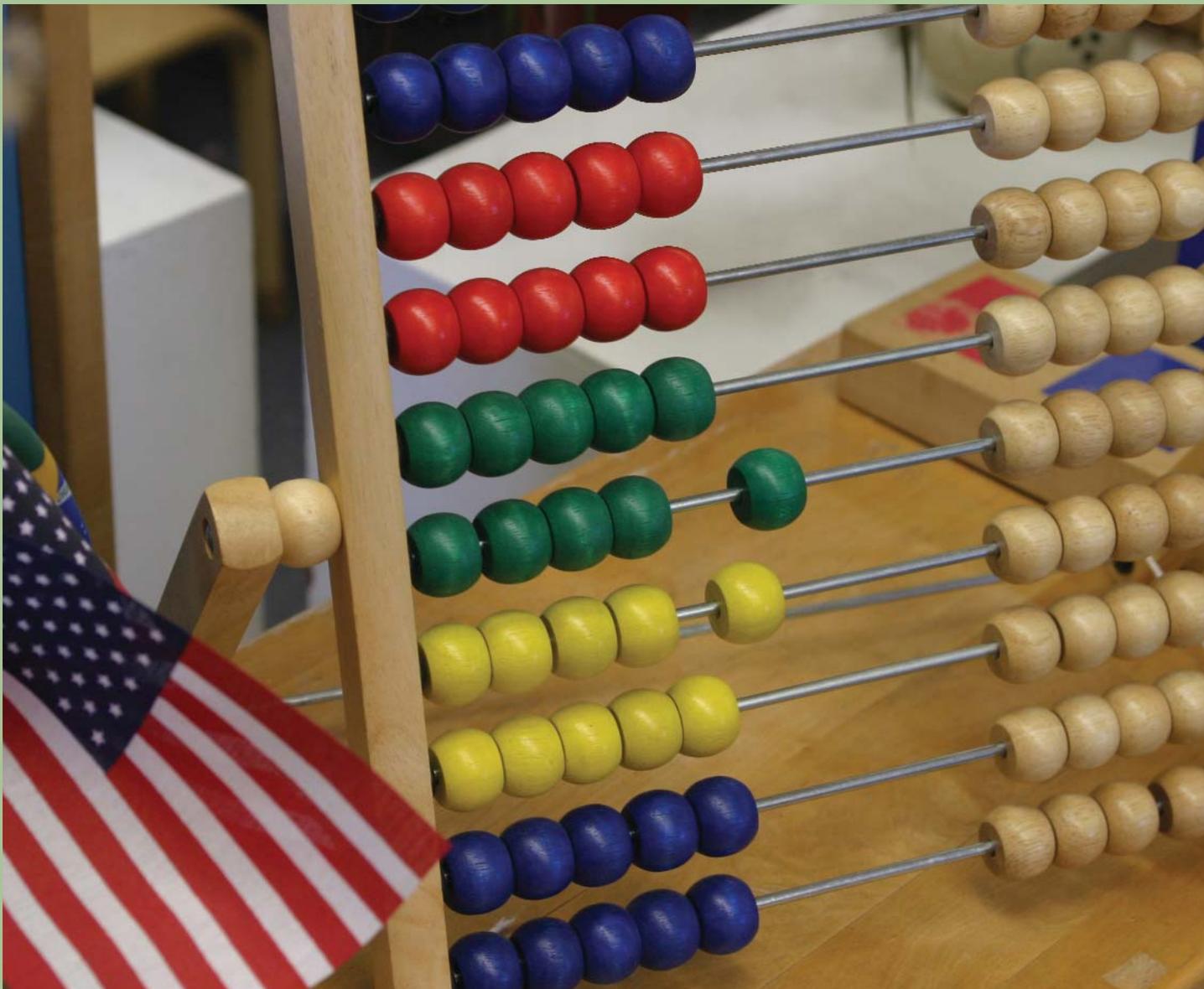


Pre-K Now  
Research Series

May 2007

Dollars and Sense:  
A Review of  
Economic Analyses of Pre-K

Albert Wat  
Pre-K Now  
Washington, DC





May 2007

Dear Colleague:

Each year, state policymakers confront difficult budgetary decisions as they seek to address extensive needs with limited resources. As a former member of Congress and the former mayor of Dallas, I know that identifying public investments that provide the greatest fiscal and social benefits can be a complex and contentious process.

Recently, economic analyses have helped policymakers distinguish pre-kindergarten as a sound public investment strategy that yields impressive fiscal returns, reduces spending on crime and remedial and special education, generates increased tax revenues, and improves short- and long-term outcomes for children, families, and communities.

The ten studies compiled in this new *Review of Economic Analyses of Pre-K* capture the strength and breadth of the currently available research to offer material that is relevant and accessible to states and communities across the country. These studies are part of a growing body of research regarding the economics of early childhood education and range from benefit-cost analyses of well-known experimental pre-k programs to projections of the potential returns on expanded state and federal pre-k investments.

The research indicates substantial returns on pre-k investments in the form of measurable productivity gains both for program participants and their parents and significant job and earnings growth. These findings have solidified support for pre-k among business leaders who understand its role in maintaining competitiveness in a global economy.

Due to this research, the economic impacts of high-quality pre-k have gained the attention of the financial community. It is clear to me in my current role as president and CEO of the Financial Services Roundtable, that my member companies are recognizing the strong investment profile of high-quality early education.

These findings make a powerful case for investing in pre-k and for its impressive returns to the economy, to communities, and to children.

Sincerely,

A handwritten signature in black ink that reads "Steve Bartlett". The signature is written in a cursive, flowing style.

Steve Bartlett  
U.S. Rep. TX (1983-91)  
Mayor, Dallas, TX (1991-95)  
Pre-K Now Advisory Board Member



# Introduction

The momentum behind high-quality, voluntary pre-kindergarten is growing dramatically across the country – in families, in communities, and in the halls of academia and government. Thanks to this strong wave of support, state spending on pre-k increased from \$2.4 billion to \$4.2 billion nationwide between 2002 and 2007. This investment is built upon a solid research base, which shows that quality pre-k makes the most of children’s crucial early brain development, meets their social and educational needs, and gives them a strong foundation for school and life.

Support for high-quality pre-k has also grown in the nation’s boardrooms. Financial experts have been impressed with the ability of voluntary, high-quality pre-k to create a more productive workforce, to stimulate the economy, and to yield significant financial returns. In short, business leaders and economists – people who know financial management – are increasingly convinced that high-quality pre-k is a sound investment.

To illustrate that point, the potential impacts of pre-k have been the subject of many benefit-cost (B/C) analyses and other economic studies. However, to make the best

**Table 1: Pre-K Economic Research at a Glance**

The studies listed here appear in the order in which they are reviewed in the following pages. They are identified by the actual pre-k program studied or by the names of the authors.

The findings of the studies featured in this report are especially powerful when they are used to complement each other. The replication of similar findings in two different studies – for instance, one using a randomized experimental design with a relatively small sample size and one that is not a controlled experiment but takes place in a large-scale public setting – reinforces the strength of both. A study

	High/Scope Perry page 4	Chicago CPC page 6	Abecedarian page 8	Lynch page 12	Karoly & Bigelow page 14	Belfield & Schwartz page 16
Peer Reviewed	●	●	●			
Randomized Experimental Design	●		●			
Analysis of Actual Pre-K Programs	●	●	●			
Analysis of Projected Pre-K Programs				●	●	
Targeted Pre-K	●	●	●	●		
Pre-K for All				●	●	
Microeconomic Outcomes	●	●	●	●	●	●
- K-12 savings	●	●	●	●	●	●
- crime savings	●	●		●	●	
- increased earnings	●	●	●	●	●	
- savings on social services	●	●	●	●		
- health savings			●			
- benefits to mothers/families			●		●	
Macroeconomic Outcomes						
- gross domestic product						
- job creation						
- human capital						
National Perspective				●		

use of this growing body of research, stakeholders must be able to cite those studies that best address the particular questions and issues that arise in their states. Some studies focus on targeted pre-k programs rather than programs for all children. Some more strongly emphasize the role of quality in realizing maximum returns. Some studies provide evidence that pre-k saves money in the criminal justice system, while others focus on savings to school systems or on pre-k's impact on job growth. The ability to make these distinctions and to select the most relevant study for a given fiscal or policy context is critical to

effectively understanding and articulating the economic benefits of pre-k, whether one is an advocate, a policymaker, or a member of the media.

The purpose of this report is two fold. First, it provides readers with a “one-stop shop” for the most current and relevant economic-impact studies of pre-k. Second, it highlights the key arguments made by these studies as well as other factors to consider in their use to help readers more strategically choose those studies that speak directly and appropriately to the interests and concerns of their audience.

demonstrating short-term economic benefits can complement one that focuses on long-term returns. In short, the strength behind this body of research is the consistency of the findings of economic benefits of high-quality pre-k in different contexts. This chart provides a quick overview of the featured studies to help readers determine which studies best fit their needs.

**Behind the Numbers:  
Net Present Value and  
Benefit-Cost Ratios**

Citing statistics and numbers is important, but unless one has an understanding of certain fundamental economic concepts, it is possible to misrepresent the information. To help the reader accurately interpret the data and findings contained in this review, on page 26 we provide explanations of two key concepts: “net present value” and “benefit-cost ratio.”

