to enter adulthood lacking the skills to compete in the global labor market. As adults, they are more likely to suffer from poor health and participate in crime and other antisocial behavior; these children are also less likely to grow up to be gainfully employed and contributing to economic growth and community well-being.

There is a strong consensus among the experts who have studied high-quality early childhood development (ECD) programs that these programs have substantial payoffs. Although the programs vary in whom they serve and in the services they provide, most ECD programs offer wide-ranging education services as well as health services (such as immunizations and health screenings) and nutrition services, typically for children younger than six. Many also provide adult education and parenting classes for the parents of young children. Investments in high-quality ECD programs consistently generate benefit-cost ratios exceeding 3-to-1—or more than a \$3 return for every \$1 invested—well above the 1-to-1 ratio needed to justify such investments. Even economists who are particularly skeptical about government programs make an exception for high-quality ECD programs. Follow-up studies of poor children who have participated in these programs have found solid evidence of markedly better academic performance, decreased rates of criminal conduct, and higher adult earnings than among their non-participating peers.

This study demonstrates, for the first time, that providing all 20% of the nation's three- and four-year-old children who live in

poverty with a high-quality ECD program would have a substantial payoff for governments and taxpayers in the future. As those children grow up, costs for remedial and special education, criminal justice, and welfare benefits would decline. Once in the labor force, their incomes would be higher, along with the taxes they would pay back to society.

A publicly financed, comprehensive ECD program for all children from low-income families would cost billions of dollars annually, but would create much larger budget savings over time. By about the 17-year mark, the net effect on budgets for all levels of government combined would turn positive. Within 25 years, by 2030 if a nationwide program were started next year, the budget benefits would exceed costs by \$31 billion (in 2004 dollars). By 2050, the net budget savings would reach \$61 billion (in 2004 dollars).

The timing of these fiscal benefits resulting from a nationwide ECD program should appeal to those concerned about the fiscal difficulties posed by the impending surge of retiring baby boomers. The substantial fiscal payoffs from investing in young children would become available to governments just as the wave of new retirements puts the greatest pressure on government resources. For example, the government-wide budget savings in 2030 and in 2050 from ECD investments begun next year would be enough to offset about one-fifth of the deficits in the Social Security trust fund projected for those years. This potential contribution to the solvency of the Social Security system would be achieved without raising social security taxes or cutting benefits.

The economic and social benefits from ECD investment amount to much more than just improvements in public balance sheets. By improving the skills of a large fraction of the U.S. workforce, these programs for poor children would raise the gross domestic product (GDP), reduce poverty, and strengthen U.S. global competitiveness. Within 45 years the increase in earnings due to ECD investments would likely boost GDP by nearly one-half of 1%, or \$107 billion (in 2004 dollars). Crime rates and the heavy economic costs of criminality to society are likely to be substantially reduced, as well, with savings of about \$155 billion (in 2004 dollars) realized by 2050.

The United States should be investing in high-quality early child-

hood development programs to improve the quality of life for millions of children, reduce crime, make the workforce of the future more productive, and strengthen the overall economy. The resulting budget relief gained by providing ECD services to poor children will ultimately contribute to funding some of the nation's most pressing future needs.

Introduction

At a time of fundamental disagreements in the United States over the nature of the country's economic problems and their solutions, it is rare when a consensus emerges across the political spectrum on both the problems and the appropriate policy solutions. There is almost universal agreement among experts that too many young children—the most vulnerable members of our community—have inadequate access to food, clothing, shelter, health care, and clean, safe, crime-free living environments. In addition, too many of our children do not have access to high-quality educational opportunities or fall far short of achieving their academic potential while in school. At the very same time, however, there is a consensus among experts of all political stripes that high-quality investments in the education and health of young children would have huge long-term economic payoffs, both to our children and to society as a whole. Recent studies of high-quality early childhood development (ECD) programs have consistently found that investing in young children has many important benefits for children, their families, and society at large (including its taxpayers).

Although there are many ways to illustrate the deprivation experienced by children, one good indicator of the magnitude of the crisis is the statistics on childhood poverty. In 2003, fully 19.8% of all children under the age of six—that is, one out of every five kids, or some 4.7 million children—were living in poverty in the United States. This is up from 18.5%, or 4.3 million children in 2002.

To make matters worse, poor children grow up into adults who are more likely to engage in crime, use illegal drugs, abuse alcohol, neglect and abuse their children, and suffer from poor physical health and a variety of mental illnesses. They are also less likely to be gainfully employed

and, thus, less likely to contribute to the growth of our economy. Poor children who fail to achieve their full academic potential are more likely to enter adulthood without the skills necessary to develop into highly productive members of society able to compete effectively in a global labor market. Less skilled, less productive, and earning less, when these children become adults they will be less able to help us sustain public retirement benefits systems such as Social Security, one of the most challenging problems we face in the future. In short, as has been documented by countless researchers, the consequences of childhood poverty on our collective economic health and well-being as a community are profoundly negative and thus should be addressed now.

This study estimates the likely benefits of investment in a high-quality, large-scale ECD program. Chapter 1 provides a brief overview of the benefits of high-quality ECD programs and reports the benefit-cost ratios that have been calculated for four such programs: the Perry Preschool Project, the Prenatal/Early Infancy Project, the Abecedarian Early Childhood Intervention, and the Chicago Child-Parent Center Program. This study also presents calculations on the effect a high-quality, large-scale ECD program for all poor three- and four-year-old children would have on future government budgets, the economy, and crime. Additionally, this study illustrates the potential benefit to the solvency of the U.S. Social Security system from ECD investment. Finally, Appendix 1 presents in more detail the benefits of investments in ECD programs. In particular, after a review of the general characteristics of ECD programs, Appendix 1 provides case studies of the benefits of the four high-quality ECD programs mentioned above and of Head Start, which is the largest of the ECD programs.

Overview of the benefits of early childhood development programs

Consensus about the effectiveness of investments in high-quality ECD programs has not always existed.¹ Early studies showed that children in high-quality ECD programs performed significantly better on IQ tests in the first few years after program participation than did comparable children who did not participate in the programs (see, for example, Deutsch 1967). Thus, there was great initial optimism about the benefits of ECD programs. However, follow-up studies of ECD participants found that their advantage over non-ECD participants in terms of IQ test scores tended to fade as they progressed through school so, that by the end of elementary school, there were no significant IQ test score differences (see, for example, Cicirelli 1969). The initial optimism turned to pessimism and some scholars concluded that investment in ECD was a waste of money, producing few if any benefits but costing thousands of dollars per participant.

Long-term studies of ECD participants have found that the pessimism is unwarranted because exclusive attention on IQ test scores is misplaced and significant benefits to ECD programs do in fact exist. In general, these benefits include:²

- Higher levels of verbal, mathematical, and intellectual achievement;
- Greater success at school, including less grade retention and higher graduation rates;
- Higher employment and earnings;
- Better health outcomes;
- Less welfare dependency;

- Lower rates of crime; and
- Greater government revenues and lower government expenditures.

More specifically, assessments of well-designed and well-executed ECD programs have established that participating children are more successful in school and in life after school than children who are not enrolled in high quality programs. In particular, children who participate in high quality ECD programs tend to have higher scores on math and reading achievement tests, have greater language abilities, are better prepared to enter elementary school, are more likely to pursue secondary education, have less grade retention, have less need for special education and other remedial coursework, have lower dropout rates, have higher high school graduation rates, higher levels of schooling attainment, improved nutrition, better access to health care services, higher rates of immunization, better health, and experience less child abuse and neglect. These children are also less likely to be teenage parents and more likely to have higher employment rates as adults, higher earnings as adults, greater self-sufficiency as adults, lower welfare dependency, lower rates of drug use, show less-frequent and less-severe delinquent behavior, engage in fewer criminal acts both as juveniles and as adults, have fewer interactions with the criminal justice system, and lower incarceration rates. The benefits of ECD programs to participating children enable them to enter school “ready to learn,” helping them achieve better outcomes in school and throughout their lives.

Parents and families of children who participate in ECD programs also benefit. For example, mothers have fewer additional births, have better nutrition and smoke less during pregnancy, are less likely to abuse or neglect their children, complete more years of schooling, have higher high-school graduation rates, are more likely to be employed, have higher earnings, engage in fewer criminal acts, have lower drug and alcohol abuse, and are less likely to use welfare.

Investments in ECD programs easily pay for themselves over time by generating very high rates of return for participants, the public, and government. Good programs produce \$3 or more in benefits for every dollar of investment. While participants and their families get part of the total benefits, the benefits to the rest of the public and government are

larger and, on their own, tend to far outweigh the costs of these programs. Thus, it is advantageous even for non-participating taxpayers to help pay for these programs.

