
prepared for

The Strive Partnership and
United Way of Greater Cincinnati

by the
Economics Center

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Overview
The Strive Partnership and United Way of Greater Cincinnati engaged the Economics Center at the University of Cincinnati to conduct a two-part study calculating the economic value of the Cincinnati Preschool Promise and the potential return on investment of such a program. The Cincinnati Preschool Promise aims to provide two years of quality preschool education for every child in Cincinnati by providing:

- Preschool tuition credits to Cincinnati families on an income based sliding scale (credits can be used at public or private centers and for full or part-time preschool). The only requirement is that the center be quality rated;
- Support for centers to become quality-rated and increase their quality; and
- An accountable structure focused on effective stewardship of resources, transparency, and continuous improvement.

This study shows the economic and social benefits of quality preschool education on the local economy. It is intended to inform local elected officials, local stakeholders and business leaders, and the community at large about the economic benefits of the Cincinnati Preschool Promise.

Project Phases
Phase 1 calculated the public savings that result from ensuring all Cincinnati children receive two years of quality preschool and are ready to enter kindergarten. Ready is defined by a score of 19 on Ohio’s Kindergarten Readiness Assessment in Literacy (KRA-L). Phase 1 of this project provides a thorough review of leading research and existing literature on the benefits of quality preschool, and applies those findings to the City of Cincinnati. Phase 2, yet to be completed, will evaluate the costs of providing universal quality preschool. Completion of this phase of the study will yield a full cost/benefit analysis of the Cincinnati Preschool Promise.

What Is Included – Phase 1
The study only considers benefits that accrue in real dollars to public entities; private/personal and intangible social benefits (e.g., increased personal earnings and the statistical value of a human life) that accrue as a result of a quality preschool experience are not included. Using kindergarten readiness data from the State of Ohio and population data from the 2011 American Community Survey, The Economics Center projects that there are 5,341 three-year-old children in the City of Cincinnati. They estimate 2,100 of those children are “at risk,” or not prepared for kindergarten each year. The study calculates the benefits that accrue over a working lifetime to each cohort of 3 year old children who receive two years of high quality preschool.
Key Findings – Phase 1

- Reductions in school system expenditures: $2,060 per enrollee
  - Quality preschool education provides cost savings to public school districts by reducing the incidence of special education and grade retention. This is particularly important as Ohio prepares to implement the Third Grade Guarantee in 2014 which will require third grade reading proficiency. Students unable to meet this requirement repeat third grade.

- Reduction in teacher costs: $378 per enrollee
  - Improvements in academic achievement and student behavior from quality preschool education reduces costs of hiring and retaining teachers, substitute teachers, spending on school security, and state spending on improving achievement

- Increase in parental taxes: $281 per enrollee
  - Expanded participation in quality preschool programs will free up parents to enter the labor market, resulting in increased sales and income tax revenues

- Reduced crime and criminal justice costs: $7,735 per enrollee
  - Providing quality preschool education for at risk students has been proven to substantially reduce criminal activity, thus reducing costs on the criminal justice system

- Reduced health care and social service costs: $218 per enrollee
  - Quality preschool programs have also been shown to provide public gains associated with health screening, immunization, and nutrition, which may be delivered directly through the program or as a result of higher family incomes

- Increase in student taxes (income and sales) over a 47 year work life: $2,279 per enrollee

The total benefits/savings per enrollee are estimated at $12,942.

Estimated Total Benefits
If all three-year-old children in Cincinnati enroll in the Cincinnati Preschool Promise, including all 2,100 children who are “at risk” (i.e., will not be kindergarten ready in the absence of quality preschool), each cohort will provide a maximum, annual public benefit of $69.1 million.

Based on the experience of the Denver Preschool Program (www.dpp.org), the Economics Center expects to see 70% of all three-year-olds in Cincinnati utilize the Cincinnati Preschool Promise, for two years each. Assuming this 70% take up rate is the same for the at-risk population, a total of 3,739 total three-year-old students will annually enroll in quality preschool (including 1,470 at risk students) and the aggregate, annual economic benefits will be $48.4 million over the working lifetime of these students.