Dickens, Sawhill, & Tebbs page 18	Heckman & Maesterov page 20	Rolnick & Grunewald page 22	Bartik page 24	
				Peer Reviewed
				Randomized Experimental Design
				Analysis of Actual Pre-K Programs
●			●	Analysis of Projected Pre-K Programs
	●	●		Targeted Pre-K
●			●	Pre-K for All
				Microeconomic Outcomes
				- K-12 savings
				- crime savings
				- increased earnings
				- savings on social services
				- health savings
				- benefits to mothers/families
●	●	●	●	Macroeconomic Outcomes
●			●	- gross domestic product
		●	●	- job creation
●	●			- human capital
●	●		●	National Perspective

## The High/Scope Perry Preschool Program

### Overview

The High/Scope Perry Preschool Program study is the longest-running longitudinal study of a pre-k program. The program, which took place in Ypsilanti, Michigan and lasted from 1962 to 1967, was a high-quality, two-year, center-based program offered for 2.5 hours each weekday using a curriculum that took an active learning approach to children's intellectual, social, and physical development. The program included teachers trained in both special education and early childhood development; a child-teacher ratio lower than 7:1; weekly 1.5-hour home visits; and parent meetings for further family support. One hundred twenty-three African American three and four year olds with significant risk factors (e.g., poverty, low parental education and initially low IQs) participated in the longitudinal study, with 58 of them participating in the pre-k program. The benefit-cost (B/C) analysis examines the program's cumulative economic benefits to individuals, government, and society when participants turned 40 years old.

### Main Findings

According to the B/C analysis, the High/Scope Perry Preschool Program achieved both short-term and long-term educational and economic benefits:

- Participants had significantly higher scores on intelligence and language tests through age seven as well as higher school-achievement test scores at age 14 than did the control group.
- Through their entire K-12 careers, program participants were less likely to need special education services and more likely to complete high school than the control group.
- At age 40, program participants were more likely to be employed and to earn significantly more than the control group.
- Participants were half as likely as the control group to be arrested; had fewer arrests for violent, property, or drug crimes; and were less likely to be sentenced to prison.
- Program participants were less likely to be on welfare. (See Table 2 for specific data for these differences.)

### Strengths of this Study

- A randomized experimental design is used to create a treatment group and a control group. As a result, any differences in outcomes are very likely due to participation in the pre-k program rather than other variables.
- Though the study started more than 40 years ago, researchers have been able to track more than 90 percent of the original subjects.
- Tremendous savings are indicated for government and society, particularly from reduced crime.
- The program is of very high quality. Teacher quality, small classes, a research-based curriculum, and family-support services all play a role in producing short- and long-term impacts in a very disadvantaged population.

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### Report Cited

Belfield, Clive R., Milagros Nores, W. Steven Barnett, and Lawrence Schweinhart. "The High/Scope Perry Preschool Program: Cost-Benefit Analysis Using Data from the Age-40 Followup." *Journal of Human Resources* 41, no. 1 (2006): 162-90.

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### Other Factors to Consider

- The program was relatively expensive – an average of \$15,166 per child or \$8,540 per child-year (in 2000 dollars)<sup>1</sup> – and highly targeted, which could limit its applicability to large public programs with wide-ranging accessibility.
- The large benefit-cost ratio of 17:1 is heavily reliant on a single source of savings: reduced criminal activity, which includes not only criminal justice system costs, but also tangible (e.g., medical treatment, poverty replacement, lost productivity) and intangible (e.g., pain and suffering) victim costs.<sup>2</sup> Even without any of the crime savings, however, the return on investment is still an impressive \$5.00 for every dollar invested.
- Because program participants’ significant risk factors: single parent homes, drug use, and crime; have arguably exacerbated since the 1960s, a pre-k program, even of the same high quality as the High/Scope Perry Preschool Program, may have a less dramatic impact on today’s more-challenged children. On the other hand, because crime and violence have worsened, high-quality pre-k has even greater potential to improve participant outcomes and produce economic benefits.
- If the study were conducted today, more of the control group would likely participate in some center-based care, possibly reducing the size of the group differences.
- Other limits on the applicability of this study may include its small sample size, its age, its relevance to other populations and communities with fewer risk factors, the feasibility of replicating the program in large-scale public settings, and concerns over the extent of certain educational impacts. Larry Schweinhart, president of the High/Scope Educational Research Foundation, has written a response to these points, which is available at <http://highscope.org/Research/PerryProject/perrymain.htm>.

### The Bottom Line<sup>3</sup>

#### Type of Program

- Targeted pre-k
- Three and four year olds
- Part day
- School year

<b>Average Per-Child Investment</b>	\$ 15,166
<b>Net Present Value Benefits</b>	\$ 243,722
<b>Benefit-Cost Ratio</b>	\$ 17.1:1

#### Breakdown of Economic Returns

- \$12.90 to the general public (75%)
- \$11.31 from crime savings (66%)
  - \$0.93 from increased tax revenue (5%)
  - \$0.48 from education savings net costs of postsecondary/adult education (3%)
  - \$0.19 from welfare savings (1%)

\$4.17 to participants (25%), mostly from increased earnings

#### Notes

- 1 The per child-year cost is about 15 percent more than typical per-pupil spending for K-12 students, but less than the typical cost per special education student.
- 2 Intangible crime savings have been estimated to be three times tangible crime savings. See Arthur J. Reynolds et al., “Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers,” *Educational Evaluation and Policy Analysis* 24 (2002).
- 3 All figures are projected over the lifetime of the participants and presented in discounted present value in 2000 dollars.

### The High/Scope Perry Preschool Program Cost vs. Benefit



**Source:** Schweinhart, Lawrence J. “The High/Scope Perry Preschool Study through Age 40.” Ypsilanti, MI: High/Scope Educational Research Foundation, 2004.

## The Chicago Child-Parent Centers

### Overview

Funded by Title I, the Chicago Child-Parent Centers (CPC), which still operate today, first opened in 1967 with four sites in the city's poorest neighborhoods each serving 100 to 150 children. The CPCs include a pre-k program for three and four year olds, a kindergarten program, and at some sites, a school-age program lasting through third grade. The CPC pre-k program is of very high quality and features teachers with bachelor's degrees and certification in early childhood education who are paid on par with K-12 teachers; small child-adult ratios (17:2); a heavy curricular emphasis on early reading and math skills; and a parent-resource teacher and a school-community representative at each center to conduct home visits and provide referral, health, and nutrition services. The benefit-cost (B/C) analysis presents findings from a longitudinal study of 1,539 children born in 1979 or 1980, of whom, 989 participated in at least one year of the part-day pre-k program and 550 did not attend CPC pre-k. This comparison group was chosen from randomly selected schools and participated in other early education programs, such as full-day kindergarten or Head Start. While the two groups were not randomly assigned, they were matched closely on a variety of demographic variables including race; poverty; parental education, marital, and employment status; family size; and incidence of child abuse. Researchers have tracked the sample since 1985. After more than 21 years, researchers were still able to collect data from more than 90 percent of the program and comparison groups.<sup>1</sup>

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### Report Cited

Reynolds, Arthur J., Judy A. Temple, Dylan L. Robertson, and Emily A. Mann. "Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers." *Educational Evaluation and Policy Analysis* 24 (2002): 267-303.

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### Main Findings

The study finds that participation in CPC pre-k yields significant benefits to children and the public.

- Attendees had higher reading and math achievement scores through ninth grade than did children in the comparison group.
- Children in the pre-k program group were less likely to be in special education or be held back during their academic career and were more likely to complete high school.
- Outside of school, pre-k program participants were less likely to be arrested as juveniles.
- Participation in two years of pre-k was associated with improved school readiness, kindergarten achievement, lower grade-retention and special education-placement rates (especially in the early grades), and reduced child abuse and neglect. (See Table 2 for specific data.)

### Strengths of this Study

- It demonstrates that public schools can effectively implement high-quality pre-k programs that produce long-term positive effects.
- Given that the program is still in existence today and that the participant group included a large sample of children in a typical, urban public school setting, the findings are generalizable to other similar and contemporary locations and contexts.
- The B/C findings provide a conservative estimate that does not include intangible benefits of crime reduction or savings due to reduced dependence on public assistance.
- CPC pre-k impacts are compared to those of "typical early childhood programs in low-income neighborhoods" (e.g., 15 percent of the comparison group attended Head Start). While this introduces a conservative bias to the findings, it also makes the study more relevant to today's communities.
- The benefits accrue with relatively even distribution to the general public, the government, and program participants.
- Strong evidence is provided of the critical role of quality – high teacher qualifications, adequate teacher compensation, effective curriculum, parent involvement, and wraparound services – in producing significant cost savings.

### Other Factors to Consider

- Because the study is not randomized, conclusions about causal links between program participation and observed effects are somewhat limited, but the presence of a comparison group, chosen from randomly selected schools, that participated in other early education programs helps to support causal inferences. Researchers also conduct rigorous analyses of selection bias and attrition bias and find no evidence of either.

## The Bottom Line<sup>2</sup>

### Type of Program

- Targeted pre-k
- Three and four year olds
- Part day
- School year

### Average Per-Child Investment

\$ 6,692

### Net Present Value Benefits

\$ 41,067

\$ 61,245

### Benefit-Cost Ratio

\$ 7.14:1

\$ 10.15:1

### Breakdown of Economic Returns

Returns to the General Public

\$ 3.85 (54%)

\$ 6.86 (68%)

- *Tangible Crime Savings*
- *Increased Tax Revenues*
- *Education Savings net costs of postsecondary / adult education*
- *Child Welfare Savings*

\$ 1.98 (28%)

\$ 4.99 (50%)

\$ 1.08 (15%)

\$ 1.08 (10%)

\$ 0.67 (9%)

\$ 0.67 (7%)

\$ 0.12 (1.6%)

\$ 0.12 (1%)

Returns to the Program Participants,  
primarily realized as increased earnings

\$ 3.29 (46%)

\$ 3.29 (32%)

- Participating in the program for two years is not found to yield significantly greater long-term benefits than participating for one year, but researchers do document enhanced short-term benefits from two-year participation.
- Since participants were only 21 at the time of this analysis and were not fully integrated into the workforce, researchers have only limited data about income gains and so must project the increase in lifetime earnings and tax revenues based on participants' educational attainment to date. The practice of projecting earnings based on educational attainment is a long-standing and accepted practice, originally established by the U.S. Census.