There is now a consensus among experts of all political persuasions that investments in ECD programs have huge potential long-term payoffs. Several prominent economists and business leaders (many of whom are skeptical about government programs generally) have recently issued well-documented reviews of the literature that find very high economic payoffs from ECD programs. For example, Nobel Prize winning economist James Heckman of the University of Chicago has concluded:

Recent studies of early childhood investments have shown remarkable success and indicate that the early years are important for early learning and can be enriched through external channels. Early childhood investments of high quality have lasting effects....In the long run, significant improvements in the skill levels of American workers, especially workers not attending college, are unlikely without substantial improvements in the arrangements that foster early learning. We cannot afford to postpone investing in children until they become adults, nor can we wait until they reach school age—a time when it may be too late to intervene. Learning is a dynamic process and is most effective when it begins at a young age and continues through adulthood. The role of the family is crucial to the formation of learning skills, and government interventions at an early age that mend the harm done by dysfunctional families have proven to be highly effective.³

The Director of Research and a regional economic analyst at the Federal Reserve Bank of Minneapolis, Arthur Rolnick and Rob Grunewald, have come to similar conclusions:

...recent studies suggest that one critical form of education, early childhood development, or ECD, is grossly under-funded. However, if properly funded and managed, investment in ECD yields an extraordinary return, far exceeding the return on most investments, private or public....In the future any proposed economic development list should have early childhood development at the top.⁴

Likewise, after reviewing the evidence, The Committee for Economic Development (CED), a nonpartisan research and policy organization of some 250 business leaders and educators, concluded that:

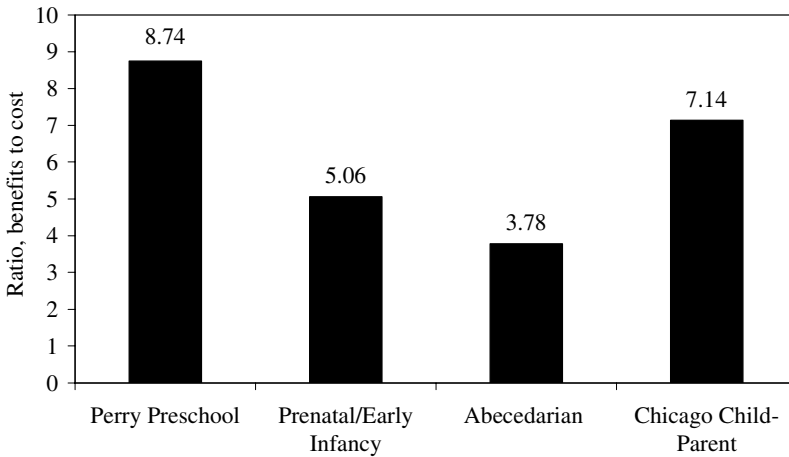
Society pays in many ways for failing to take full advantage of the learning potential of all of its children, from lost economic productivity and tax revenues to higher crime rates to diminished participation in the civic and cultural life of the nation. . . . Over a decade ago, CED urged the nation to view education as an investment, not an expense, and to develop a comprehensive and coordinated strategy of human investment. Such a strategy should redefine education as a process that begins at birth and encompasses all aspects of children's early development, including their physical, social, emotional, and cognitive growth. In the intervening years the evidence has grown even stronger that investments in early education can have long-term benefits for both children and society.⁵

Reviewing the benefit-cost ratios calculated for four high-quality programs will illustrate the net benefits of investments in ECD programs.

Estimates of benefit-cost ratios for ECD investment

Four ECD programs have had carefully controlled studies with long-term follow-up of participants and a control group of non-participants: the Perry Preschool Project, the Prenatal/Early Infancy Project, the Abecedarian Early Childhood Intervention, and the Chicago Child-Parent Center Program.⁶ All of these studies, described in more detail in Appendix 1, have found that enormous payoffs result from investments in early childhood development. Specifically, as illustrated in **Figure A**, analyses of the four programs have found benefit-cost ratios that varied from a minimum of 3.78-to-1 to a high of 8.74-to-1. It should be noted that investment in a project is justified if its benefit-cost ratio exceeds 1-to-1.⁷ Moreover, in the benefit-cost analyses of all four of these programs, the costs may have been fully described but the benefits were certainly understated.⁸ Thus, the benefits of these ECD programs probably exceed the costs by margins greater than those indicated in Figure A.

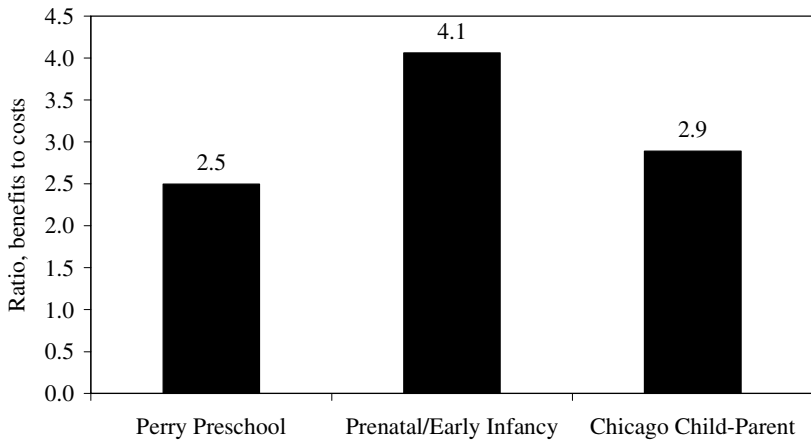
From the perspective of public policy, it should be observed that investments in ECD programs easily pay for themselves by generating

FIGURE A Benefit-cost ratio for ECD programs

Source: Barnett (1993), Karoly et al. (1998), Masse and Barnett (2002), Reynolds et al. (2002).

very high rates of return for participants, the non-participating public, and government (in the form of either reduced public service costs or higher tax payments by participants and their families). While participants and their families get part of the total benefits, it is noteworthy that the benefits to the public and government are larger and in and of themselves tend to far outweigh the costs of these programs. For example, a Federal Reserve Bank of Minneapolis study determined that annual real rates of return on public investments in the Perry Preschool program were 12% for the non-participating public and government and 4% for participants, so that total returns exceeded 16%. Thus, it is advantageous even for non-participating taxpayers to pay for these programs. To comprehend how extraordinarily high these rates of return on ECD investments are, consider that the highly touted real rate of return on the stock market that prevailed between 1871 and 1998 was just 6.3%.⁹

Even from the narrow perspective of government budgets, investments in ECD programs pay for themselves because the costs to government are outweighed by the budgetary benefits that the investments eventually produce. **Figure B** illustrates the benefit-cost ratio for three of the four ECD programs described in Figure A, assuming that all the

FIGURE B Ratio of government benefits to costs

Source: Barnett (1993), Karoly et al. (1998), Reynolds et al. (2002) and author's analysis.

costs are borne by government and taking into account only the benefits that generate budget savings for government.¹⁰ These ratios vary from a low of 2.5-to-1 for the Perry Preschool program to a high of 4.1-to-1 for the Prenatal/Early Infancy program.¹¹

Although earlier research has not translated these calculations for benefit-cost ratios and rates of return into estimates of how investments in ECD programs affect future government finances, the economy, and crime, **Chapter 2** presents such an analysis by building upon the earlier works of Barnett (1993), Schweinhart (1993), and Rolnick and Grunewald (2003) that described the outcomes of the Perry Preschool program. For the purposes of these analyses, we assume that a high-quality, publicly funded ECD program is established to serve roughly all three- and four-year-old children in the United States who are living in poverty. More specifically, we assume that the program enrolls 20% of all three and four year olds: those living in the lowest-income families and who are most at risk for poor educational performance.¹²

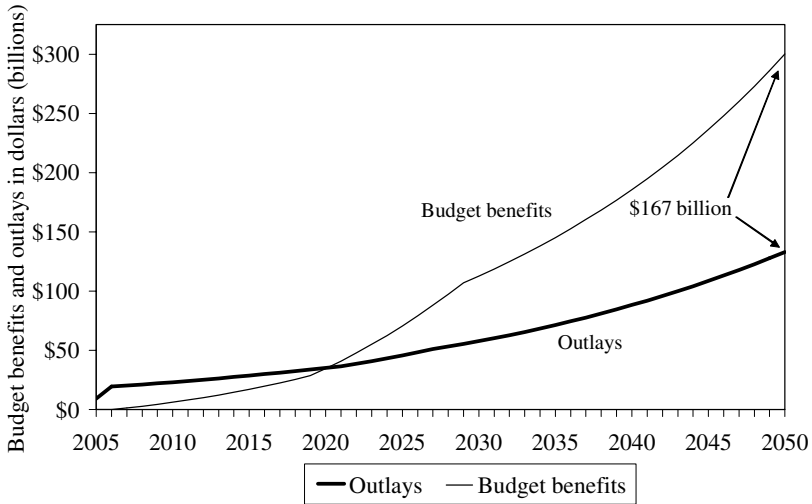
The effects of ECD investment on future government finances, the economy, and crime

Budget effects of ECD investment

Follow-up research on children who participated in high-quality ECD programs and similar non-participating children has found that ECD investment benefits taxpayers and generates government budget benefits in at least four ways.¹³ First, subsequent public education expenses are lower because participants spend less time in school (as they fail fewer grades) and require expensive special education less often. Second, criminal justice costs come down because participants—and their families—have markedly lower crime and delinquency rates. Third, both participants and their parents have higher incomes and pay more taxes than non-participants. Fourth, ECD investment reduces public welfare expenditures because participants and their families have lower rates of welfare usage. Against these four types of budget benefits, we must consider two types of budget costs: the expenses of the ECD program itself and the increased expenditure on higher public education due to greater use of higher education by ECD participants.¹⁴

The ECD programs do not perform miracles on poor children. As Appendix 1 shows in detail, substantial numbers of ECD participants do poorly in school, commit crimes, have poor health outcomes, and receive welfare payments. The key point is that ECD participants as a group have far lower rates of these negative outcomes than do non-participants.