These findings strongly suggest that the costs of such a program will more than be repaid in terms of future benefits.
An increasing number of studies show that quality of preschool is associated with a host of benefits to students, schools, and society at large. Some benefits accrue in the short term, while the child is enrolled. Some benefits accrue in the medium term as the child progresses through school. Others accrue over the longer term and through adulthood, with entry into the labor force. One obvious benefit of Early Childhood Education (ECE) is enhanced academic achievement. These enhancements are evident in higher test scores, graduation rates, retention rates, and college attendance.

According to new data from the Early Childhood Longitudinal Study (ECLS) on reading and math tests in kindergarten, children from center-based care show the highest scores in comparisons with preschooling care either by parents, relatives, non-relatives, or in mixed settings. The ECLS dataset shows that children who attend center-based preschool report test scores that are 0.3 standard deviations higher than other children. Another study by Magnuson et al. (2004) finds that preschool attendance increases math/reading scores by 0.1 standard deviations in the first school year, with persistent academic gains for children from low-income families. The improvement in academic achievements due to expansion of preschool comes from both individual gains (as a result of being more proficient in school) and from peer effects (as other students who are more proficient contribute to a positive learning environment).

Increasing the proportion of students in a classroom who have attended preschool by 40% can be expected to increase academic achievement by approximately 0.15 standard deviations. In total, the individual gains from preschool, and the peer effects of preschool raise the academic achievement of each participant child by approximately 0.30 standard deviations.

Higher academic ability and center-based preschool also has strong impacts on student behavior. The ECLS substantively shows that, when 40% more students have attended preschool, student behavior improves by approximately 32 points. ECLS dataset of responses of 2,079 public school kindergarten teachers shows they are less likely to say that “student behavior interferes with their teaching” either: when their class is reading at or above grade level in Math (a result of preschool education); or when more of the class had attended center-based preschool. New data from Arizona State University shows that, children who interacted well with their peers in preschool, were more likely to exhibit behaviors in kindergarten that would help them achieve, such as being able to listen and follow a teacher’s directions. The ECLS data also shows that, plausibly, teacher absenteeism and turnover rates are lower when students are better behaved.

There is also substantively strong evidence that schools with higher academic scores or higher proportions of preschool enrollees report fewer problems in maintaining order and discipline, and in student absenteeism. These schools also report less fighting, fewer weapons brought to school, fewer thefts, and fewer physical attacks in schools. The consistency in results from ECLS datasets, and other similar studies establishes a strong link between preschool education and: achievement, student behavior, school climate, and teacher working conditions.

Studies have also shown that when children go on to kindergarten and higher grades, those with ECE are less likely to repeat grades and need less special education assistance. Children who have had ECE also commit fewer crimes over their lifetime than children in the same socioeconomic circumstances who have not had ECE. Over the long term, further gains from ECE are realized on local, state, and national levels, as the children enter the labor force themselves, earn higher salaries, and contribute larger income and sales tax payments.
The Economics Center categorized the types of benefits and determined that only those benefits accruing to 1) public entities and 2) reflecting actual dollar transactions would be counted. These benefits are considered public, tangible benefits and they exclude several critical but non-economic categories of benefits such as the statistical application of the dollar value of a life, or the dollar value of pain and suffering. The Economics Center benefits also exclude an increase in student or parental income because these dollars accrue directly to individuals (note: the taxes from these increased earnings are calculated however).