### Notes

1 The findings reported here are from the age 21 follow-up. New findings from the age 24 follow-up are at press as of April 2007 but have not yet been released. However, according to conversations with the researchers, the updated results will show that children who attended pre-k in the CPCs were more likely than the comparison group to complete high school and go to college and less likely to be arrested, convicted, or jailed; less likely to experience depressive symptoms, and more likely to have health insurance.

2 All figures are projected over the lifetime of the participants and presented in discounted present value in 1998 dollars.

## The Chicago Child-Parent Centers Cost vs. Benefit

### Cost:

\$ 6,692

### Benefits:

\$ 67,937



## The Carolina Abecedarian Project

### Overview

This study reviews the findings from an earlier longitudinal study of the Carolina Abecedarian Project, analyzes its benefits and costs, and compares them to the High/Scope Perry Preschool Program. The Abecedarian Project, located in Chapel Hill, North Carolina, provided children from infancy through five years of age with both quality child care and pre-k experiences. It was a 10-hour-per-day, five-day-a-week, 50-week-per-year program that featured low child-staff ratios (3:1 for infants/toddlers; 6:1 for older children) and a comprehensive curriculum emphasizing language development while addressing other developmental domains. One hundred twelve children born between 1972 and 1977 who were “at risk of retarded intellectual and social development” were randomly assigned to participate in the program or to a control group. Both groups received medical and nutrition services to isolate the effects of the educational intervention. Almost all of the subjects were African American. Of participating children, 93 percent have been followed through age 21.

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### Report Cited

Barnett, W. Steven, and Leonard N. Masse. “Comparative Benefit-Cost Analysis of the Abecedarian Program and Its Policy Implications.” *Economics of Education Review* 26 (2007): 113-25.

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### Main Findings

The impacts of the Abecedarian Project fall into three categories: cognitive, educational, and maternal outcomes (see table 2 for specific data.)

- Program participants had higher reading and math scores through age 21 than the control group.
- The program group had a lower grade-retention rate, less need for special education, and higher rates of postsecondary enrollment.
- Participants were less likely to smoke and to receive welfare payments than the control group.
- The mothers of participants achieved higher education levels and had higher-paying jobs.

Based on the above findings, the authors calculate a benefit-cost ratio for the program of about 2.5:1. The relatively low rate of return as compared to the High/Scope Perry Preschool Program and Chicago Child-Parent Centers can be attributed in part to the following factors:

- The program lasted five years, so per-child costs were over \$63,000, much greater than typical pre-k programs that serve only three and/or four year olds.
- This study finds no difference in incidence of criminal activity between participants and non-participants. Researchers believe that this is at least partly due to geographical differences: Ypsilanti and Chicago had much higher crime rates than Chapel Hill.

### Strengths of this Study

- Like the High/Scope Perry Preschool Program study, the randomized design supports the conclusion that benefits are caused by the intervention.
- Benefits are included that are not usually considered, such as child care savings, maternal earnings and educational achievement, earnings of future generations, and increased longevity.
- Savings as a result of reduced smoking are underestimated because they do not include public benefits such as increased productivity and reduced health care costs.
- It is significant that such an expensive program could still produce positive returns and do so without achieving any savings from reduced criminal activity. As such, the findings are a good complement to the High/Scope Perry Preschool Program study, which relies heavily on crime reduction to realize benefits.
- The benefits of pre-k are not limited to major urban centers.
- Program participation increases college enrollment rates, which enhances earning potential. The economic benefits of this greater educational attainment are offset somewhat by increased public costs for higher education.

- Economic benefits derive from employing a diverse delivery model that collaborates with child care and other early childhood programs.
- The substantial savings in child care costs and the increased maternal earnings are especially appropriate for addressing concerns about the availability of quality child care or the ability of mothers to participate in the workforce and contribute to the economy.
- Educational benefits in the form of higher test scores lasted through age 21 – 16 years after participants stopped receiving the services.

#### Other Factors to Consider

- Total benefits accrued to the general public are limited in part due to the inclusion of increased higher education costs.
- More than half of the economic benefits of the Abecedarian Project – child care savings and increased maternal earnings – stems from the provision of stable, quality child care during the first five years of the children’s lives. The benefits of two years of pre-k within this period are not calculated separately from the full five-year program.
- The study includes economic benefits from reduced smoking and lower dependence on welfare, even though the differences in these outcomes between the treatment and control groups were not statistically significant. (Savings from welfare payments were only estimated to be \$200 per child.)<sup>1</sup>
- Because the analysis was conducted when participants were age 21, researchers do not have data about actual income gains and so must project the increase in lifetime earnings based on the participants’ educational attainment to date. This practice of projecting earnings based on educational attainment is a long-standing and accepted practice, originally established by the U.S. Census.

### The Bottom Line<sup>2</sup>

#### Type of Program

- Targeted comprehensive early care and education
- Birth to five years
- Full day
- Full year

**Per-Child Investment Over Five Years** \$ 63,476

**Net Present Value Benefits** \$ 94,802

**Benefit-Cost Ratio** \$ 2.5:1

#### Breakdown of Economic Returns

Almost all benefits – \$2.35 or 94% – were realized by participants, their mothers, and their children.

- *Child care benefits: \$0.44 (18%);*
- *Increased lifetime earnings*
  - for participants: \$0.46 (18%)
  - for participants’ mothers: \$1.08 (43%)
  - for future generations: \$0.09 (4%)
- *Increased longevity from less smoking: \$0.28 (11%)*

Benefits to government and general public, \$0.14 or about 6%, come mostly from increased tax revenues and from savings in educational and welfare costs.

#### Notes

<sup>1</sup> With the Abecedarian study’s small sample, an effect on smoking of this size, even though potentially important, is not statistically significant. The High/Scope Perry Preschool study also found a similarly sizeable, but statistically insignificant, effect on smoking. Given the consistency of results, the researchers performed another analysis to look at the effect on smoking by pooling the data from both studies and found a significant effect.

<sup>2</sup> All figures are projected over the lifetime of the participants and presented in discounted present value in 2002 dollars

### The Carolina Abecedarian Project Cost vs. Benefit

#### Cost:

**\$ 63,476**

#### Benefits:

**\$ 158,278**



# Impacts of High-Quality Pre-K on Child and Parent Outcomes

**Table 2**

The High/Scope Perry Preschool Program, Chicago Child-Parent Centers, and Abecedarian Project studies are the three most well-known, ongoing, longitudinal studies of high-quality pre-k's educational and economic impacts. The data presented here illustrate both the range of public and participant benefits and the impressive fiscal returns.

In each case, these programs provided high-quality early education with wraparound or home visiting services to at-risk children.

*Unless otherwise indicated, impact is expressed in percentage change from control/comparison group*

<b>Education</b>	<b>Chicago Child-Parent Centers<sup>1</sup></b>	<b>High / Scope Perry Preschool</b>	<b>Abecedarian Project<sup>2</sup></b>
Special Education Placement	- 41 %	- 26 % <sup>3</sup>	- 48 % <sup>4</sup>
Grade Retention	- 40 %	- 13 % <sup>5</sup>	- 44 % <sup>6</sup>
High School Completion	+ 20 %	+ 44 % <sup>7</sup>	+ 4 % <sup>8</sup>
College Enrollment	+ 33 % <sup>9</sup>	No difference observed	+157 % <sup>10</sup>
<b>Crime</b>			
Arrest by Age 19	- 32 % <sup>11</sup>	- 39 % <sup>12</sup>	No difference observed
Incarceration	No difference observed	- 46 % <sup>13</sup>	No difference observed
<b>Income and Tax Revenue<sup>14</sup></b>			
Increased Lifetime Earnings	\$ 20,517	\$ 50,448 <sup>15</sup>	\$ 29,274
Increased Tax Revenue	\$ 7,243	\$ 14,078 <sup>16</sup>	\$ 8,257
Increased Maternal Earnings	Not measured	Not measured	\$ 68,728
Intergenerational Earnings	Not measured	Not measured	\$ 5,722
<b>Social Services</b>			
Reliance on Welfare	Not measured	- 17 % <sup>17</sup>	- 50 %
Incidence of Child Abuse and Neglect	- 51 %	Not measured	Not measured
<b>Other</b>			
Smoking	Not measured	- 24 %	- 29 %
Child Care Savings	\$ 1,657	\$ 906 <sup>18</sup>	\$ 27,612