This section examines the budget effects through the year 2050 of launching a government-financed, permanent, high-quality ECD program in 2005 that targets 20% of all three and four year olds—roughly all of them who live in poverty.¹⁵ This analysis considers budget effects on all levels of government—federal, state, and local—as a unified whole.

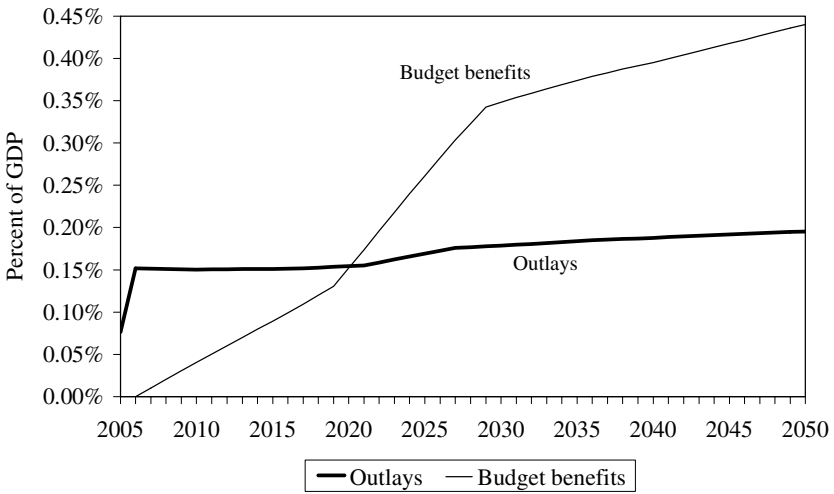
FIGURE C Annual budgetary benefits and outlays

Source: Author's analysis.

As a practical matter, the source estimates have not made such a distinction, nor should they. All levels of government share in the costs of education, criminal justice, and income support. Responsibilities have shifted in the last half-century and will continue to do so over the nearly half-century time frame used in this analysis. Although a case can be made that ECD investments should be the responsibility of the federal government to address educational inequalities before children enter the school system, these investments could be made at any or all levels of government. This analysis focuses on capturing national effects of ECD investments.

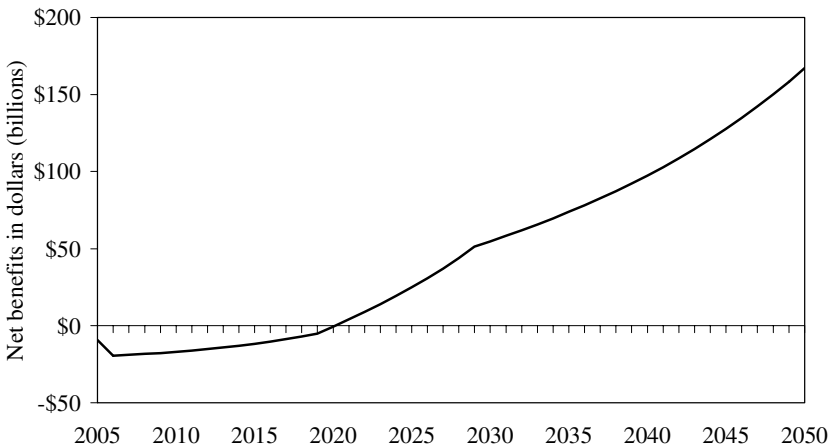
Offsetting budget benefits take a while to outstrip the costs, but the gap becomes substantially favorable over time. For the first 16 years, additional costs exceed offsetting budget benefits, but by a declining margin. Thereafter, offsetting budget benefits exceed costs by a growing margin each year. This pattern is illustrated in **Figures C and D**. Annual revenue impacts and costs are portrayed in nominal terms in Figure C and again as a percentage of gross domestic product (GDP) in Figure D. **Figure E** shows the annual net budget impact in nominal terms.

FIGURE D Annual budgetary benefits and outlays as percent of gross domestic product



Source: Author's analysis.

FIGURE E Annual net budgetary impact of ECD investments



Source: Author's analysis.

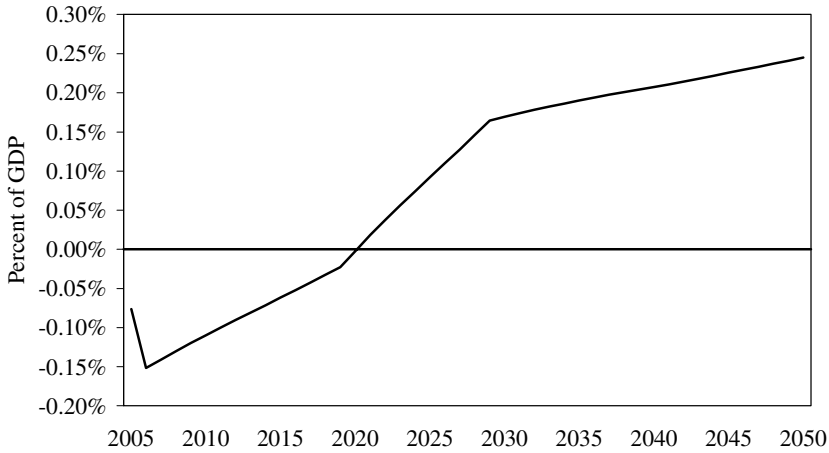
In the second year of the program, 2006, when the program is fully phased in, government outlays would exceed offsetting budget benefits by \$19.4 billion. The annual deficit due to the ECD program would shrink for the next 14 years. By the 17th year of the program, in 2021, the deficit would turn into a surplus that would grow every year thereafter culminating in a net budgetary surplus of some 0.25% of GDP in 2050 (the last year estimated), as illustrated in **Figure F**. Thus, by 2050, the offsetting budget benefits of ECD investments would total 0.44% of GDP and the costs to government of ECD investments would amount to almost 0.2% of GDP. In dollar amounts, by 2050 the net budget savings would total \$167 billion (or \$61 billion in 2004 dollars).

The reason for this fiscal pattern is fairly obvious. The costs of the program will grow fairly steadily for the first decade and a half, in tandem with modest growth in the population of three- and four-year-old participants. Thereafter, costs will grow at a somewhat faster pace for a few years as, in addition to the costs of educating three and four year olds, the first and subsequent cohorts of participant children begin to use higher public education services. After the first two years, when the first cohort of children start entering the public school system, public education expenditures will begin to diminish due to less grade retention and remedial education. After a decade and half, the first cohort of children will be entering the workforce, resulting in increased earnings and thus higher tax revenues and lower welfare expenditures. In addition, governments will experience lower judicial system costs.

Economic effects of ECD investments

The previous section described the fiscal impacts of investments in ECD programs. It is important to keep in mind that savings to government are not the only benefits from ECD investments. For example, benefits that did not accrue to government finances represented a sizeable portion of the total benefits found in the studies of high-quality ECD programs. In fact, 19.8% of the estimated total benefits found for the Prenatal/Early Infancy program, 59% for the Chicago Child-Parent Centers program, and 81.4% for the Perry Preschool program went to groups aside from government.¹⁶ These other benefits come in many forms.

FIGURE F Annual net budgetary impacts of ECD investments as a percent of gross domestic product



Source: Author’s analysis.

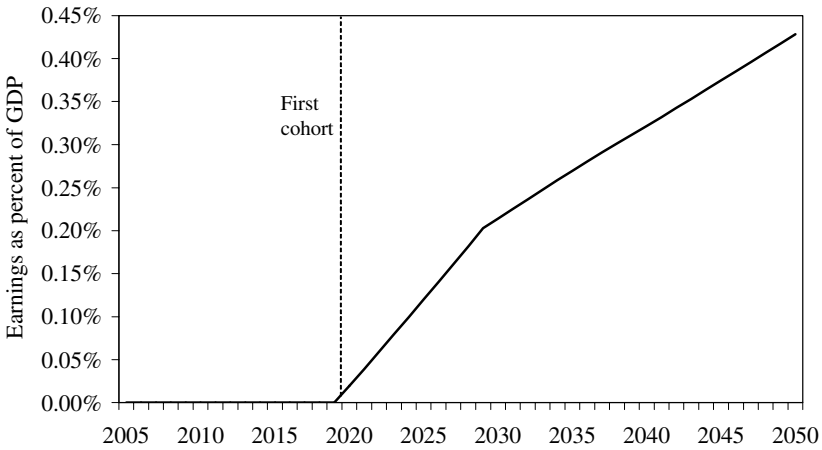
For example, there are huge benefits to society from lower crime rates that go beyond just savings to governments. Fewer people will be raped, murdered, and assaulted (these benefits are quantified in the next section of this chapter).

Another major benefit of ECD investments is their impact on the future earnings of participants.¹⁷ In the long run these higher future earnings result from productivity gains of as much as a fifth of the future workforce and translate into higher GDP levels.

Figure G illustrates the impact of ECD investments on GDP by showing the annual increase in earnings due to ECD investment as a percentage of GDP. The initial increase in earnings occurs in 2020 when the first cohort of participating children turns 18 and enters the labor market. By 2050, the increase in earnings due to ECD investments is estimated to amount to 0.43% of GDP, or some \$107 billion in 2004 dollars.