<table>
<thead>
<tr>
<th>Table 1: Categorization of Economic Benefits Considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Item Benefit</td>
</tr>
<tr>
<td>Crime</td>
</tr>
<tr>
<td>social impacts of crime</td>
</tr>
<tr>
<td>criminal justice system cost savings</td>
</tr>
<tr>
<td>Changes in Income (student and parent)</td>
</tr>
<tr>
<td>increased earnings</td>
</tr>
<tr>
<td>increased income tax collections</td>
</tr>
<tr>
<td>increased sales tax payments</td>
</tr>
<tr>
<td>Health Care and Social Services</td>
</tr>
<tr>
<td>decreased state funding for child welfare</td>
</tr>
<tr>
<td>Reduction in School Costs</td>
</tr>
<tr>
<td>reduction in costs for special education</td>
</tr>
<tr>
<td>reduction in costs for students repeating grades</td>
</tr>
<tr>
<td>Decreased Teacher Costs due to Student Behavior</td>
</tr>
<tr>
<td>pay to compensate for unpleasant working</td>
</tr>
<tr>
<td>hiring costs associated with increased teacher</td>
</tr>
<tr>
<td>substitution costs associated with teacher</td>
</tr>
<tr>
<td>reduction in spending on school security</td>
</tr>
<tr>
<td>reduction in expenditures on improving</td>
</tr>
</tbody>
</table>

**public tangible benefits**
- benefits accrue to the general public in actual dollars.
  - e.g. increased income taxes

**private tangible benefits**
- benefits accrue to individuals.
  - e.g. increased earnings

**intangible benefits**
- benefits do not represent a real exchange of currency.
  - e.g. statistical value of life
Reduction in School Costs

One of the best documented cost savings from early childhood education are the cost savings to school districts. Previous literature has defined these cost savings by tracking the incidence of special education and student withholding (repeating for grades), and determining the relevant reduction in these expenditures by the local school districts. Belfield (2004) shows that across sources, a representative reduction in the incidence of special education is 12%, although there is a broad range of estimates for this impact. Literature also identifies a variety of estimates for reductions in grade retention ranging from 6% to 23%.

Decreased Teacher Costs due to Student Behavior

Improvements in academic achievement and student behavior from preschool education have fiscal implications in-terms of reduced school costs and decreased teacher costs.

Decreased teacher costs due to improved student behavior include cost savings from teacher satisfaction, reduction in teacher turnover and teacher absenteeism. Belfield demonstrated that improved student behavior has a strong impact on teacher job satisfaction, and this improvement in working conditions for teachers is equivalent to a 3% increase in pay for all teachers.

Belfield also shows that, given a 40% increase in preschool enrollment, teacher turnover falls by approximately 24%. This decrease in teacher turnover has significant impacts on educational budgets for teaching. An industry practice identified the cost of teacher turnover equivalent to 33% of the salary of the new hire. Teacher absenteeism is a problem in schools where preschool enrollments are low.

Reduction in school costs from preschool education result mainly from improved school safety. Quantitatively, the effect of preschool on school safety is estimated in three ways. One approach demonstrates that when student achievement is higher by 0.30 standard deviations, physical attacks on teachers fall by 10 percentage points (i.e. by 19%). The other two approaches show that school safety would be enhanced by 42-63 percentage points, i.e. school safety rises by 19%, assuming preschool enrollment is 40% higher.

Changes in Income

Expanded participation in ECE will affect tax revenues in two ways. First, expanded ECE participation will free up some parents to enter the labor market, or work more hours. Second, ECE participation studies have found that ECE increases high school graduation rates, thus increasing student earnings.

Analysis of the High/Scope Perry Pre-School program shows that the present value gains from parental participation in the labor market yielded incomes of $963 (Barnett et al., 2004). This impact is the total additional income expected per parent, as a result of the extra time to work due to more comprehensive child care opportunities.

Several studies have discussed the fiscal impacts of ECE program in terms of future earnings of participants. Chicago Child-Parent Centers Study shows that the program reduces the high school drop-out rate by 24%. For the High/Scope Perry Pre-School program, the reduction in drop-out rate is almost exactly the same, at 25% (Barnett et al., 2004).
Crime
Economic evaluations of longitudinal data from preschool programs have found that the largest returns to society result from reduced criminal activity (Reynolds et al., 2002; Barnett et al., 2004). ECE program participants report lower juvenile crime, adult crime, and spend less time on probation or in prison (Belfield, 2004).