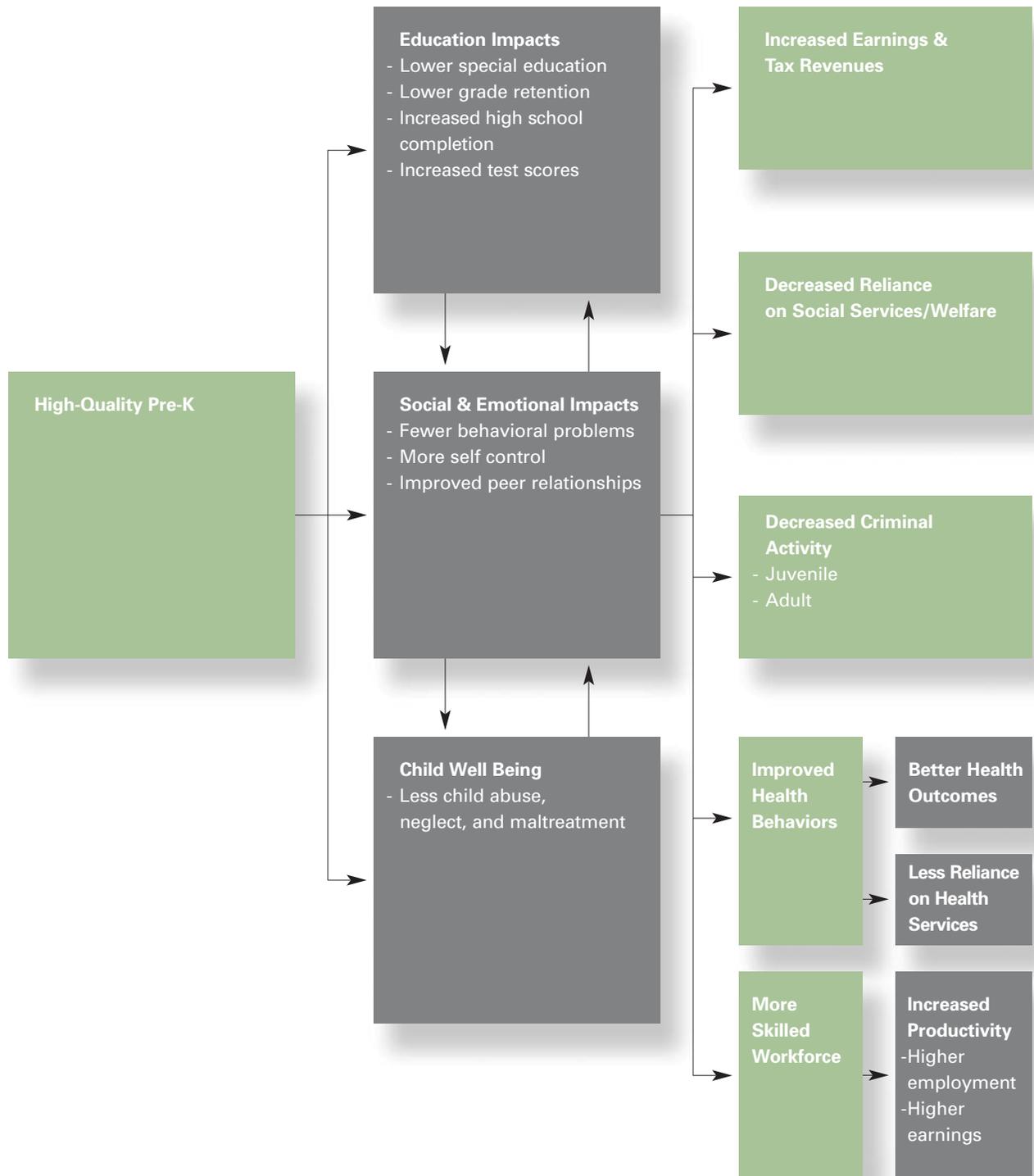
**Notes**

1 Data from Arthur J. Reynolds et al., "Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers," *Educational Evaluation and Policy Analysis* 24 (2002) unless otherwise indicated.  
 2 Data from W. Steven Barnett and Leonard N. Masse, "Comparative Benefit-Cost Analysis of the Abecedarian Program and Its Policy Implications," *Economics of Education Review* 26 (2007) unless otherwise indicated.  
 3 Ibid.  
 4 Judy A. Temple and Arthur J. Reynolds, "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs," *Economics of Education Review* 26 (2007).  
 5 W. Steven Barnett, "Maximizing Returns from Prekindergarten Education" (paper presented at the Conference on Education and Economic Development, Cleveland, OH, November 18-19, 2004).  
 6 Temple and Reynolds, "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs."  
 7 Lawrence J. Schweinhart, "The High/Scope Perry Preschool Study through Age 40," (Ypsilanti, MI: High/Scope Educational Research Foundation, 2004).

8 Frances A. Campbell et al., "Early Childhood Education: Young Adult Outcomes from the Abecedarian Project," *Applied Developmental Science* 6, no. 1 (2002).  
 9 Temple and Reynolds, "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs."  
 10 Campbell et al., "Early Childhood Education: Young Adult Outcomes from the Abecedarian Project."  
 11 Temple and Reynolds, "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs."  
 12 Ibid.  
 13 Schweinhart, "The High/Scope Perry Preschool Study through Age 40."  
 14 All monetary figures are presented in discounted present value: 1998 dollars for Chicago CPC, 2000 dollars for Perry, 2002 dollars for Abecedarian.  
 15 Clive R. Belfield et al., "The High/Scope Perry Preschool Program: Cost-Benefit Analysis Using Data from the Age-40 Followup," *Journal of Human Resources* 41, no. 1 (2006).  
 16 Ibid.  
 17 Ibid.  
 18 Ibid.

# High-Quality Pre-K: A Lifetime of Benefits

Figure 1



## Projected Economic Benefits: Analyses of Pre-K for All and Targeted Pre-K

### Overview<sup>1</sup>

Using data from the Chicago Child-Parent Centers (CPC), this study projects the long-term savings and benefits to individuals, government, and society that would result from a nationwide expansion of high-quality pre-k for low-income children (at or below 125 percent of the federal poverty threshold) and then for all children. The program is modeled on the Chicago CPCs and would operate three hours a day, five days a week during the school year. Teachers would hold bachelor's degrees with certification in early childhood education and would be paid commensurate with K-12 teachers. Classrooms would have an aide and a maximum child-adult ratio of 17:2; would use a comprehensive curriculum that attends to the cognitive, physical, and social and emotional development of children; and would include home visits. The initial per-child cost would be \$6,300. The report includes specific benefit-cost data for each of the states, the District of Columbia, and the nation as a whole. In addition, national and state-by-state data are projected through the year 2050 for the additional investment needed for a high-quality pre-k program, for government budget savings, for increased government revenue, for increased individual earnings, and for individual savings from crime reduction.

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### Report Cited

Lynch, Robert. *Enriching Children, Enriching the Nation: Public Investment in High-Quality Prekindergarten*. Washington, DC: Economic Policy Institute, 2007.

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### Main Findings

In the long term, public investment in high-quality pre-k compares favorably to other government expenditures. State and federal governments would more than recoup their investments in quality pre-k, even if it were offered to all children. Further, should the federal proportion of pre-k spending remain steady, the majority of benefits accrued to government would be realized at the state level.

A program targeted to three and four year olds living at or below 125 percent of the federal poverty threshold would serve more than 2 million children nationwide in 2008 and would have the following costs and benefits:

- The program would cost \$13.2 billion in 2008 or \$8.2 billion more than current state and federal investments in pre-k.
- In the year 2050, 43 years after full implementation, the program would cost about \$26 billion<sup>2</sup> and the benefits would total \$315 billion.
- The ratio of total social (government and individual) benefits to program costs in 2050 would be 12:1. The return to government alone would be about 3:1.
- The total benefit for the government in 2050 would be \$83 billion, yielding a net benefit of \$57 billion.
- Nationally, it would take six years before total annual benefits exceed annual costs and nine years before the annual benefits to government alone exceed annual costs.
- All state governments would experience a positive return on their pre-k investment within 18 years (some in as few as four). By 2050, the benefit-cost ratios for state governments range from about 2:1 to 7:1.

A similar program available to all three and four year olds would serve about 7 million children nationwide in 2008 and would have the following costs and benefits:

- Total cost in 2008 would be \$43 billion, or \$33 billion more than current state and federal pre-k spending.
- In the year 2050, the program would cost \$95.5 billion, with annual benefits totaling \$779 billion.
- The ratio of total social (government and individuals) benefits to program costs in 2050 would be 8:1. The return for government alone would be 2:1.
- The total benefit for government would be \$191 billion in 2050, yielding a net benefit of \$96 billion.
- Nationally, it would take nine years before total annual benefits exceed annual costs and 17 years before the annual benefits to government alone exceed annual costs.
- All state governments would experience a positive return on their pre-k investment within 29 years (some in as few as 10). By 2050, the benefit-cost ratios for state governments range from about 1.4:1 to 2.7:1.

## The Bottom Line

Type of Proposed Program	Targeted Pre-K	Pre-K for All
	<ul style="list-style-type: none"> <li>• Three and four year olds</li> <li>• Part day</li> <li>• School year</li> </ul>	<ul style="list-style-type: none"> <li>• Three and four year olds</li> <li>• Part day</li> <li>• School year</li> </ul>
<b>Annual Investment in 2050</b>	\$ 26 billion	\$ 95.5 billion
<b>Net Benefit in 2050<sup>3</sup></b>	\$ 289 billion	\$ 683.5 billion
<b>Benefit-Cost Ratio</b>	\$ 12:1	\$ 8:1
<b>Breakdown of Economic Returns</b>		
– Accrued to Government <sup>4</sup>	\$ 3.10 (26%)	\$ 2.00 (25%)
– Accrued to the General Public <sup>5</sup>	\$ 2.90 (24%)	\$ 1.60 (20%)
– Accrued to Program Participants and Their Parents <sup>6</sup>	\$ 6.00 (50%)	\$ 4.40 (55%)

### Strengths of this Study

- By showing benefits from both the national and state perspectives, increased contributions from both levels of government are justified.
- Campaigns for pre-k for all are supported by the substantial returns shown to accrue from a for-all program.
- For states that have not performed a benefit-cost analysis of high-quality pre-k, quick access to rough but research-based estimates are provided for all 50 states and the District of Columbia.
- This analysis may underestimate the real benefits of pre-k because it omits some potential benefits: annual savings to families who would otherwise have paid for child care or private pre-k (estimated nationally at \$4 billion per year); positive effects of pre-k participants on their peers as they advance through K-12; positive impacts of pre-k on participants' children; savings on public health; and increased productivity of a more educated workforce.<sup>7</sup>
- While the study assumes that middle- and upper-income children benefit relatively less from high-quality pre-k (and adjusts the benefits of a pre-k-for-all program accordingly), credible studies are also cited to show that children from all backgrounds benefit equally from pre-k.
- Even under the most conservative assumptions,<sup>8</sup> for every dollar invested in a high-quality pre-k-for-all program in 2050, the government would reap a return of \$1.50.

### Other Factors to Consider

- Lower returns for some states can reflect a number of factors: current investment in pre-k, which determines the additional funding needed; current spending on criminal justice and child welfare services, which dictates the savings potential; and tax rates, because higher rates produce higher revenues.
- The study includes intangible savings to victims of crime in its calculations, which can result in a relatively less conservative benefits estimate for crime savings.
- While its findings are based on empirical data, this analysis is a projection of hypothetical pre-k programs rather than a calculation of actual costs and benefits.