The increased earnings of children who participate in an ECD program not only allow the United States to compete more effectively in a global economy, but it also has positive implications for both earlier and future generations of children. These increased earnings will benefit

FIGURE G Annual earnings effects of ECD investment as a percentage of gross domestic product



Source: Author's analysis.

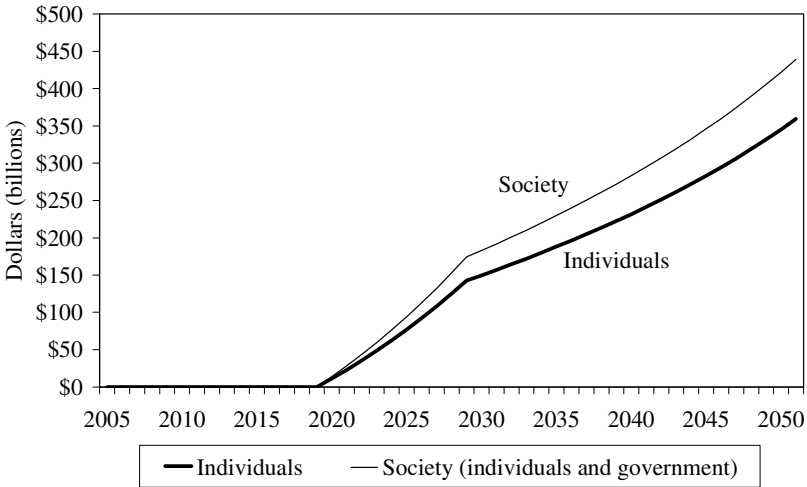
earlier generations who reach retirement age by contri vency of Social Security and other public retirement benefit programs. Future generations will benefit because they will be less likely to grow up in families living in poverty.

Crime effects of ECD investments

Investments in ECD programs are likely to substantially reduce crime rates and the extraordinary costs to society of criminality. Some of these reduced costs are savings to government in the form of lower criminal justice system costs. These savings to government would total nearly \$77 billion (or \$28 billion in 2004 dollars) in 2050, and were included in the earlier discussion of the fiscal effects of ECD investments.

But there are other savings to society from reduced crime. These include the value of material losses and the pain and suffering that would otherwise be experienced by the victims of crime.¹⁸ By 2050, these savings to individuals from less crime would amount to \$345 billion (\$127 billion in 2004 dollars). Including the savings to government, the savings to society from reductions in criminality due to investments in ECD

FIGURE H Annual savings to individuals and society from reduced crime due to ECD investment



Source: Author’s analysis.

programs would total \$422 billion (\$155 billion in 2004 dollars). **Figure H** illustrates the annual savings to individuals and to society from ECD induced reductions in crime.

The validity of extrapolating from the Perry Preschool Project and issues raised by increasing the scale of ECD investment

Making extrapolations from the Perry Preschool Project to a nationwide ECD program raises several questions. Do results from a program that operated in a small-town setting carry over to large urban, often inner-city environments where many poor children live today? Have the problems faced by poor children changed so much since the Perry Preschool Project operated in the 1960s that it is unlikely that the success of that program can be replicated? Have the dramatic changes in the U.S. welfare system that have taken place over the past decade reduced the welfare savings that could be generated by an ECD program like the Perry Preschool Project? Does the fact that the Perry Preschool Project had

the highest benefit-cost ratio of all the ECD programs analyzed (see Figure A) imply that the results for that project may overstate the net benefits of a nationwide ECD program? Finally, how confident can one be that the benefits found for the Perry Preschool Project, which was a relatively small pilot program, would apply when replicating the program, or a similar high-quality program, on a large, nationwide scale?

We believe that the results for the Perry Preschool Project would apply to a large-scale, nationwide ECD program today. The results for the Perry Preschool Project are similar to those of the Chicago Child-Parent Centers program. The Chicago Child-Parent Centers program is not a small-scale pilot program: it serves about 5,000 children annually and has served over 100,000 children to date (Reynolds et al. 2001). The Chicago program operates in a large urban, inner-city environment. The program started in 1967 but *continues* to serve thousands of children annually, with all their modern-day problems. Its net benefits, moreover, may actually exceed those of the Perry Preschool Project.

In fact, in terms of government finances, the net benefits of the Chicago Child-Parent Centers (and of the Prenatal/Early Infancy program) are higher than they are for the Perry Preschool Project (see Figure B).¹⁹ Likewise, in terms of economic impacts alone, the benefit-cost ratio for the Chicago program exceeds that of the Perry Preschool Project (3.1-to-1 versus 1.7-to-1). Furthermore, the total net benefits of The Chicago Child-Parent Centers program are probably greater than they are for the Perry Preschool Project. As explained in more detail in Appendix 1, the total benefits of the Chicago program are underestimated relative to the Perry Preschool Project because they do not include the substantial savings that derive from reductions in the intangible losses due to crime.

It is not clear whether the dramatic changes in the welfare system would likely result in lower savings to government today than would have been generated decades ago by ECD investments. But even if the changes in the welfare system did mean that there would be relatively less government savings from reduced welfare usage, the results of this extrapolation would not change substantially. After all, for the Perry Preschool Project the savings to government from reductions in welfare usage amounted to only about 9% of the total savings to government and less than 3% of the total benefits of the program.

This analysis did not extrapolate from the Perry Preschool Project because it is the ideal program, or even better than the three other model

programs described. Instead, the Perry Preschool Project was used to calculate the budgetary, economic, and crime effects of investments in ECD programs because it is the only program for which the data exist on rates of return necessary to do these extrapolations.²⁰

The ultimate benefit-cost ratio for a large-scale, nationwide ECD program enrolling roughly 1.6 million children a year could turn out to be higher or lower than in smaller pilot programs. A large program would have the potential not possible in small programs to improve the school atmosphere for everyone, not just ECD participants. Raising academic performance while reducing disruptive classroom behaviors and drug or criminal activity of 20% of children and teenagers should benefit the other 80% of students who attend school with them. In addition, there may be some multiplier effects on the economy from the higher-skilled, more productive, and higher-earning ECD participants.²¹ On the other hand, a larger scale ECD program might draw in more kids who are less at risk than those in the pilot programs. Such kids might (or might not) have lower benefit-cost ratios than those in the pilot programs—experts are divided on this issue.²² Likewise, the quality of teachers and other staff may not be as good, or the teachers and staff may not be as highly motivated, as those in the pilot programs.

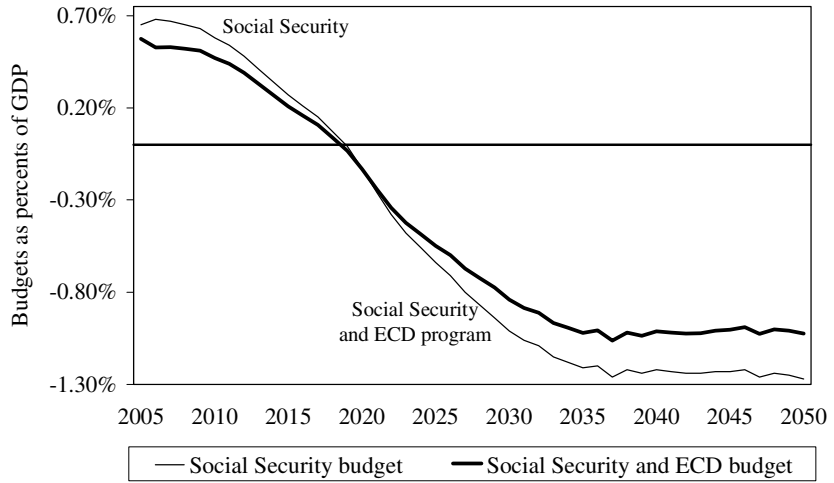
For illustration purposes, this analysis assumes the launch of an ECD program on a national scale immediately in 2005, with full phase-in by 2006. But, for practical purposes, such as the recruitment and training of teachers and staff and finding appropriate locations, a large-scale ECD program would have to be phased in over a longer period. There may be start-up costs associated with the training and recruitment of teachers and staff (and the establishment of appropriate sites) that are not accounted for in these estimates of the net benefits of ECD investment. And, of course, there may be other costs associated with the scaling up of ECD investment that have not been considered. On the other hand, the total benefits of ECD investment are understated in these estimates (see Appendix 1 for a discussion of the some of the benefits of Perry Preschool Project that are unaccounted for). Thus, although the benefit-cost ratio of a national ECD program could be somewhat higher or lower than found in the pilot programs, it is implausible that the ratio would be less than the 1-to-1 ratio necessary to justify launching the program.

The potential impact of ECD investment on the solvency of the Social Security system

The fiscal pattern for investment in high-quality early childhood development has almost the mirror image of the pattern projected for the Social Security trust fund. Compare the fiscal pattern for ECD investments in Figure D to the fiscal pattern for the Social Security trust fund in **Figure I** on the following page. Although the risk of insolvency is a matter of dispute, according to the most recent Congressional Budget Office (CBO 2004) analysis, the Social Security trust fund will continue to receive more revenues than it pays out in benefits until 2018. After that, as illustrated by the thin line in Figure I, it runs a growing gap between benefits paid out and revenues.