A study by Barnett (2004) found that the lifetime cost-savings to the criminal justice system per participant in the High/Scope Perry Pre-School program are $47,000 (discounted at 7%). Another study by Lochner and Moretti (2004) finds that each additional male graduate yields annual social benefits of between $1,170 and $2,100 (including victim costs). The Chicago Child-Parent Center program study of over 1,000 youths in Chicago, reports average present value gains to the criminal justice system from reductions in juvenile and adult crime of $6,000 per participant.

Although intangible crime impacts were not considered within the scope of this study, they should not go undiscussed. There are direct effects of preschool programs on crime rates, and only considering the justice system costs of these crimes tells only part of the story. The High/Scope Perry program saw dramatic effects of preschool across all categories of crime. Applying these reductions to the crime rates of Cincinnati can help demonstrate these qualitative impacts. The Perry preschool program determined lifetime reductions in arrests of 50.0% for violent crime arrests, 37.9% in property crime arrests, and 58.9% in drug crimes. Extrapolating these numbers to Cincinnati’s crime rate implies a potential reduction in crime as illustrated in table 2 (assumes 70% take up rate, 47 year crime life).

<table>
<thead>
<tr>
<th>Crime</th>
<th>Cincinnati Reports</th>
<th>Projected Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murder and non-negligent manslaughter</td>
<td>46</td>
<td>0.26</td>
</tr>
<tr>
<td>Forcible rape</td>
<td>188</td>
<td>1.05</td>
</tr>
<tr>
<td>Robbery</td>
<td>1,725</td>
<td>9.63</td>
</tr>
<tr>
<td>Aggravated assault</td>
<td>928</td>
<td>5.18</td>
</tr>
<tr>
<td>Burglary</td>
<td>5,483</td>
<td>23.21</td>
</tr>
<tr>
<td>Larceny-theft</td>
<td>11,590</td>
<td>49.07</td>
</tr>
<tr>
<td>Motor vehicle theft</td>
<td>1,100</td>
<td>4.66</td>
</tr>
</tbody>
</table>

Health Care and Social Services
Apart from behavioral and academic advantages of preschool programs, there are also health gains associated with screening, immunization, and nutrition, which may be delivered directly through the program or as a result higher family incomes. A study by Reynolds et al (2002) found very strong impacts on child welfare: court petitions of child maltreatments by age 17 were reduced by 52% as a result of preschool participation. The study also estimated the cost-savings from reduced abuse/neglect of children; per child, the cost-savings in this domain have been estimated at $338.
The methodology employed by the Economics Center generally mirrors that used by Clive Belfield in his analysis of the economic benefits of preschool in the State of Ohio. Belfield’s calculations are not only specific to the State of Ohio, but also analyze the application of estimates from a variety of sources. By employing a variety of studies to estimate the benefits, Belfield determines a more robust set of estimates than any single study. In other words, because many of these estimates are calculated according to the results of multiple studies, Belfield’s methods are more likely to be in line with the impacts that will accrue due to such a provision in Cincinnati.

Population:

<table>
<thead>
<tr>
<th>Table 3: Critical Population Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Single Eligible Cohort of Cincinnati Preschool Promise</td>
</tr>
<tr>
<td>Projected Kindergarten Ready 3 Year Olds (KRA-L)</td>
</tr>
<tr>
<td>At Risk Students</td>
</tr>
<tr>
<td>Projected to Utilize Program in Full Swing</td>
</tr>
<tr>
<td>Projected Kindergarten Enrollment Cohort at CPS</td>
</tr>
<tr>
<td>CPS Special Education Students per Cohort</td>
</tr>
<tr>
<td>CPS Students Held Back Per Cohort</td>
</tr>
</tbody>
</table>

Take up rate:
The take up rate (or percent of eligible children who use the program) is based off of Denver’s preschool program, which currently provides preschool to nearly 70% of Denver’s 4-year-olds. Denver is considered a peer city to Cincinnati by the Cincinnati USA Regional Chamber because its population and demographics are relatively similar to those of Cincinnati. Denver’s take up rate falls just shy of state-level programs in Florida (79%) and Oklahoma (74%).