### Notes

- 1 All figures represent 2006 dollars, adjusted for inflation. They have not been discounted to reflect present value.
- 2 This projected cost takes into account growing enrollment and is assumed to rise at a rate faster than inflation.
- 3 These figures represent economic benefits accrued to society in 2050 resulting from all past participants in the program.
- 4 Savings in education, child welfare, and criminal justice systems
- 5 Savings primarily from reduced crime
- 6 Benefits primarily from increased earnings
- 7 Productivity benefits are estimated at \$75 billion for a targeted program and \$215 billion for a program open to all children.
- 8 Specifically, the author assumes that participants who would have attended some other pre-k program in the absence of a high-quality pre-k-for-all program would only experience 30 percent of the typical benefits. He also assumes that middle-income and high-income participants would only experience 70 percent and 40 percent, respectively, of the typical benefits.

## Projected Benefit-Cost Analysis of Pre-K for All in California

### Overview

In 2005 the RAND Corporation conducted an analysis of the costs and benefits for taxpayers, the state and federal governments, and society in general of providing high-quality pre-k for all four year olds in California. The researchers assume that the program standards would be similar to the Chicago Child-Parent Centers (CPC): a high-quality, part-day program with bachelor-degree-holding teachers earning salaries on par with K-12 teachers, a maximum class size of 20, and a maximum student-adult ratio of 10:1. Accordingly, they base their benefit-cost projections on previous benefit-cost analyses of the Chicago CPC program.



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### Report Cited

Karoly, Lynn A., and James H. Bigelow. "The Economics of Investing in Universal Preschool Education in California." Santa Monica: The RAND Corporation, 2005.

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### Main Findings

The researchers assume an increase in state investment of approximately \$4,300 per child and from that, calculate the following returns:

- This additional investment is expected to generate about \$13,700 per child in benefits for society or \$3.15 per dollar. California and its residents would reap 83 percent of these benefits.
- One-third of all benefits accrue to government (local, state, and federal), with about half of that realized at the local and state levels.
- 57 percent of all benefits accrue to program participants and their families.
- About 10 percent of all benefits accrue to the general public as reduced crime.
- Even using the most conservative estimates in which high-quality pre-k has no benefits for low-risk and/or medium-risk students, each dollar invested still yields between \$2.30 and \$2.90 to society and between \$2.00 and \$2.40 to the state of California and its residents.

### Strengths of this Study:

- This study provides a comprehensive model for a benefit-cost analysis of a state pre-k program – targeted and for all – taking into consideration a variety of factors, including take-up rates, previous pre-k experience, effects on children at different risk and income levels, use of sliding-scale fees, and even migration of families out of state.
- Even using conservative estimates, returns from pre-k for all are still positive. Researchers assume that benefits to middle- and upper-income children would be lower than those to low-income children and that low-risk children switching from a public or private pre-k program to this new program would not benefit at all. As a result, the average benefit to participants in the new pre-k program would be just 23 percent of that experienced by Chicago CPC pre-k participants.
- The researchers use a more conservative approach and do not include some benefits found in other studies, such as reduced reliance on income assistance programs, intangible costs to crime victims, increased earnings by parents of participants, intergenerational effects, peer effects, and better health.

- The researchers provide excellent rationales for pre-k for all. They show that families in the middle- or lower-middle-income spectrum are less likely to enroll their children in pre-k than those in poverty. Also, they demonstrate that educational problems alleviated by pre-k, such as participation in special education, dropout rates, and retention rates, are also prevalent among middle-income children.<sup>1</sup>
- Benefits are found to outpace costs in a relatively short time: when the first cohort turns 14 years old.
- Other pre-k benefits to the state's economy are also discussed, including increased productivity of the workforce; a more attractive business environment; more mothers, especially unmarried women, able to participate in the workforce; decreased job turnover and absenteeism; child care savings to businesses; increased competitiveness in the global economy; and reduced income inequality, especially among racial groups.
- A discussion is included of different policy choices that help in evaluating issues such as for-all vs. targeted, one year vs. two years, and which quality components to mandate.
- The authors argue that, given the private and social benefits of high-quality pre-k, society is currently not making the optimal pre-k investment. This concept of "market failure" makes an economic case for government investment.

#### Other Factors to Consider

- While its findings are based on empirical data, this analysis is a projection of a hypothetical pre-k program rather than a calculation of actual costs and benefits.
- Because the study is state specific, it may be more difficult to generalize the findings for audiences from other states.
- Because this analysis is somewhat conservative, though state and local governments would reap roughly \$2,200 in returns on their investments, this in fact results in a net loss of about \$2,000 per child. Nevertheless, as the authors suggest, the key consideration for the government should not be limited to tax revenues and savings to public agencies, but the total social return, which is positive under this analysis.

### The Bottom Line<sup>2</sup>

#### Type of Proposed Program

- Pre-k for all
- Four year olds
- Part day
- School year

#### Additional Annual

**Per-Child Investment** \$ 4,300<sup>3</sup>

**Net Present Value Benefit** \$ 9,329 per child

**Benefit-Cost Ratio** \$ 3.15:1

#### Breakdown of Economic Returns

\$1.80 to participants and their families (57%)

- \$1.25 from increased earnings (40%)
- \$0.55 from child care savings (17%)

\$1.05 to government (33%)

- \$0.60 from increased tax revenues (19%)
- \$0.25 from crime savings (8%)
- \$0.20 from education savings (6%)

\$0.30 to the general public in crime savings (10%)

#### Notes

<sup>1</sup> Families that earn between 170 percent and 280 percent of the federal poverty threshold enroll their children in pre-k at lower rates than those earning less than \$15,000 or more than \$50,000. One-third of all special education students are from families earning more than \$50,000. Middle-income children (those from households with incomes in the middle 60 percent) make up 56 percent of students who have been held back and 54 percent of high school dropouts.

<sup>2</sup> All figures presented in discounted present value in 2003 dollars.

<sup>3</sup> This figure represents an increase in per-child investments over current California pre-k expenditures for a total per-child cost of \$5,704.

## Economic Benefits of Pre-K to School Systems

### Overview

This study estimates the economic benefits pre-k would return to the K-12 system. To determine pre-k's impact on the education system and the associated savings, the researchers use three data sources: the Early Childhood Longitudinal Study (ECLS-K), which tracks a cohort of kindergartners over time (through fifth grade at the time of the analysis); the Schools and Staffing Survey, which collects data on teachers and administrators as well as their perceptions of their working environments; and the larger body of literature on pre-k.



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### Report Cited

Belfield, Clive R., and Heather Schwartz. "The Economic Consequences of Early Childhood Education on the School System." New Brunswick, NJ: National Institute for Early Education Research, 2006.

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### Main Findings

The authors find that attendance in "center-based preschool" is associated with the following impacts on the K-12 system:

- Increased standardized reading and math test scores at third and fifth grades;
- A lower grade-retention rate at third and fifth grades;
- Reduced need for special education services at third and fifth grades;
- Fewer behavioral problems and more self control at third and fifth grades;
- Lower teacher absenteeism and turnover;
- Higher work satisfaction among teachers;
- Lower student absenteeism and more "order and discipline" at kindergarten;
- A lower rate of teen pregnancy;
- Better health status due to early detection and a reduction of risky behavior; and
- Peers who attend K-12 with former pre-k students exhibit higher test scores.

The authors also examine the more general research literature on academic achievement and find that higher achievement is related to:

- Less crime and violence in schools (fighting, thefts, etc.); and
- Lower rates of tobacco and other drug use.

Based on the above relationships, the authors calculate savings to the school system:

- For each additional child served in a pre-k program, school districts can save between \$2,600 and \$4,400<sup>1</sup> over the child's K-12 experience.
- More than 70 percent of the savings are related to reduced special education costs and savings from improved working environments for teachers (i.e., lower turnover and absenteeism, reduced recruitment and retention costs).

### Strengths of this Study

- The focus on the economic benefits of pre-k for the K-12 system is unique in the available body of research.
- In an innovative approach, certain educational and economic benefits that have not been previously studied to a great extent, such as teacher satisfaction, peer effects, and school facilities are included.
- Unlike many economic studies that focus exclusively on long-term economic benefits, the relatively immediate benefits generated by pre-k participation feature prominently in this analysis.
- The authors are able to examine the relationship between participation in pre-k and all of the outcome variables while statistically controlling for the potential effects of family background and ability. So, the observed benefits associated with pre-k participation hold true regardless of a child's ability or family background.

### Other Factors to Consider

- Because the authors use ECLS-K data, which does not make distinctions about the quality of pre-k programs, a strong argument for quality is not provided.
- The findings may be somewhat less reliable because much of the ECLS-K data used are based on self-reports by teachers, parents, and school administrators and are therefore subject to biases or inaccurate perceptions. This could result in overestimated or underestimated benefits.
- Results do not derive from comparisons between treatment and control groups. While statistical procedures allow researchers to approximate such comparisons, they can be more difficult to explain to policymakers, the media, and other audiences.
- Though other studies have drawn relatively more direct connections between quality pre-k and educational outcomes, in this study, these relationships are sometimes mediated by a series of variables. For instance, the relationship between pre-k enrollment and savings from teachers' salaries is mediated by better test scores, higher achievement due to peer effects, a safer school environment, and increased teacher satisfaction.