The thick line in Figure I depicts the combined effect of the projected budget impact of ECD investment and the CBO's projections for the Social Security trust fund. The net savings to government from investment in an ECD program are smaller than the projected deficits for the Social Security trust fund, but they are significant. The projected government-wide budget gain from ECD would be 0.25% of GDP in 2050, about one-fifth of the projected 1.27% of GDP deficit projected in the Social Security trust fund for that year. This contribution toward fiscal balance would start in less than two decades and would be achieved without raising taxes or cutting benefits.

FIGURE I Annual Social Security and ECD budget outlook



Source: CBO (2004) and author's analysis.

Conclusion

A high-quality, nationwide commitment to early childhood development would cost a significant amount of money up front, but it would have a substantial payoff in the future. The United States' political system, with its two- and four-year cycles, tends to under-invest in programs with such long lags between when investment costs are incurred and the benefits are enjoyed. The fact that lower levels of government cannot capture all the benefits of ECD investment may also discourage them from assuming all the costs of ECD programs. Yet, the economic case for ECD investment is compelling.

We estimate that providing poor three- and four-year-old children—20% of all children in this age range—with a high-quality program would initially cost about \$19 billion a year. Such a program would ultimately reduce costs for remedial and special education, criminal justice, and welfare benefits, and it would increase income earned and taxes paid. Within about 17 years, the net effect on the budget would turn positive (for all levels of government combined). Within 30 years, the offsetting budget benefits would be more than double the costs of the ECD program (and the cost of the additional youth going to college).

In addition, investing in our poor young children is likely to have an enormous positive effect on the U.S. economy by raising GDP, improving the skills of the workforce, reducing poverty, and strengthening the United States' global competitiveness. Crime rates and the heavy costs of criminality to society are likely to be substantially reduced, as well. If we invest in young children, we could also enhance the solvency of public retirement benefits systems such as Social Security.

We should be investing in ECD programs to improve the quality of life of millions of our children, to reduce crime, to make the work force

of the future more productive, and to strengthen the economy. Because the retirement of the baby boom generation will put great pressure on the budget in coming decades, we should also be investing in ECD programs to provide future budget relief.

Appendix 1: Case studies of the benefits of investments in early childhood development programs

General characteristics of ECD programs

In general, ECD programs target economically disadvantaged children and their families. Some programs accept participants as early as prenatal and others as late as four years of age. These programs typically continue providing assistance to participants until the onset of elementary school, but some continue to provide services through the elementary years. Some programs provide assistance at a center or school, others provide in-home services, and still others combine in-home with center-based care. Some ECD programs focus exclusively on children, while also providing education, training, and assistance to parents. Services offered typically include language development and core educational services, but often include many other provisions such as health services, nutrition services, social and emotional development services, parenting instruction, adult education, and employment acquisition education for parents. Some programs are daylong and year round, while others are half day or less and run only part of the year.

The five programs described in more detail were selected because they represent examples of well-conceived programs or, in the case of Head Start, because it is by far the largest of the early childhood intervention programs. But, just as importantly, these five programs all had long-term follow-up studies that analyzed the outcomes of the programs until the children were 15 years old (Prenatal/Early Infancy Program), 21 years old (the Abecedarian Early Childhood Intervention), 22 years old (Chicago Child-Parent Centers), 31 years old (Head Start), or 41 years old (Perry Preschool Project). In addition, the programs covered a broad range of possible ages for the participants, from prenatal to two years of age (Prenatal/Early Infancy Program), birth to age three (Early Head Start), early infancy through age eight (the Abecedarian Early Childhood Intervention), ages three through five (Perry Preschool Project and Head Start), and ages three through nine (Chicago Child-Parent Centers). Finally, these programs took place in a wide variety of areas from rural (Abecedarian), to small town (Perry Preschool), to small city (Prenatal/Early Infancy), to large urban inner city (Chicago Child-Parent Centers).

1. Perry Preschool Project (Ypsilanti, Michigan, 1962-1967)

Description: One hundred and twenty-three African American children with low IQs (in the 70 to 85 range) and from families with low socioeconomic status were randomly assigned to one of two groups: one enrolled in a preschool program and one not. Those enrolled in preschool attended for two school years at ages three and four. Services included daily 2.5-hour classes and weekly 1.5-hour home visits with mother and child. Evaluations of the children were performed annually until the children reached age 11, and then again at ages 14, 15, 19, and 27. A forthcoming analysis will follow the children through age 41.

Results: Table 1 summarizes some of the statistically significant outcomes of the preschool program. Researchers observed additional positive outcomes from the program, but these benefits have not been included in the table or described in the following discussion because it cannot be asserted with a high degree of certainty that these additional benefits resulted from the ECD investment.

Each time the children were evaluated, important benefits of the preschool program emerged. For example, by age 10 only 17% of the preschool children had been held back a grade or placed in special education compared to 38% of children who had not been placed in preschool. By age 14 the preschoolers had significantly higher achievement scores, and by age 19 they had higher literacy scores and grade-point averages.

The differences in achievement appear to have grown over time. By age 27, 71% of the preschoolers had graduated from high school versus 54% of those not placed in preschool. Seven percent of the preschoolers had been arrested five or more times as compared to 35% of those who had not participated in preschool. Seven percent of the preschoolers had been arrested for drug-related offenses compared with 25% of the non-preschoolers. By age 27, significantly fewer preschoolers had ever been arrested (57% versus 69% of the control group), and the average number of arrests was about half (2.3 lifetime arrests versus 4.6 for the control group).

In addition, the children in the program had significantly better lifetime earnings opportunities. About 29% of preschoolers earned \$2,000 or more per month compared to 7% of the non-preschoolers. The employment rate was 71% for the preschoolers compared to just 59% for the non-preschoolers. At age 27, average monthly earnings were 59% higher for the program participants (\$1,219 versus \$766 in 1993 dollars); 36% of preschoolers owned their own home, and 30% owned a second car. Only 13% of non-preschoolers owned their own home, and 13% owned a second car. Just 59% of preschoolers had received welfare or other social services in the past 10 years versus 80% of the non-preschoolers. More dramatically, only 15% of preschoolers were receiving public assistance at age 27 compared to 32% of the non-preschoolers. Finally, 57% of the female Perry Preschool participants were single mothers compared to 83% of the non-preschoolers. Preliminary evidence for the chil-

TABLE 1 Statistically significant benefits of the Perry Preschool Project

	Preschoolers	Non-preschoolers
Grade retention or special education, age 10	17%	38%
High school graduation, age 27	71%	54%
Arrested five or more times	7%	35%
Arrested for drug-related offenses	7%	25%
Arrested, age 27	57%	69%
Average number of arrests, age 27	2.3	4.6
Earn \$2,000 or more per month, age 27	29%	7%
Employment rate	71%	59%
Average monthly earning, age 27	\$1,219	\$766
Homeownership	36%	13%
Own second car	30%	13%
Receive Welfare or social services	59%	80%
Receiving public assistance, age 27	15%	32%
Single mothers	57%	83%

Source: Barnett (1993), Schweinhart (1993), and Karoly (1998, 2001).

dren at age 41 indicates “that program participants continued to commit half as many violent crimes as non-participants, and that subsequently, the number of them in prison, and the time they spent there, was substantially less than for non-participants.”²³

A benefit-cost analysis by Barnett (1993) found \$108,002 in benefits and \$12,356 in costs per preschool participant (in 1992 dollars), a benefit-cost ratio of 8.74-to-1. Of the total benefits, the public received \$88,433 and \$19,570 accrued to the program participants. The benefits to the public included \$70,381 saved by potential victims of crimes never committed (based on typical settlements for such crimes) and in reduced justice system costs; \$8,846 in higher taxes paid because of higher participants’ earnings; \$7,155 saved in education costs due primarily to lower grade retention and use of special education; and \$2,918 in lower welfare costs. These benefits were partly offset by \$868 in increased costs for the public funding of higher education. The benefits to the program participants included \$21,485 in higher earnings and fringe benefits and \$738 in childcare offset by a loss of \$2,653 in welfare payments.

Another benefit-cost analysis of the Perry Preschool Project found substantial net benefits. Karoly et al. (1998) found \$49,972 in benefits and \$12,148 in program costs in 1996 dollars—a benefit-cost ratio of 4.1-to-1. Karoly et al.’s estimates of benefits differ from those of Barnett mostly because they exclude the benefits that derive from reductions in the intangible losses due to crime: the pain and suffering that crime victims experience. Thus, Barnett calculates \$70,381 in benefits from less crime, while Karoly et al. estimate the

benefits from less criminal activity at just \$20,885. The benefits from reductions in the intangible losses due to crime do not, for the most part, go to government. Thus, while there is a large difference in the overall benefit-cost ratios calculated by Barnett (1993) and Karoly et al. (1998), the benefit-cost ratios they calculate for government savings are very similar: 2.5-to-1 in Barnett and 2.1-to-1 in Karoly et al.

The economic benefits of the Perry Preschool Project were probably underestimated by both Barnett (1993) and Karoly et al. (1998). For example, given that the preschool program was a form of childcare, some of the mothers of program participants were probably able to increase their employment and earnings relative to what they would have been without the program, and thus they probably also increased their tax contributions and decreased their welfare consumption.²⁴ In addition, neither of these benefit-cost analyses calculate the likely positive effects on the children born to participants who have higher earnings and employment and lower incarceration rates.²⁵ Other savings to taxpayers and boons to government budgets, such as reductions in public health care expenditures, likely resulted from the program, but these benefits too were not calculated.