CALCULATIONS

Criminal Justice System Cost Savings:

Barnett found that lifetime cost-savings to the criminal justice system were $47,000 in 2004 dollars, per participant. First, the Economics Center adjusted this 2004 estimate to 2013 dollars using data from the Bureau of Labor Statistics. Next, the appropriate population was identified. Though the numbers from this study were per participant, the High/Scope Perry Program specifically targeted extremely at-risk youth. Thus, it is unfair to generalize these results to the entire population of the Cincinnati Preschool Promise. To calculate this population, the dropout rate of CPS was applied to the 2,100 determined to
be at-risk (i.e. those children who are not kindergarten ready). These numbers were then multiplied together.

Reynolds et al. (2002) found average lifetime crime savings of $6,000 per enrollee in the Chicago Program. This number was adjusted to 2013 dollars and then applied to one entire cohort entering this program. Once both calculations were complete, the aggregate reductions in costs to the criminal justice system were averaged to determine the likely benefits.

**Increased Income and Sales Tax Revenues:**

Barnet et al. (2004) found an increase in parental earnings during the High/Scope Perry program of $963. Belfield (2004), determined that the adjusted value of these earnings for a two-year program (such as the Preschool Promise) was $1,445 per parent. This number is an average for all parents including those parents with multiple children, but only applies to the portion of the population without current provisions of preschool. Thus, this per parent value was multiplied by the total population of three-year-olds in Cincinnati, then deflated by 25% to account for those children already in preschool. Following this, the total increase in earnings was multiplied by the combined average tax rates (state, county, and local) for the average earnings in Cincinnati. Sales tax was calculated by using the total income and subtracting income taxes, then multiplying this value by the percentage of expenditures that are taxable under Ohio law (34%), and then multiplied by the sales tax rate.

The methodology for the increase in future earnings of students was similar, but the stream of earnings calculation was more complex. To calculate the present value of the change in earnings due to preschool education, the following methodology was employed. A variety of estimates for the reduction in dropout rates exist in the literature, but the majority of these specify a rate around 24%. This rate of reduction was multiplied by the dropout rate of CPS students (34%) and by the number of at risk students to determine how many students would complete high school because of the Preschool Promise. To calculate the total impact, Census data on average earnings in the City of Cincinnati was used. The difference in earnings of a high school dropout and an individual with a high school diploma or equivalent was calculated and adjusted to 2013 dollars. This difference was multiplied by the number of years in the average working life (estimated to be 47 years) to determine the present value of these earnings. The same methods as detailed for parental taxes were then applied to determine the impact on income and sales tax collections.

**Reduction in School Costs:**

By increasing rates of academic achievement and improving student social skills universal preschool ultimately reduces the need for special education resources. Further, students are withheld less often when they have a pre-school education.

Special education student enrollment was based off of 2013 CPS statistics. Special education rates were calculated for all CPS students then multiplied by the number of students currently enrolled in CPS kindergarten. The projected Special Education kindergarten students were then multiplied by the Ohio average annual difference in cost between a special education student and a typical student in 2013 dollars (Belfield, 2004). This total annual special education cost was then multiplied by the representative reduction in incidence of special education for the annual savings to special education budgets (Belfield, 2004). Ultimately, these savings were multiplied by the 13 years students spend in school (K-12).
Mary Ronan at CPS provided the Economics Center with data about total expenditures due to student withholding. This expenditure was multiplied by a representative reduction in the incidence of grade repetition (12%: Belfield, 2004).

**Reduction in Teacher Costs due to Student Behavior:**
*For a detailed description of these expenditures and their basis in scientific literature, see Belfield, 2004.*

The procedure outlined in Belfield’s report for the State of Ohio was followed and numbers were adjusted to 2013 dollars. For expenditures on employee turnover and teacher absenteeism, the Cincinnati Public Schools 2013 approved budget was used. State level programs were converted to Cincinnati level expenditures by multiplying by the ratio of CPS students to Ohio public school students.