### The Bottom Line

#### Type of Proposed Program

- Pre-k for all
- Four year olds
- Part day
- School year

#### Breakdown of Economic Returns

Total savings to the school system for each additional child served in a pre-k program	\$ 2,625 to \$4,385
• <i>Reduced special education costs</i>	\$ 600 to \$1,600
• <i>Lower grade-retention rates</i>	\$ 100 to \$ 120
• <i>Lower teacher turnover</i>	\$ 300 to \$ 400
• <i>Lower teacher absenteeism</i>	\$ 200 to \$ 250
• <i>Reduced teacher-recruitment and retention costs</i>	\$ 935 to \$1,000
• <i>Instructional time gained due to reduced drug education requirements</i>	\$ 120 to \$ 150
• <i>Reduced spending on violence prevention and security</i>	\$ 250 to \$ 290
• <i>Reduced in-school health and mental health services costs</i>	\$ 120 to \$ 575

#### Notes

- <sup>1</sup> This figure represents 60 percent of the national average public school per-year, per-pupil spending and six percent of the national average public school per-pupil, 13-year (K-12) spending.

## Pre-K and Economic Growth

### Overview

Research has demonstrated that children who attend high-quality pre-k are more likely to graduate from high school and acquire more education. Research also clearly shows that a more educated workforce increases a nation's productivity. This analysis uses empirical data from an experimental pre-k study and macroeconomic theory to calculate the economic benefits accrued to society from increased workforce productivity as a result of participation in a high-quality pre-k program open to all three and four year olds.

### Main Findings

The authors reviewed the findings from the High/Scope Perry Preschool Program study, demographic projections, and current pre-k enrollment rates to predict the following:

- A pre-k program for all three and four year olds will, on average, extend a child's education by more than four months.
- Pre-k participants, who would otherwise join the workforce sooner, instead stay in school longer. Thus, a nationwide expansion of pre-k would initially shrink the workforce when the first cohort enrolled in the program reach the end of their educational careers. This would yield a temporary negative impact on the national economy.
- When these children join the workforce, the authors estimate their increased productivity, as a result of high-quality pre-k participation, would raise the GDP above its baseline projection<sup>1</sup> as early as 33 years after program implementation.
- As additional cohorts join the workforce over time, per-capita GDP is projected to increase by \$270 billion (0.88 percent) in the program's 45th year.
- In the 60th year, GDP is projected to increase by \$988 billion dollars (2.34 percent) over the baseline, and in the 75th year, \$2 trillion (3.50 percent).
- Assuming that about 20 percent of GDP is collected as federal revenue, the federal government stands to gain \$400 billion in additional funds in the program's 75th year.
- Taking into account that high-quality pre-k for all three and four year olds would cost the government about \$59 billion in the 75th year, this investment would produce a net benefit of \$341 billion for the government in that year.

### Strengths of this Study

- This study focuses on pre-k for all's impact on the nation's macroeconomic growth and provides justification for an increase in pre-k investment.
- Extensive related analyses are conducted, including an estimate based on a more conservative growth model, which found that a pre-k-for-all program would pay for itself more than two times over in 2080 and would generate an increase in federal revenue of more than \$155 billion.<sup>2</sup>
- The authors take into account current pre-k enrollment data and adjust the impact of a pre-k-for-all program accordingly. They assume that children who previously did not attend pre-k would reap 100 percent of the benefits, those who previously attended a public program would reap 50 percent of the benefits, and those who previously attended a private program would not receive any additional benefits.

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### Report Cited

Dickens, William T., Isabel Sawhill, and Jeffrey Tebbs. "The Effects of Investing in Early Education on Economic Growth." Washington, DC: The Brookings Institution, 2006.

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### Other Factors to Consider

- The study focuses exclusively on the macroeconomic benefits of a pre-k-for-all investment and does not evaluate the myriad additional microeconomic and educational benefits of high-quality pre-k.
- The macroeconomic returns on an investment in pre-k for all accrue over many years, so these findings do not include short-term benefits.
- The authors base their analysis on the finding that participants in the High/Scope Perry Preschool Program attained an average of 0.9 more years of schooling than the control group. Since this was a highly targeted program, the authors' assumption that all children would realize similar educational attainment gains from participating in high-quality pre-k is not directly supported by the program data. The authors base this assumption in part on a study of Oklahoma's pre-k-for-all program,<sup>3</sup> which, though it does find similar cognitive effects across income spectrums, does not specifically consider long-term gains in educational attainment. The decision to use the High/Scope data, however, is also balanced by the more conservative estimates that children who transfer to a new pre-k-for-all program from other public pre-k programs would only reap 50 percent of the benefits and those from private programs would reap no benefits at all.

### Notes

- 1 GDP baseline is the estimated GDP in the absence of a high-quality pre-k program for all. Per-capita GDP growth is estimated by the Social Security Administration.
- 2 Conservative estimates show productivity gains would increase GDP by \$62 billion in 45 years (0.20 percent), by \$400 billion in 60 years (0.92 percent), and by \$778 billion in 75 years (1.34 percent).
- 3 See William T. Gormley et al., "The Effects of Universal Pre-K on Cognitive Development," *Developmental Psychology* 41, no. 6 (2005).
- 4 All figures presented in adjusted 2005 dollars.

### The Bottom Line<sup>4</sup>

#### Type of Proposed Program

- Pre-k for all
- Three and four year olds
- Part day
- School year

**Annual Investment in 2080**      \$ 59 billion

#### Annual Benefits in 2080

\$2.0 trillion in increased GDP, or 3.5% more than the baseline  
\$400 billion in increased federal revenues  
*\$341 billion net fiscal benefit for the federal government*



## Pre-K and Workforce Productivity

### Overview

Using data from demographic trends, economic analyses, evaluations of the High/Scope Perry Preschool Program, Chicago Child-Parent Centers (CPC), the Abecedarian Project, and from Robert Lynch's earlier research,<sup>1</sup> this paper lays out the argument that, in order for the country's economy to continue to grow, children who live in "adverse childhood environments" must have access to quality pre-k.



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### Report Cited

Heckman, James J., and Dimitriy V. Masterov. "The Productivity Argument for Investing in Young Children." Washington, DC: Committee for Economic Development, 2004.

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### Main Findings

- The growth of the nation's workforce in the near future will come from households with lower incomes, lower levels of education, and higher incidences of single parenthood, especially among poor and less educated women. Children from these homes tend to have low educational attainment.
- Though the quality of the workforce must improve to meet the increasing demands of the economy, the education level of the workforce is projected to remain stagnant through 2020. This trend has begun to slow the nation's economic growth.
- The authors show that because they provide more effective early learning environments for children from disadvantaged backgrounds, high-quality pre-k programs are cost-effective and can narrow the achievement gap between poor and more well-to-do children, increase educational attainment, and enhance future productivity of the economy.
- Pre-k's positive impact is a result of what the authors call "dynamic skill formation." Young children who learn more as a result of quality early learning environments are, in turn, more able to learn as they grow up and to take advantage of later interventions, whether remedial or enrichment. For this reason, initiatives like class-size reduction, job training, and GED programs, when not preceded by high-quality pre-k, usually don't yield positive rates of return.

### Strengths of this Study

- The paper provides evidence of the lasting benefits of pre-k. The authors argue that non-cognitive gains (e.g., ability to learn, persistence, motivation) have been shown to lead to greater high school completion, more reduction in criminal activities, and healthier behaviors and could be more important than cognitive outcomes (e.g., increased test scores) in the long term.
- The focus on worker productivity can be used to address economic concerns.
- James Heckman is a Nobel Prize-winning economist and a strong proponent of high-quality pre-k.

### Other Factors to Consider

- The authors only review the benefits of pre-k for at-risk children and therefore, argue for targeted pre-k programs rather than programs for all children.

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### Notes

- <sup>1</sup> Robert Lynch, "Exceptional Returns: Economic, Fiscal, and Social Benefits of Investment in Early Childhood Development," (Washington, DC: Economic Policy Institute, 2004).

## Representative Research: Latinos and Economic Pre-K Analyses

### The Bottom Line

- Increasingly, the workforce is coming from low-income, at-risk households.
- Adverse home environments can lead to low educational attainment.
- Low educational attainment is threatening the economic competitiveness of the American workforce.
- High-quality pre-k can counteract some of the negative impacts of adverse home environments by improving children's cognitive and non-cognitive skills, increasing their educational attainment, and ultimately, enhancing the quality and productivity of the country's workforce.

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**James J. Heckman and Dimitriy V. Masterov**  
***The Productivity Argument***  
***for Investing in Young Children***

Indeed, if proven early intervention programs are adopted, schools will be more effective, firms will have better workers to employ and train, and the prison population will decline. At lower cost to society, bolstered families will produce better educated students, more trained workers and better citizens.

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Around the country, demographics are changing quickly as minority populations, particularly Latinos who are the fastest-growing segment of the U.S. population, become a greater presence in American communities. These demographic changes are of particular importance in early childhood education. Twenty-one percent of children under age five in the U.S. are Latino, and in 2003, 22 percent of the babies born in the U.S. had Latino mothers.<sup>1</sup> Yet, the research on pre-k's educational and economic impacts has been slow to include this growing population in study samples. Latino children have not been part of rigorous longitudinal pre-k studies, particularly those of the High/Scope Perry Preschool Program and the Abecedarian Project, and the sample from the Chicago Child-Parent Centers study included just 7 percent Latino children.<sup>2</sup> Many of the other studies reviewed in this publication project economic benefits from hypothetical pre-k programs based upon the findings of these well-known longitudinal studies. While Latino children, especially those from low-income backgrounds, may have much in common with the children studied in these earlier analyses, they also live in unique cultural and linguistic contexts that affect the extent to which they benefit from high-quality pre-k in the short and long terms. Clearly, future economic studies of pre-k need to include in their samples Latino children and English Language Learners generally, so that their findings can be more readily applied to the increasingly diverse communities of our nation.

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### Notes

1 E.E. Garcia and S. Miller, "Strengthening Preschool/Pre-K Education for the Diverse Hispanic Population in the United States" (paper presented at the NAEYC 15th Annual Institute for Early Childhood Professional Development, San Antonio, TX, June 4, 2007).

2 Arthur J. Reynolds et al., "Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers," *Educational Evaluation and Policy Analysis* 24 (2002).