An analysis of Barnett's (1993) and Schweinhart's (1993) benefit and cost estimates for the Perry Preschool program conducted by the Federal Reserve Bank of Minneapolis estimated the real rate of return for the Perry School Project at 16%—12% to society and an additional 4% to the program participants.²⁶ As the Minneapolis Federal Reserve noted, compared to other public investments, and even those in the private sector, such a rate of return on an investment is very high. Indeed, it compares very favorably to the 6.3% real rate of return on the stock market that prevailed between 1871 and 1998 (Burtless 1999).

2. The Prenatal/Early Infancy Project

(Elmira, New York, 1978-1982)

Description: Four hundred first-time mothers were enrolled in the program before their 30th week of pregnancy. The women enrolled in the program were overwhelmingly at high risk of poor child and family outcomes: 85% were under age 19 and/or unmarried and/or of low socioeconomic status. The women were randomly assigned to one of two intervention groups or one of two control groups. The data discussed below compare the outcomes for the women (116 of them) and children in the more aggressive intervention group with the outcomes for the women (184 of them) and children in the two control groups who received little or no services. Within the aggressive intervention group, data were collected for a high-risk sub-sample, defined as single mothers with low socioeconomic status. The women in the aggressive intervention group received, on average, nine home visits during pregnancy and 23 home visits from birth to age two by specially trained nurses. The nurses provided instruction about prenatal care, infant care, childrearing, family planning, and the education and employment of mothers. Data were collected two to three times a year until the children reached four years of age and then again when the children were 15 years old.

TABLE 2 Statistically significant benefits of the Prenatal/Early Infancy Project

	High risk	Control
ER visit	1	1.5
Percent arrested, child age 15	24%	53%
Child abuse or neglect, age 15	29%	54%
Months on Welfare, mother	60.4	90.3
Months on food stamps, mother	46.7	83.5
Mother arrested, child age 15	18%	58%
Mother conviction, child age 15	6%	28%
Mother's subsequent pregnancy	1.5	2.2
Months between mother's first and second births	68.8	37.3

Source: Karoly (1998, 2001).

Results: Table 2 summarizes some of the statistically significant outcomes of the program. Researchers observed additional positive outcomes from the program, but these benefits have not been included in the table or described in the following discussion because it cannot be asserted with a high degree of certainty that these additional benefits resulted from the ECD investment.

The women in the intervention group smoked less, had better nutrition, had higher childbirth class attendance, and gave birth to heavier babies than did the women in the control groups. By age two, children in the intervention group experienced an average of only one emergency room (ER) visit compared to 1.5 ER visits for children in the control group. By age 15, only 24% of the high-risk intervention group children had ever been arrested compared to 53% of the control group children. Similarly, only 29% of the intervention group children had experienced child abuse or neglect by age 15 versus 54% of the control group children.

Intervention group mothers also felt the benefits of the program. Intervention group mothers in the high-risk sample spent fewer months on welfare (60.4 versus 90.3) and received food stamps for less time (46.7 months versus 83.5 months) than did the high-risk control group mothers. By the time the children were 15, intervention group mothers in the high-risk sample were much less subject to arrest (18% versus 58%), conviction (6% versus 28%), and incarceration than were the mothers in the high-risk control group. Intervention group mothers in the high-risk sample experienced fewer subsequent pregnancies (1.5 versus 2.2) and went a longer time between the first and second birth (68.8 months versus 37.3 months) than did the mothers in the high-risk control group. The intervention group mothers in the high-risk sample also reported many fewer episodes of impairment due to alcohol or drugs than did the high-risk control group mothers.

Karoly et al. (1998) conducted a benefit-cost analysis of the Prenatal Project. They calculated \$30,766 in total benefits and \$6,083 in total costs, in 1996 dollars, for the high-risk sample—a benefit-cost ratio of 5.1-to-1. For the lower-risk sample, Karoly et al. (1998) found \$6,713 in benefits and \$6,083 in costs, or a benefit-cost ratio of 1.1-to-1. The largest benefits for the high-risk sample included \$14,067 in reduced welfare payments, \$9,890 in reduced losses due to crime, and \$5,863 in higher tax payments. For the high-risk sample, all but \$1,010 of the benefits went to the public. For the low-risk sample, the benefits were more evenly shared: \$1,622 went to the program participants and \$5,091 went to the public.

As Karoly et al. note (1998, p. 87), the true benefits of the Prenatal Project were probably underestimated. For example, Karoly et al. did not estimate the increases in the children's future income (and thus increases in tax revenue or decreases in the children's use of welfare) that probably resulted from the children's participation in the program. Nor did they attempt to estimate the increases in employment, income, and taxes or the decreases in welfare use by the mothers after the child was 15 years old. Neither did they monetize other benefits from the program, such as reduced child abuse and drug use. In addition, Karoly et al. did not include the benefits that derive from reductions in the intangible losses due to crime, such as the pain and suffering that crime victims experience.

3. The Abecedarian Early Childhood Intervention

(North Carolina, 1972-1985)

Description: One hundred eleven children believed to be at high risk for hindered intellectual and social development based on the low socioeconomic background of their families were enrolled in the program when they were between six and 12 weeks old. The children were randomly assigned to a preschool or a control group. The preschool ran full day, five days a week, and 50 weeks per year. The curriculum stressed language development but attempted to address the social developmental needs of the children, as well. Children in the preschool and the control group also received medical and nutritional services. At age five all the children were reassigned to either a special intervention program through age eight or a control group. The intervention program involved having parents engage in specific supplemental education activities for the children in their homes. The parents were provided with educational material and training, with which to engage their children, roughly every two weeks. Data were collected at ages three, five, eight, 12, 15, and 21.

Results: Table 3 summarizes some of the statistically significant outcomes of the program. Researchers observed additional positive outcomes from the program, but these benefits have not been included in the table or described in the following discussion because it cannot be asserted with a high degree of certainty that these additional benefits resulted from the ECD investment.

TABLE 3 Statistically significant benefits of the Abecedarian Early Childhood Intervention

	Preschool	Control
IQ test, age 21	89.7	85.2
Special education, age 9	25%	48%
Grade retention, age 15	31%	55%
High school graduation, by age 19	67%	51%
Years of education, age 21	12.2	11.6
Employed in high-skill jobs, age 21	47%	27%
Enrolled in four-year colleges, age 21	36%	14%
Marijuana use in last 30 days, age 21	18%	39%
Smoked marijuana regularly, age 21	39%	55%
Mother's education, in years	11.9	10.3
Mother additional births	23%	40%
Teenage parents	26%	45%

Source: Masse and Barnett (2002), Campbell et al. (2002).

The children who attended the preschool, whether or not they had participated in the post-age-five intervention program, had significant cognitive achievements relative to the control group children. For example, at ages three, five, eight, 12, and 21 the preschoolers scored significantly higher on IQ tests than did the control group children. The preschoolers also scored substantially higher on both math and reading achievement tests at ages eight and 15. By age nine, only 25% of the preschoolers had required special education services compared to 48% of the control group children. By age 15, only 31% of the preschool participants had ever been retained in grade compared to 55% of those in the control group. By age 19, 67% of the preschool-attending group had graduated from high school compared to just 51% of the control group. By age 21, those who had attended preschool had significantly higher scores on an array of cognitive tests and earned grade equivalent scores in math and reading that were almost two years higher than those of the control group (Campbell et al. 2002). Also by age 21, the preschool attendees had completed significantly more years of education (12.2 years versus 11.6 years), and were more likely to be employed in high-skill jobs (47% versus 27%). Finally, by age 21, 36% of the preschool attendees had enrolled in a four-year college versus just 14% of the control group.

In addition to improving measures of intelligence and achievement of the preschoolers, the program had other benefits for the preschoolers as well as benefits for their mothers. For example, at age 21, the preschool participants reported significantly lower marijuana use within the past 30 days (18% versus 39% for the control group); only 39% were regular smokers compared to

55% of the control group. Preschool participants were also less likely to have been a teenage parent (26% versus 45% for the control group). When the preschoolers were approximately four and a half years old, data were collected on the mothers who were under age 18 at the time they gave birth. These young mothers were more likely to have graduated from high school, attained post high school education, been employed, and been self-supporting than were the young mothers in the control group. On average, these young mothers had more education (11.9 years versus 10.3 years) than did the control group's mothers. Moreover, only 23% of these young mothers had an additional birth compared to 40% of control group mothers.

Masse and Barnett (2002) conducted a benefit-cost analysis of the Abecedarian Early Childhood Intervention Program in which they calculated \$135,546 in benefits and \$35,864 in total costs (2002 dollars)—a benefit-cost ratio of 3.8-to-1. As was the case for the other benefit-cost analyses discussed earlier, the benefits were surely underestimated as the researchers limited themselves to benefits for which it was possible to obtain monetary estimates. Thus, Masse and Barnett left out benefits such as the intrinsic value of lower marijuana use, the value of fewer teenage parents, and the value of greater self-sufficiency among the mothers of the preschoolers.²⁷ In addition, Masse and Barnett did not calculate the government savings in welfare outlays due to the higher earnings of the mothers of participants. Nor did they calculate the probable savings from less crime because the results for crime, while indicating improvement, were not statistically significant.