The following were considered:
- Teacher-related savings in:
  - Pay to compensate for unpleasant working conditions
  - Hiring costs associated with increased teacher turnover
  - Substitution costs associated with teacher absenteeism
  - Professional development related to student behavior
- School-wide savings in:
  - Security, policing, and custodial services to ensure safety
  - Substance abuse, truancy, and absenteeism operations/programs in relation to low achievement
  - Expenditures associated with theft and damage to property
- System-wide savings in:
  - State programs to raise student achievement

**Health Care and Social Services:**
*For detailed description of these expenditures and their basis in scientific literature, see Belfield, 2004.*

Belfield’s 2004 aggregation of Ohio’s reduction in expenditures on health and welfare for children was adjusted for Cincinnati using the ratio of students in CPS to the number of public school students in the State of Ohio.

The following state investments were considered (as identified by Belfield from the Office of Budget Management in the Children’s Budget (2004)): ensuring children are ready for school, those for at-risk children to succeed in school, Services for Severely Emotionally Disturbed and At-Risk Children and Youth, Child Protection Services, Child Foster Care and Adoptions, Youth Choose Healthy Behaviors, and school breakfasts and lunch.
Overall, the Cincinnati Preschool Promise program will provide substantial economic benefits to the Cincinnati region. The maximum annual benefit that will accrue to the Cincinnati region is nearly $70 million, assuming that all Cincinnati three-year-olds receive two years of quality preschool and all 2,100 at-risk children become kindergarten-ready. However, if only 70% of children (including 70% of at-risk children) enroll in quality preschool (a more realistic figure based on rates of enrollment in universal preschool programs, such as the Denver Preschool Program), then the annual benefits are closer to $49 million. Using this enrollment rate, the Economics Center projects total enrollment of 3,738 three-year-olds per year, or 70% of three-year-olds in the City of Cincinnati.

<table>
<thead>
<tr>
<th>Table 4: Cincinnati Preschool Promise Benefits per Enrollee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Student Estimate</td>
</tr>
<tr>
<td>Parental Taxes</td>
</tr>
<tr>
<td>Health Care and Social Services</td>
</tr>
<tr>
<td>Reduction in School Costs</td>
</tr>
<tr>
<td>Reduction in Teacher Costs</td>
</tr>
<tr>
<td>Reduced Crime</td>
</tr>
<tr>
<td>Student Taxes (based on 47 year work life)¹</td>
</tr>
<tr>
<td><strong>Total Benefits</strong></td>
</tr>
</tbody>
</table>

Estimates of the Economic Benefits per student enrolled in the program show that under a variety of cost structures, the average benefits per student will outweigh the costs. Savings in costs to the justice system are by far the largest single category of cost savings ($7,735), followed by increased tax revenues from student earnings and reduction in school costs.

How benefits accrue over time is a critical consideration for funding city-wide preschool. Because preschool is argued to be offset by specific cost categories, the Strive Partnership should consider funding from the recipients of these benefits.

¹ Economics Center, 2008
**BENEFITS ACCRUAL TIMELINE** (per enrollee)

1. **PARENTAL TAXES** $281
2. **HEALTH CARE AND SOCIAL SERVICES** $218
3. **REDUCTION IN SCHOOL COSTS** $2,060
4. **DECREASED COST OF HIRING AND KEEPING TEACHERS DUE TO STUDENT BEHAVIOR** $378
5. **REDUCED COSTS TO SOCIETY FROM REDUCED CRIME RATES** $7,735
6. **STUDENT TAXES** $2,269

**COSTS < PARENTAL TAX + HEALTH AND SOCIAL + SCHOOL + TEACHERS+ CRIME + STUDENT TAX**

$XXXX < $281 + $218 + $2,060 + $378 + $7,735 + $2,269

**COSTS < BENEFITS**

$XXXX < $12,942
Table 5: Cost Benefit Comparison Per At-Risk Enrollee (2013 dollars)