## Comparing Targeted Pre-K and Traditional Economic Development Strategies

### Overview

Based on findings from the High/Scope Perry Preschool Program study, this article argues that policymakers should consider using high-quality pre-k as an economic development strategy because it is more effective than traditional strategies such as subsidies to businesses. It also proposes a strategy for states to create a sustainable source of funding for pre-k: Create a public-private endowment fund, invest it in bonds, and use the interest to provide targeted pre-k.

### Main Findings

- State and local subsidies to businesses are not effective. Spending public funds to relocate businesses within a state or country does not create new jobs; it only shifts them around.
- By projecting future benefits for program participants to age 65, the authors find that the internal rate of return<sup>1</sup> for a quality pre-k program is 16 percent (12 percent for the public and 4 percent for participants).
- Given the potential internal rate of return for society, the authors argue that pre-k is not currently being funded at the optimal level and that this is a failure of the market that justifies government intervention and investment.

### Strengths of this Study

- The 16 percent rate of return is impressive given that it is adjusted for inflation.
- The evidence that pre-k is a more effective economic development strategy than subsidies, stadiums, or entertainment complexes could be useful when weighing various development options.
- By illustrating that there is a market failure in pre-k, the authors justify government intervention from an economic perspective, blunting concerns about increasing government programs and expenditures.
- The authors are economists from the Federal Reserve Bank of Minneapolis whose work on this issue has been widely cited.

### Other Factors to Consider

- The authors provide a limited range of data to support their claims. A later report by the Committee for Economic Development<sup>2</sup> provides evidence that industrial parks, stadiums, and subsidies for companies do not yield net benefits for the public.
- The authors acknowledge that basing their analysis on the High/Scope Perry Preschool Program study's findings may overstate returns, but they defend their choice by highlighting the potential intergenerational effects of quality pre-k, which are not included in the High/Scope Perry Preschool Program study.
- Because the paper compares pre-k benefits favorably to those of business subsidies, it may be perceived as positioning pre-k as competition to business for development funding.

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### Report Cited

Rolnick, Arthur, and Rob Grunewald. "Early Childhood Development = Economic Investment." *fedgazette*, March 2003.

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### Notes

<sup>1</sup> Internal rate of return is the interest rate received for an investment over a period of time.

<sup>2</sup> "Developmental Education: The Value of High Quality Preschool Investments as Economic Tools," (Washington, DC: Committee for Economic Development, 2004).

## The Bottom Line

### Type of Proposed Program

- Targeted pre-k
- Three and four year olds
- Part day
- School year

High-quality pre-k has proven to be a better economic development tool than traditional strategies like subsidies and tax breaks for businesses.

<b>Internal Rate of Return:</b>	16%
<i>For the public:</i>	12%
<i>For the participants:</i>	4%



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### Arthur Rolnick and Rob Grunewald *Early Childhood Development = Economic Investment*

Early childhood development programs are rarely portrayed as economic development initiatives, and we think that is a mistake. Such programs, if they appear at all, are at the bottom of the economic development lists for state and local governments. They should be at the top.

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## Comparing Pre-K for All and Traditional Economic Development Strategies

### Overview

This study answers the question: Is high-quality pre-k more or less effective in stimulating economic development than traditional business subsidies?

The author compares the effects of a given investment in a pre-k program (which grows with the economy each year thereafter) with that of a similarly priced subsidy program and projects each program's impact on job growth, earnings, and productivity at both the state and national levels over a 75-year period. To estimate the costs and benefits of a pre-k-for-all program, the author uses findings from the Chicago Child-Parent Centers (CPC) and follows assumptions laid out in Karoly and Bigelow, 2005 (see page 14) that middle- and upper-income children will not benefit as much from pre-k as their low-income peers.

### Main Findings

- As an economic development strategy, subsidies to business produce more short-term benefits than pre-k, but over the long-term, pre-k for all creates a significantly greater growth in jobs, earnings, and productivity. The author concludes that subsidies are more effective at promoting state economic development over a five- to 15-year horizon, while pre-k is better over a time horizon of 30 years or more.
- At the state level, pre-k and subsidy programs have similar rates of return in increased earnings: for every dollar invested in either strategy, the present value of state residents' earnings would increase by about \$3.00. However, pre-k for all creates more jobs for a state in the long run, 1.3 percent, compared to 0.6 percent job growth from business subsidies over the same period.
- At the national level, pre-k creates more jobs and greater earnings than subsidies because subsidy programs tend to "reshuffle" jobs from state to state rather than creating new ones. As a result, the return on investment for subsidies in increased earnings (in present value terms) is only \$0.65 per dollar versus a yield of \$3.79 in increased earnings per dollar invested in pre-k at the national level. The national return from pre-k is higher than the state return due to out-of-state migration of the workforce.
- From the national perspective, an ongoing pre-k-for-all program will, over 75 years, have large economic benefits, producing more than 3 million jobs, increasing annual earnings by almost \$300 billion, increasing annual GDP by almost \$1 trillion, and increasing annual tax revenues by \$235 billion.
- Most of pre-k's impact on economic development comes from its effect on the participants and their peers and the subsequent increase in the quantity and quality of the workforce.

### Strengths of this Study

- Assertions made in other, similar studies that pre-k is a more effective economic development strategy than many traditional subsidy programs, especially sports teams and "big box" retailers is supported by actual data and projections given in this analysis.
- Poorly designed economic development subsidies to sports teams or retailers at the state level are found to yield only \$0.79 in increased present value of earnings for every dollar invested, compared to high-quality pre-k, which produces a \$3.00 return per dollar invested.

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### Report Cited

Bartik, Timothy J. "The Economic Development Benefits of Universal Preschool Education Compared to Traditional Economic Development Programs." Working paper. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 2006.

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- An equitable comparison between subsidy programs and pre-k is assured by the exclusion of benefits of pre-k that are not typically considered results of economic development initiatives, such as crime reduction and education savings.
- A distinction is made between well-designed subsidies directed at “export-based” businesses (e.g., manufacturing firms) and poorly designed subsidies to “big box” retailers or sports teams. The latter tend to increase economic activity for subsidized companies and surrounding communities but reduce it for others, thus yielding little or no net benefits for the state.
- Pre-k and traditional economic development strategies are shown to be potentially complementary. Pre-k has more long-term benefits while subsidies have more short-term ones. Moreover, as subsidies create jobs, pre-k will produce a larger and better work force to fill those jobs.
- This paper provides a rationale for shifting federal investment from traditional economic development strategies to pre-k by showing that the latter has a greater impact on job creation, earnings, and productivity at the national level.
- While arguing for pre-k for all, this study considers, but ultimately rejects targeted programs – even if sliding-scale fees are applied to low-risk children – because of the political implications of excluding the majority of children, additional administrative costs associated with determining eligibility, and the inconclusive research concerning the differential impacts of pre-k on children of various income backgrounds.
- A projection of how a pre-k program and a subsidy program would impact job creation, earnings, tax revenue, and productivity over time is given for each state.

#### Other Factors to Consider

- This study is exclusively focused on long-term economic development results.
- While its findings are based on empirical research, this analysis is a projection of hypothetical programs rather than a calculation of actual costs and benefits.

### The Bottom Line

#### Type of Program Proposed

- Pre-k for all
- Three and four year olds
- Part day
- School year

#### Nationwide Results after 75 years:

New jobs created	3 million
Increased annual earnings	\$ 300 billion
Increased annual GDP	\$ 1 trillion
Increased annual tax revenue	\$ 235 billion

#### Returns in Increased Earnings

##### (Present Value) Per Dollar Invested

	State Perspective	National Perspective
Pre-K for All	\$ 2.78	\$ 3.79
Business Subsidies	\$ 3.14	\$ 0.65



# Understanding Net Present Value and Benefit-Cost Ratios

## What is Net Present Value?

As with other investments, many of the economic benefits of pre-k do not accrue until some years into the future. However, since a dollar received in the future is worth less than a dollar in the present (one can earn interest on money in the present), how can the public or policymakers know if the future benefits of pre-k are worth the investment today? To make an informed assessment, stakeholders must know how future economic benefits “translate” into present-day dollars.

In order to make proper comparisons between today's costs and tomorrow's benefits of a pre-k program, both must be represented in present-day values. Typically, economists accomplish this by applying a discount rate from 3 to 7 percent to the future dollars to calculate their equivalent or “present value” at the time of the initial investment.<sup>1</sup> After all the future figures are translated into present value terms, they can then be used to yield a *benefit-cost (B/C) ratio* and *net present value (NPV)*. The B/C ratio of any investment is the present value of benefits divided by the present value of costs. The NPV refers to the benefits of an investment less its costs. Generally, when the B/C ratio is greater than one or the NPV of an investment is positive, then economists consider the investment to be a sound one.

B/C ratios and NPV benefits provide slightly different information and answer different concerns. B/C ratios represent the gross returns on each dollar invested, whereas NPV indicates the magnitude of economic returns. While targeted pre-k programs may have larger B/C ratios because they serve small groups of at-risk children who stand to gain more from a pre-k experience, pre-k for all may have greater NPV because it benefits more children.<sup>2</sup>

## How to Interpret Benefit-Cost Ratios<sup>3</sup>

Is a program that yields a B/C ratio of 7 to 1 necessarily of higher quality than one with a 3 to 1 ratio? A high-quality program will produce greater cognitive and social benefits, which increase economic returns and result in a higher B/C ratio. However, high-quality programs also tend to be more expensive, which lowers the ratio. In fact, a B/C ratio cannot and should not be used to evaluate program quality because it is only one of many variables that impact the ratio. The following is a discussion of other variables that influence benefit-cost analyses.

### What benefits are included?

Researchers differ in what they include as program benefits. The decision depends on a number of factors, including impacts observed and/or measured, whether effects are monetarily quantifiable, and how conservative the researchers want their analysis to be. For instance, some researchers include intangible savings to victims of crime while others omit this variable to get a more conservative estimate. Also, while most researchers believe that children who participate in quality pre-k will exert positive peer effects as they enter the K-12 system, they often do not include these benefits in their calculations because they are difficult to quantify in economic terms.