4. The Chicago Child-Parent Center Program

(Chicago, Illinois, 1967 to present)

Description: The Chicago Child-Parent Centers serve children from low socioeconomic status. Twenty-four centers provide half-day preschool services for children aged three or four. Nineteen of these centers also provide half-day or full-day kindergartens. Thirteen of the centers provide additional educational services through the third grade when children typically reach nine years of age. Annually, over 5,000 children are now attending the centers. The centers emphasize basic language and reading skills as well social and psychological development, and the centers encourage parental involvement in classroom activities, field trips, and adult education classes. The centers also provide free breakfasts and lunches and health services. Several different studies have followed large samples—typically 1,000 or more students—and compared outcomes for center students to non-center students. Data in these various studies were collected periodically, with one ongoing study having analyzed data for as long as 19 years, or until the students were 22 years old.

Results: **Table 4** summarizes some of the statistically significant outcomes of the program. Researchers observed additional positive outcomes from the program, but these benefits have not been included in the table or described in the

TABLE 4 Statistically significant benefits of the Chicago Child-Parent Center Program

	Center students	Non-center students
Special education	12%	22%
Grade retention, age 15	24%	34%
Years in special education, age 18	0.7	1.4
Serious criminal charges	17%	25%
Violent offenses charges	9%	15%
High school graduation, age 20	50%	39%
High school graduation, age 22	65%	54%
Victim of abuse or neglect, ages 4-17	5%	10%

Source: Karoly (1998, 2001), Reynolds et. al. (2001, 2002).

following discussion because it cannot be asserted with a high degree of certainty that these additional benefits resulted from the ECD investment.

Fuerst and Fuerst (1993) reported that center students had higher scores on achievement tests at grade two as well as significantly higher graduation rates (62% versus 49%) than non-center students. Reynolds (1994) found that center children scored higher on achievement tests than other comparable groups of children every year from kindergarten to 7th grade. In addition, that study found center children had less need for special education (12% versus 22%) and significantly lower rates of grade retention (24% versus 34%).

The Chicago Longitudinal Study (CLS) has been following nearly all 1,150 students who attended center preschools in 1983-85 and center kindergartens in 1985-86 and comparing them to a control group of 389 children of the same age who met the eligibility criteria for participation in the intervention program and came from families of low socioeconomic status. The CLS has demonstrated that numerous benefits have been generated by the centers. For example, the study found that the center children had significantly higher achievement test scores at ages five, six, nine, and 14. These children also spent less time in special education through age 18 (0.7 years versus 1.4 years), and had lower grade retention at ages nine and 15 (19% and 23% versus 26% and 38%). Between the ages of four and 17, 5% of the preschool children had been victims of abuse or neglect compared to 10% of the nonparticipating group. Delinquency rates were significantly lower for the center children through ages 13 and 14. By age 18 only 17% of center preschool children had serious criminal charges brought against them compared to 25% for non-center children, and charges for violent offenses were brought against 9% of center children but 15% of non-center children. Parental involvement with the schools was much higher among the parents of center children than it was for

the parents of non-center children. By ages 20 and 22, the high school graduation rates for center children were 50% and 65% compared to just 39% and 54% for non-center children.

Reynolds et al. (2002) carried out a benefit-cost analysis of the Chicago Child-Parent Center Program. For the preschool program alone, they identified \$47,759 in benefits and \$6,692 in total costs in 1998 dollars—a benefit-cost ratio of 7.1-to-1. The benefits derived mainly from reduced public education expenditures due to lower grade retention and use of special education, reduced costs to the criminal justice system and victims of crime due to lower crime rates, increased income tax revenue due to projected higher lifetime earnings of center participants, and higher projected earnings of center participants.

Once again, the benefits of the program were underestimated. For example, the savings from reduced adult welfare usage on the part of center participants was not calculated. Furthermore, the benefits from less pain and suffering, as a result of fewer crime victims, were not included. In addition, the likely gains from improved health, changes in fertility behavior, and other life changes were not monetized. Moreover, the likely benefits to offspring of center participants were not calculated, nor was the value of the likely increase in parental earnings, due to the child care provided by the preschool, included.

5. Head Start (1965 to present) and Early Head Start (1995 to present)

Description: Head Start is the best-known and largest early childhood intervention program in the United States. Head Start provides early childhood education and development services, health services, and nutrition services to preschool children from low-income families as well as education services for their parents. The Head Start program is administered at the local level, with over 1,400 local programs. There is substantial variation in how the program is carried out, but all local programs must comply with federal performance standards and quality guidelines. The typical program runs part-time during one school year for children age four. There are about 900,000 children enrolled annually in the program (less than two-thirds of those who are eligible) at a cost of over \$6 billion.

Early Head Start is an extension of the Head Start program that targets low-income pregnant women and families with infants and toddlers. It serves over 60,000 children from birth to age three in some 700 programs nationwide.

Results: Before discussing the outcomes of the Head Start programs, two caveats are in order. First, one should not expect the results of the Head Start programs to be as impressive as those of the other programs discussed. Head Start is generally ranked lower in quality than the other programs in terms of teacher/pupil ratios, class size, teacher education and experience, teacher pay, and the safety and cleanliness of the preschools. The Head Start

programs are also funded at much lower levels than the other programs discussed above. For example, Karoly et al. (1998) estimated that the Perry Preschool Project cost about \$7,000 per child annually (for a half-day program), and estimated the Abecedarian program cost about \$15,000 per child annually (for a full-day program), compared to about \$5,000 per child annually (for a half-day program) for the Head Start programs (all amounts expressed in 1996 dollars).

Second, it is difficult to evaluate the overall effectiveness of Head Start. The 1,400 local programs are not uniform (although they must all follow federal guidelines). In addition, there have been no carefully controlled, large scale, long-term randomized studies of the outcomes of the local Head Start programs.

Nonetheless, the following outcomes can be reported. In terms of IQ and achievement test scores, the results of Head Start programs were quite variable. Specifically, some studies found that Head Start had no effect on test scores, many found positive initial affects that faded by ages seven through 11, and a few studies found longer-term positive effects on test scores.

Currie and Thomas (2000) found that the fading of Head Start gains may be due to the fact that Head Start students, particularly nonwhite children, are more likely to attend inferior schools subsequent to the Head Start program than are non-Head Start children. Indeed, white Head Start students who attend schools of similar quality to other white students maintain the initial gains in test scores. This suggests that, in order to prevent the “fade out” of the gains of Head Start, the quality of subsequent schooling must be improved.

Barnett (2002) argues that the “fade out” of Head Start gains may not be occurring at all. He points out that Head Start students’ achievement test scores have been improperly compared to non-Head Start students’ achievement test scores because the test scores of children held back or placed in special education were not included in the samples. He notes that studies that do not have these design flaws found persistent positive effects of Head Start on achievement test scores.

Most studies found that Head Start reduced grade retention and the need for special education services. Only one Head Start study (of the program in Rome, Georgia) followed the children through high school. It found that Head Start had a large positive effect on high school graduation rates. Head Start participation is also associated with higher immunization rates.

There is some evidence of the long-term benefits of Head Start. A comparison by Garces et al. (2000) of Head Start participants to non-participants between the ages of 18 and 31 found that white participants had a significantly higher probability of completing high school and attending college. In addition, this same comparison found that white participants had elevated earnings in their early twenties. For white children whose mothers had less than a high school education, attending Head Start led to a 28% increase in high school graduation, a 27% increase in attending college, and a 100% increase in earnings in their

early twenties. African American participants had a significantly lower probability of ever being charged or convicted of a crime and African American male participants were more likely than their siblings to have completed high school.

Oden, Schweinhart, and Weikart (2000) also found some evidence of the long-term benefits of Head Start. They analyzed 622 young adults, who were 22 years old, 17 years after their participation or non-participation as children in Head Start programs at two sites (one in Florida and one in Colorado). At one site, 95% of the female Head Start participants had obtained a high school diploma or GED diploma compared to just 81% of the female non-participants. In addition, only 5% of the female Head Start participants had ever been arrested compared to 15% of the female non-participants. They further found that the children who had attended Head Start classes using an enhanced curriculum rather than the standard Head Start curriculum had significantly higher grades throughout their schooling and less than half as many criminal convictions by age 22 as the non-participants.

As mentioned above, it would be unreasonable to expect Head Start to generate the same positive results as the other model ECD programs, in part because the Head Start programs are funded at much lower levels per student than are the other programs. Currie and Neidell (2003) provide strong evidence that funding levels matter. They found that Head Start children in higher per-student spending programs have significantly larger gains on reading scores and a lower probability of grade retention than do Head Start children in lower spending programs.

A carefully controlled, randomized assessment of the Early Head Start program is in progress but has not yet been completed. However, preliminary results have been reported (Love, Brooks-Gunn, Paulsell, and Fuligni 2002). By age three, children in Early Head Start performed significantly better than control groups on cognitive, language, and social-emotional development indicators. Their parents were more emotionally supportive, used less punitive parenting, provided more stimulating home environments, and read more to their children. The parents were also more likely to participate in education and job training and less likely to have another child during the two years after enrollment in Early Head Start than were control group parents.