<table>
<thead>
<tr>
<th></th>
<th>Cincinnati Preschool</th>
<th>Abecedarian</th>
<th>Belfield Est.</th>
<th>High/Scope</th>
<th>Chicago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxes*</td>
<td>$6,486</td>
<td>$10,652</td>
<td>$4,003</td>
<td>$19,005</td>
<td>$10,357</td>
</tr>
<tr>
<td>Earnings*</td>
<td>$28,410</td>
<td>$45,145</td>
<td>--</td>
<td>$85,410</td>
<td>$31,443</td>
</tr>
<tr>
<td>Welfare</td>
<td>$555</td>
<td>$253</td>
<td>$710</td>
<td>$3,737</td>
<td>$1,101</td>
</tr>
<tr>
<td>Health/Smoking</td>
<td>--</td>
<td>$22,937</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Education*</td>
<td>$6,201</td>
<td>$913</td>
<td>$6,940</td>
<td>$9,859</td>
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<tr>
<td>Justice System</td>
<td>$19,669</td>
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<td>$10,770</td>
<td>$40,560</td>
<td>$18,958</td>
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<tr>
<td>Crime (intangible)</td>
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<td>--</td>
<td>$190,928</td>
<td>$28,855</td>
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<td>Child Care</td>
<td>--</td>
<td>$35,619</td>
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<td>--</td>
<td>--</td>
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<tr>
<td>Maternal Employment</td>
<td>--</td>
<td>$88,659</td>
<td>--</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Cost</td>
<td>--</td>
<td>$81,884</td>
<td>$11,764</td>
<td>$20,474</td>
<td>$9,570</td>
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<tr>
<td>Economic Benefits</td>
<td>$32,910</td>
<td>$47,437</td>
<td>$22,423</td>
<td>$73,161</td>
<td>$36,853</td>
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<td>Aggregate Benefits</td>
<td>--</td>
<td>$204,179</td>
<td>--</td>
<td>$349,499</td>
<td>$97,150</td>
</tr>
<tr>
<td>Population</td>
<td>2,100</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Economic Benefits</td>
<td>$69,110,989</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Benefit/Cost</td>
<td>--</td>
<td>0.6</td>
<td>1.9</td>
<td>3.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Aggregate Benefit/Cost</td>
<td>--</td>
<td>2.5</td>
<td>--</td>
<td>17.1</td>
<td>10.2</td>
</tr>
</tbody>
</table>

*Represents a combination of categories for comparison purposes.

**LIMITATIONS**

This report does not consider several critical facets of the potential benefits of the Cincinnati Preschool Promise. First and foremost, this report does not consider the percent of students using the Cincinnati Preschool Promise who will move outside of the City of Cincinnati. If a high portion of the at-risk population proceeds to move out of the City of Cincinnati at any point after the preschool investment, the City of Cincinnati will see no reduction in costs but a reduction in the benefits accruing locally. Contrary to this consideration is the inflow of students who have already had a publicly financed preschool education in other cities. In the absence of superior data on this flow of population, the Economics Center assumes that these effects will cancel each other out.

Further, establishing a successful, quality preschool program in Cincinnati could feasibly alter the demand for living in the City of Cincinnati. If more residents remain in or move to Cincinnati because of this program, total benefits of the program could potentially be higher.
CONCLUSION

Assuming all Cincinnati three-year-olds, including all 2,100 at-risk three-year-olds, enroll in this program, each cohort will provide public benefits of $69.1 million. In reality, based on success of the Denver Preschool Program, the Economics Center expects to see 70% of three and four year olds utilize the Cincinnati Preschool Promise. Assuming this 70% take up rate is the same for the at-risk population, Cincinnati Preschool Promise should expect to enroll 3,739 students annually (including 1,470 at-risk students) and see aggregate economic benefits of $48.4 million over the working lifetime of each cohort of students.