Below is a list of benefits that have been included in benefit-cost analyses.

- K-12 education savings (e.g., reduced remedial and special education services)
- Increased earnings (both parents and participants)
- Increased income tax revenues stemming from higher participant and/or parent earnings
- Savings to public assistance programs (administrative costs and payments)
- Savings to criminal justice systems
- Tangible savings to crime victims (e.g., health costs and property damage)
- Intangible savings to crime victims (e.g., pain and suffering)
- Savings to victims of child abuse or neglect
- Savings from lower child-welfare costs (from fewer cases of abuse or neglect)
- Savings to health care systems
- Child care savings to parents
- Benefits to next generation

### Where is the program located?

Because the costs and benefits of providing quality pre-k will differ from state to state, the B/C ratio may reflect the location of the pre-k program as much as other variables.

## Conclusion

Higher costs drive down the B/C ratio while greater savings or benefits result in a higher B/C ratio. For instance, the costs for personnel and facilities may be higher in California than in Kentucky. Therefore, even if the economic returns of pre-k in both states are similar, California's program will yield a smaller B/C ratio. Similarly, because quality pre-k tends to reduce special education placements and criminal activity, states that have large investments in these areas will also save more, which increases the B/C ratio for their pre-k programs.

### What population is served by the program?

A targeted program for at-risk children tends to yield a higher B/C ratio because it serves fewer children, incurring less cost while yielding greater per-child benefits.

### How many years into the future does the analysis project?

Studies that project farther into the future are able to include more benefits (e.g., increased earnings, less criminal activity) than short-term studies.

### Who is in the comparison group and what early childhood services, if any, did they receive?

Studies that compare children who participate in pre-k with those who are not enrolled in any form of early childhood education are likely to report higher differential benefits than studies that compare participation in pre-k with participation in other forms of early education or care.

Taken together, the factors discussed above explain the range of benefit-cost ratios reported by researchers. They also caution against basing comparisons of the merits of different pre-k programs on these ratios. The bottom line is that while the ratios may differ, researchers have consistently found that the economic benefits of pre-k exceed its costs, often by large margins.

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### Notes

- 1 In an analysis of a program that occurred in the past, such as that of the High/Scope Perry Preschool Program, the cost would have to be adjusted for inflation in addition to discounted, so that the present value of inflation-adjusted benefits are compared to the present value of inflation-adjusted costs.
- 2 This is because the B/C ratio for expanding beyond the narrow target population, while it might be lower, is still greater than 1. See W. Steven Barnett, "Maximizing Returns from Prekindergarten" (paper presented at the Conference on Education and Economic Development of the Federal Reserve Bank of Cleveland, November 18-19, 2004).
- 3 This information is adapted from Lynn A. Karoly, Rebecca Kilburn, and Jill S. Cannon, "Early Childhood Interventions: Proven Results, Future Promise," (Santa Monica, CA: The RAND Corporation, 2005).

With each passing year, state-funded, voluntary pre-k programs increase in quality, serve more children, and gain the confidence of more policymakers, educators, and parents. The body of research reviewed here has played an important role in this growth of support. Together, the articles featured in this review show that high-quality pre-k benefits everyone.

These returns are impressive, but it is important to bear in mind that in every case, the economic benefits of pre-k are the result of high-quality programs like the High/Scope Perry Preschool Program, Chicago CPC, or the Abecedarian Project. These programs all feature well-compensated teachers with bachelor's degrees and training in early childhood development, low child-adult ratios, and research-based curricula. Children and families in these programs also received support outside the pre-k setting to ensure that healthy development continued in the home.

As economic research on pre-k evolves, it will need to account for the changing demographics of our nation's children. To date, the strongest benefit-cost analyses of pre-k for all have only projected hypothetical economic returns and have not taken into consideration this country's increasing cultural diversity. Addressing these gaps in the current research will make the economic data on pre-k for all even more compelling.

Ultimately, behind the numbers about costs and benefits and the discussions about GDP and economic development, the studies reviewed here illustrate what educators and parents have known for years, that children who participate in pre-k do better academically, physically, and socially throughout their lives. As adults, they attain higher levels of education and earn more. In the end, we all live in a safer, more productive, and more educated society. The research is clear; an investment in high-quality pre-k for all three- and four-year-old children is an investment in the future of us all.

## References

Barnett, W. Steven. "Maximizing Returns from Prekindergarten Education." Paper presented at the Conference on Education and Economic Development, Cleveland, OH, November 18-19, 2004.

Barnett, W. Steven, and Leonard N. Masse. "Comparative Benefit-Cost Analysis of the Abecedarian Program and Its Policy Implications." *Economics of Education Review* 26 (2007): 113-25.

Belfield, Clive R., Milagros Nores, W. Steven Barnett, and Lawrence Schweinhart. "The High/Scope Perry Preschool Program: Cost-Benefit Analysis Using Data from the Age-40 Followup." *Journal of Human Resources* 41, no. 1 (2006): 162-90.

Campbell, Frances A., Craig T. Ramey, Elizabeth Pungello, Joseph Sparling, and Shari Miller-Johnson. "Early Childhood Education: Young Adult Outcomes from the Abecedarian Project." *Applied Developmental Science* 6, no. 1 (2002): 42-57.

"Developmental Education: The Value of High Quality Preschool Investments as Economic Tools." Washington, DC: Committee for Economic Development, 2004.

Garcia, E. E., and S. Miller. "Strengthening Preschool/Pre-K Education for the Diverse Hispanic Population in the United States." Paper presented at the NAEYC 15th Annual Institute for Early Childhood Professional Development, San Antonio, TX, June 4, 2007.

Gormley, William T., Ted Gayer, Deborah Phillips, and Brittany Dawson. "The Effects of Universal Pre-K on Cognitive Development." *Developmental Psychology* 41, no. 6 (2005): 872-84.

Karoly, Lynn A., Rebecca Kilburn, and Jill S. Cannon. "Early Childhood Interventions: Proven Results, Future Promise." Santa Monica, CA: The RAND Corporation, 2005.

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Reynolds, Arthur J., Judy A. Temple, Dylan L. Robertson, and Emily A. Mann. "Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers." *Educational Evaluation and Policy Analysis* 24 (2002): 267-303.

Schweinhart, Lawrence J. "The High/Scope Perry Preschool Study through Age 40." Ypsilanti, MI: High/Scope Educational Research Foundation, 2004.

Temple, Judy A., and Arthur J. Reynolds. "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs." *Economics of Education Review* 26 (2007): 126-44.

## Additional Resources

### **Other summaries and comparisons of pre-k and early childhood programs and their economic impact:**

Barnett, W. Steven. "Maximizing Returns from Prekindergarten Education." Paper presented at the Conference on Education and Economic Development, Cleveland, OH, November 18-19, 2004.

Karoly, Lynn A., Rebecca Kilburn, and Jill S. Cannon. "Early Childhood Interventions: Proven Results, Future Promise." Santa Monica, CA: The RAND Corporation, 2005.

Temple, Judy A., and Arthur J. Reynolds. "Benefits and Costs of Investments in Preschool Education: Evidence from the Child-Parent Centers and Related Programs." *Economics of Education Review* 26 (2007): 126-44.

Zigler, Edward, Walter S. Gilliam, and Stephanie M. Jones. *A Vision for Universal Preschool Education*. New York: Cambridge University Press, 2006.

### **Other resources and analyses for the major longitudinal studies outlined in this review:**

#### *The Carolina Abecedarian Project*

Campbell, Frances A., Craig T. Ramey, Elizabeth Pungello, Joseph Sparling, and Shari Miller-Johnson. "Early Childhood Education: Young Adult Outcomes from the Abecedarian Project." *Applied Developmental Science* 6, no. 1 (2002): 42-57.

#### *The Chicago Child-Parent Centers*

The Chicago Longitudinal Study  
<http://www.waisman.wisc.edu/cls/>

#### *The High/Scope Perry Preschool Program*

High/Scope Educational Research Foundation  
<http://www.highscope.org/Research/PerryProject/perrymain.htm>

### **Other sources for the economic benefits of investing in young children:**

Committee for Economic Development:  
Invest in Kids Working Group & Partnership for America's Economic Success  
<http://www.ced.org/projects/kids.php>

For state-specific benefit-cost analyses, please visit the Pre-K Now website  
<http://www.preknow.org/advocate/reports/>

## Authors and Acknowledgements

### Author

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## Pre-K Now at a Glance

### Mission

Pre-K Now collaborates with advocates and policymakers to lead a movement for high-quality, voluntary pre-kindergarten for all three and four year olds.

### Vision

Pre-K Now's vision is a nation in which every child enters kindergarten prepared to succeed.

### Location

Washington, DC

### Leadership

Libby Doggett, Ph.D.  
Executive Director

### Pre-K Now Press Office

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### Funders

The Pew Charitable Trusts  
The David and Lucile Packard Foundation  
The Foundation for Child Development  
RGK Foundation  
CityBridge Foundation  
PNC Financial Services Group  
The Schumann Fund for New Jersey

### Pre-K Now Key Differentiators

- Focuses exclusively on pre-k
- Provides the most up-to-date gauge of the pre-k pulse in any state
- Offers nationwide access to pre-k advocates
- Monitors and distributes daily pre-k newsclips
- Provides a national perspective on local pre-k issues
- Provides outreach, policy, and Spanish-language information targeted to the Latino community
- Leads a national movement which has gained significant momentum in the last five years

### The Case for Pre-K

- Pre-k benefits all children academically, socially, and emotionally.
- High-quality pre-k for all nets a high return on investment in children and the community.
- The most important brain development occurs by age five.
- Pre-k is the first step to improving K-12 education.

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Dollars and Sense:  
A Review of  
Economic Analyses of Pre-K