Appendix 2: Explanation of the methodology for estimating the budget, economic, and crime effects of investments in ECD

To estimate the budget, economic, and crime effects of investments in an ECD program it was assumed that the program would begin in 2005 and would serve roughly all three- and four-year-old children who live in poverty, or 20% of all children this age living in the lowest income families. The first year, 2005, would see the enrollment of just three year olds. In 2006 and every year thereafter, the program would enroll both three and four year olds. The numbers of 3 and four year olds entered in the estimating model were taken from recent projections made by the U.S. Census Bureau (2004).

It was assumed that the ECD program would be of high quality and its costs and benefits were modeled on those calculated for the Perry Preschool program: a half day, two-year program that included weekly home visits with mother and child. The annual average impact, for various types of costs and benefits in 1992 dollars, per program participant that was estimated by Rolnick and Grunewald (2003) was used as a baseline for the analysis.²⁸

The costs of the preschool program were adjusted for inflation between 1992 and 2003 by the CPI-U index for the category “Education: child care and nursery school.” From 2003 to 2050, the costs of the preschool program were inflated by 3.5% annually, in line with projections by CBO (June 2004) for inflation of 2.2% and real earnings growth of 1.3%. We reasoned that the production of education services is more labor intensive than the production of most other goods and services. Thus, adjusting education costs by inflation alone was likely to understate the true growth of the costs of providing education services given that nominal earnings growth was expected by CBO to exceed inflation.

The costs of providing additional public higher education services to participants were inflated from 1992 to 2003 by the CPI-U index for the category, “Education: college tuition and fees.” From 2003 to 2050, the costs of public higher education were inflated by 3.5% annually, in line with inflation and real earnings projections by CBO (June 2004).

The benefits of reduced public education expenditures and reduced adult education expenditures were inflated from 1992 to 2003 by the CPI-U index

for the category “Education: elementary and high school tuition and fees.” From 2003 to 2050, these education benefits were inflated by 3.5% annually, in line with inflation and real earnings projections by CBO (June 2004).

The benefits from higher earnings on the part of participants, and from higher tax revenues due to these earnings, were inflated from 1992 to 2003 by the Bureau of Labor Statistics’ inflation index for “Total Private Average Hourly Earnings of Production Workers.” From 2003 to 2050, these earnings and tax benefits were inflated by 3.5% annually, in line with CBO projections (June 2004) of real growth in earnings of 1.3% and of inflation of 2.2%.

All other costs and benefits (derived from less welfare dependency and less crime) were inflated from 1992 to 2003 by the CPI-U. From 2003 to 2050, these costs and benefits were inflated by 2.2% annually, in line with inflation projections by CBO (June 2004).

The total costs and benefits of the preschool program were determined by multiplying the number of participants of a particular age by the average value of the cost or benefit for each year the cost or benefit was produced by participants of that age as determined by Rolnick and Grunewald (2003). Thus, for example, the reductions in the cost of providing public education per participant were assumed to kick in when that participant entered the public school system at age five and were assumed to cease when that participant turned 18 and left the school system or in 2050, whichever came sooner. The costs of the preschool were assumed to prevail only when each participant was three or four years old. The costs of higher education were assumed to start at age 20 and stop at age 26. The savings from welfare reductions were assumed to start at age 18 and end at age 48 or in 2050, whichever came sooner. But, as determined by Rolnick and Grunewald, a lower rate of welfare usage was assumed for each year after age 27. Likewise, the benefits of higher earnings and taxes were assumed to start at age 18 and cease at age 48 or in 2050, whichever came sooner. However, per Rolnick and Grunewald (2003), a lower level of earnings and tax benefits were assumed to prevail after age 27.

Endnotes

1. ECD programs differ in whom they serve and in the types of services they offer. However, most programs provide brain development and education services, and often include health services (such as immunizations, health screenings, and pre and post-natal services) and nutrition services, typically for children under age six. In addition, ECD programs often provide adult education and parenting classes for the parents of young children.
2. For details on the benefits of ECD programs, see Appendix 1.
3. Heckman (1999), pp. 22 and 41.
4. Rolnick and Grunewald (2003), pp. 3 and 16.
5. Committee for Economic Development (2002).
6. All but the Chicago Child-Parent Program had random assignment of potentially eligible children into the intervention program or the control group. The Chicago Child-Parent Program did not use randomized assignment but the control group did match the intervention group on age, eligibility for intervention, and family socioeconomic status.
7. Of course, given a budget constraint it may not be possible to invest in all projects with benefit-cost ratios greater than 1-to-1 so that one may be able to invest only in the projects with the highest benefit to cost ratios.
8. It was not always possible to monetize the benefits that were identified (such as the monetary benefit of reduced child abuse and neglect) and not all the likely benefits were identified and monetized (such as the increased employment and earnings of parents who had children enrolled in preschool programs).
9. Burtless (1999).
10. Government savings were not calculated by Masse and Barnett (2002) for the Abecedarian program. Masse and Barnett did indicate budgetary impacts for government in the form of lower public education spending, lower welfare outlays, and increased outlays for public higher education; but, Masse and Barnett did not estimate the tax revenues that would derive from the additional earnings that they calculated would be generated by participants and their families. Nor did they calculate criminal justice system savings because their data on the Abecedarian program showed reductions in crime that were not statistically significant. If we ignore criminal justice system savings and apply a 33.3% marginal tax rate (e.g., 10% federal, 15.3% payroll, and 8% state and local taxes) to the additional earnings of participants and their families, then the benefit-cost ratio for government from the Abecedarian program would be 1.1-to-1.
11. The raising of funds by taxation to pay for ECD programs may impose a cost upon taxpayers beyond the tax revenue collected and may reduce the net benefits to

government from ECD investment. This extra cost, referred to by economists as the excess burden of taxation, is not included in the benefit-cost ratios described above. To the extent that taxation used to pay for ECD programs generates excess tax burdens, the benefit-cost ratios described above may be lower. In the case of the Abecedarian program, the benefit-cost ratio for government may even be less than 1-to-1 given the exclusion of benefits from crime reduction as explained in footnote 10.

12. For details on the methodology used for estimating the fiscal, economic, and crime effects of investments in ECD, see **Appendix 2**.

13. Other savings to taxpayers and boons to government budgets, such as reductions in public health care expenditures, are likely to exist. But, we lack the data to quantify all these other potential savings.

14. The excess burden of taxation used to pay for ECD investment may be an additional cost to taxpayers and may negatively affect government budgets. However, we do not have the data necessary to quantify this potential cost.

15. The purpose of this report is to illustrate the likely benefits of investment in a large-scale ECD program. Specific determination of the exact nature of the program—such as whether it should be center-based or center-based with a home visiting component, full-day or half-day, year around or nine months long, etc.—is beyond the scope of this study. Obviously, however, the precise nature of the ECD program will affect the costs and benefits. For example, the costs of a full-day preschool program are likely to be different than those for a half-day program. Likewise, the benefits of a full-day program are likely to be different than those of a half-day program because, for instance, the parents of young children are more likely to be in the labor force if their children are in a full-day program. In addition, we evaluate the benefits of an ECD program that is only for poor three and four year olds because of the limitations to the data explained in the last section of Chapter 2. Data available from the analysis of several ECD programs make it clear, however, that benefits generated by programs that begin during the prenatal months and that continue through the third grade may be significant and perhaps even greater than those estimated in this study from a program for poor three and four year olds only. Finally, it is worth noting that families may need two or three (or more) times the poverty level of income to meet basic needs and invest appropriately in the education of their children. Thus, it is possible that a larger ECD investment—one that covered children living in families up to 200% or more of poverty—may also yield excellent returns. Indeed, there is evidence that all children may benefit from enrollment in an ECD program.

16. Given our calculations in endnote 10 above, non-government benefits account for 81.3% of the total benefits of the Abecedarian program.

17. The guardians of participants are also likely to experience increases in earnings since they will have more time for employment as a consequence of the day care provided to their children by the ECD program. These earnings benefits have not been calculated for our nationwide ECD program.

18. Of course, the potential perpetrators of crime may benefit psychologically from less crime as well. For example, fewer people would experience the guilt of wrongdoing and the burdens of incarceration. However, we were not able to quantify the value of a guilt-free conscience and the avoidance of incarceration.

19. It should be noted that the government savings from the Chicago Child-Parent Centers program are understated relative to those of the Perry Preschool program because they do not include the government savings from reduced adult welfare usage on the part of the Chicago program participants.

20. In a future study, we will estimate the rates of return for the other three ECD programs described in this study. We then will be able to calculate the budgetary, economic, and crime effects for each of the three programs.

21. It is important to note that this study's estimates of the benefits of the nationwide ECD program do not take into consideration the positive feedback effects on future generations of children and therefore the possible savings in the future costs of the ECD investment. The program invests in the parents of the future who, as a consequence of the ECD investment, will be able to provide better educational opportunities to their children than they would without the ECD program. As a result, it may not be necessary to spend as much on ECD in the future to achieve the same educational, crime, and income effects on the children of the next generation as is estimated here. Alternatively, not scaling back the future level of ECD investment may result in greater benefits than estimated in this study once the generational effects are taken into account.

22. See, for example, the lively debate in Heckman and Krueger (2003).

23. Schweinhart (2003), p. 6.

24. See Karoly et al. (1998).

25. See Rolnick and Grunewald (2003).

26. See Rolnick and Grunewald (2003)

27. See Masse and Barnett (2002).

28. Rolnick and Grunewald used the costs and benefits as described by Schweinhart (1993) and Barnett (1993).

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