This study assumes that these at-risk individuals will enroll in programs of quality tantamount to those referenced in the research (likely 4 or 5 star rated programs). This consideration should be influential in determining appropriate structure of subsidies to low-income families, because to the extent that fewer students of this population enroll, or that these families opt for lower quality education, the total lifetime economic benefits will decrease. Little analysis has been completed on the sensitivity of these findings, so it is nearly impossible to make claims on the impact of full- versus half-day enrollment, as well as to what extent student enrollment in lower quality preschool will impact total benefits.

Though cost analysis has not yet been performed by the Economics Center, these findings strongly suggest that the costs of such a program will more than be repaid in terms of future benefits. The ongoing challenges for the Cincinnati Preschool Program will be several fold, first, determining the appropriate incentive structure of subsidy payments to maximize the enrollment of the at-risk population (maximize benefits) and to minimize the program costs allocated for higher income families. Second, though the Cincinnati Preschool Promise will more than pay for itself, designing and securing appropriate financing for this program will be a challenge since the benefits of the program will accrue over such a vast period of time and to many different entities.
REFERENCES


APPENDIX – LONGITUDINAL STUDIES OF EARLY CHILDHOOD EDUCATION

Prevailing research focuses on three major studies of the impact of early childhood education on educational and adult outcomes. Though there are a multiplicity of studies that analyze such impacts, all of these studies generally rely on data from three major early childhood education programs. The reason behind this is largely the cost and difficulty of monitoring a cohort of preschoolers across their entire lives. Thus, estimates of impacts of similar programs today are largely speculative as the total impact cannot truly be measured until these three-year-olds have finished their careers. Though each program differs in the specifics of its implementation, each targeted low-income, largely African American populations. These programs did not merely focus on direct educational interventions, but also sought to provide a comprehensive support system for these children, as well as their families.

<table>
<thead>
<tr>
<th>Year Initiated</th>
<th>City</th>
<th>City Population</th>
<th>Enrollees</th>
<th>Child:Teacher Ratio</th>
</tr>
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<tbody>
<tr>
<td>Abecedarian</td>
<td>Ypsilanti, MI</td>
<td>19,321</td>
<td>123</td>
<td>5:1</td>
</tr>
<tr>
<td>Chicago CPC</td>
<td>Chicago, IL</td>
<td>2,715,000</td>
<td>1,539</td>
<td>17:2</td>
</tr>
<tr>
<td>High/Scope Perry</td>
<td>Chapel Hill, NC</td>
<td>58,424</td>
<td>111</td>
<td>3:1</td>
</tr>
</tbody>
</table>

**The Abecedarian Project**

The Abecedarian Project was comprised of a population that was 98% African American, and defined as at risk based on low maternal education. This program was unique in its implementation in that its students were enrolled at an average age of 4.4 months. The duration of the program was five years, with educational programming provided six to eight hours per day, five days per week. In addition to the educational components of the program, nutritional supplements, social services, and health care were provided to ensure that these factors did not control the outcome. The program used a control trial methodology to determine the impact.

**Chicago Child Parent Centers**

The enrolling population for this longitudinal study was all students who received educational services from the Chicago Child Parent Centers who enrolled in 1979. These students were from low income, minority families. These children also lived in the highest poverty areas of the city. This program is particularly unique in its size and comprehensiveness. The program provided support for these children as well as their families from ages three to nine.

**High/Scope Perry Project**

The High/Scope Perry project targeted predominantly African American children whose parents had low educational attainment and low income. This program consisted of 2.5 hours per day of educational interventions in the center setting and 1.5 hours of home visitation per day. In addition, parental support was also provided in the format of larger group meetings. The High/Scope Perry Project used a randomized control trial to determine the impact of the program on its students.
ABOUT THE ECONOMICS CENTER

The Research and Consulting division of the Economics Center provides the knowledge building blocks that help clients make better policy and economic development decisions. Our dynamic approach and critical data analysis empower leaders to respond to changing economic conditions, strengthen local economies and improve the quality of life for their communities.

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