Economics of Early Education

Benefits and Costs of Quality Early Childhood Education

Presentation to the Speaker’s Task Force on 4-year-old Kindergarten
July 17, 2006

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Impacts of Quality Early Education

**Increases Educational Success and Adult Productivity**
- Increases cognitive abilities and achievement
- Improves social behavior
- Increases educational attainment
- Increases employment, earnings, and tax revenue

**Decreases Costs of Government**
- Lower schooling costs
- Lower social services costs
- Lower crime costs
- Lower health care costs
# Three Benefit-Cost Analyses with Disadvantaged Children

<table>
<thead>
<tr>
<th></th>
<th>Abecedarian</th>
<th>Chicago</th>
<th>High/Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year began</td>
<td>1972</td>
<td>1985</td>
<td>1962</td>
</tr>
<tr>
<td>Location</td>
<td>Chapel Hill, NC</td>
<td>Chicago, IL</td>
<td>Ypsilanti, MI</td>
</tr>
<tr>
<td>Sample size</td>
<td>111</td>
<td>1,539</td>
<td>123</td>
</tr>
<tr>
<td>Design</td>
<td>RCT</td>
<td>Matched neighborhood</td>
<td>RCT</td>
</tr>
<tr>
<td>Ages</td>
<td>6 wks-age 5</td>
<td>Ages 3-4</td>
<td>Ages 3-4</td>
</tr>
<tr>
<td>Program schedule</td>
<td>Full-day, year round</td>
<td>Half-day, school year</td>
<td>Half-day, school year</td>
</tr>
</tbody>
</table>
### High/Scope Perry Preschool: Educational Effects

<table>
<thead>
<tr>
<th></th>
<th>Program group</th>
<th>No-program group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduated from high school on time</td>
<td>66%</td>
<td>45%</td>
</tr>
<tr>
<td>Age 14 achievement at 10th %ile +</td>
<td>49%</td>
<td>15%</td>
</tr>
<tr>
<td>Special Education (Cog.)</td>
<td>34%</td>
<td>15%</td>
</tr>
</tbody>
</table>

- Graduated from high school on time: Program group 66%, No-program group 45%.
- Age 14 achievement at 10th %ile +: Program group 49%, No-program group 15%.
- Special Education (Cog.): Program group 34%, No-program group 15%.
High/Scope Perry Preschool: Economic Effects at Age 27

- Program group
- No-program group

- Earn $2,000 + monthly
  - Program group: 29%
  - No-program group: 7%

- Own home
  - Program group: 36%
  - No-program group: 13%

- Never on welfare as adult
  - Program group: 41%
  - No-program group: 20%
High/Scope Perry Preschool: Economic Effects at 40
Source: Schweinhart et al., 2005

Program group
No-program group

- Earned > $20K
  - Program group: 60%
  - No-program group: 40%

- Employed
  - Program group: 76%
  - No-program group: 62%

- Had Savings Account
  - Program group: 76%
  - No-program group: 50%
High/Scope Perry Preschool: Arrests per person by age 27

Program

- Felony: 0.7
- Misdemeanor: 1.2
- Juvenile: 0.5

Total: 2.3 arrests

No program

- Felony: 1.5
- Misdemeanor: 2.5
- Juvenile: 0.6

Total: 4.6 arrests
Perry Preschool: Crime Effects at 40
Source: Schweinhart et al. 2005

- **Drug Crime**
  - Program group: 14%
  - No-program group: 34%

- **Violent Crime**
  - Program group: 33%
  - No-program group: 48%

- **Arrested > 5X**
  - Program group: 36%
  - No-program group: 55%
Abecedarian : Academic Benefits

- Special Education: Program group 25%, No-program group 48%
- Grade Repeater: Program group 31%, No-program group 55%
- HS Graduation: Program group 67%, No-program group 51%
- 4 Yr College: Program group 13%, No-program group 36%
Abecedarian Reading Ach. Over Time

![Abecedarian Reading Achievements Over Time Graph](image-url)

- **AGE (Years)**
- **READING SCORE**
- **TREATMENT**
- **CONTROL**
Abecedarian Math Achievement Over Time

The graph shows the MATH SCORES of two groups: TREATMENT (red line) and CONTROL (blue line) over different ages. The x-axis represents AGE (Years) ranging from 8 to 22, and the y-axis represents MATH SCORES ranging from 80 to 105. The TREATMENT group generally has higher scores compared to the CONTROL group, with a noticeable downward trend as age increases.
Chicago CPC: Academic and Social Benefits at School Exit

- **HS Graduation**: Program group (50%), No-program group (39%)
  - Program group: 25%, No-program group: 17%

- **Special Education**: Program group (23%), No-program group (25%)
  - Program group: 14%, No-program group: 25%

- **Grade Repeater**: Program group (23%), No-program group (38%)
  - Program group: 17%, No-program group: 23%

- **Juvenile Arrest**: Program group (25%), No-program group (25%)
  - Program group: 17%, No-program group: 23%
# Economic Returns to Pre-K for Disadvantaged Children

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Benefits</th>
<th>B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perry Pre-K</td>
<td>$16,264</td>
<td>$277,631</td>
<td>17.07</td>
</tr>
<tr>
<td>Abecedarian</td>
<td>$36,929</td>
<td>$139,571</td>
<td>3.78</td>
</tr>
<tr>
<td>Chicago</td>
<td>$ 7,417</td>
<td>$ 52,936</td>
<td>7.14</td>
</tr>
</tbody>
</table>
Perry Preschool

Costs

- Program Cost: $15,386
- Employment: $79,743
- K-12 Schooling: $8,556
- Child Care: $919
- Welfare: $774

Benefits

- Crime: $173,959

Total Program Cost: $15,386
Abecedarian

Costs

Program Cost $63,476

Benefits

Maternal Employment $68,728

Future Employment $5,722

K-12 Schooling $8,836

Health Smoking $17,781

Child Care $27,612

Employment $37,531

Welfare $196

Maternal Employment $68,728
Chicago CPC

Costs

- Child Care: $1,878
- K-12 Schooling: $5,521
- Crime: $15,023
- Abuse/Neglect: $338
- Welfare: $535
- Child Care
- Program Cost: $7,584

Benefits

- Employment: $31,459
- Program Cost: $7,584
Could Universal Pre-K Produce Similar Benefits for the Middle Class?

Middle class children have fairly high rates of the problems that preschool reduces for low-income children.

Reducing these problems could generate large benefits.

<table>
<thead>
<tr>
<th>Income</th>
<th>Retention</th>
<th>Dropout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest 20%</td>
<td>17%</td>
<td>23%</td>
</tr>
<tr>
<td>20-80%</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>Highest 20%</td>
<td>8%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Cognitive Readiness Gap—Half as Big at Median as for the Poor (bottom 20%)
Social Readiness Gap—Half as Big at the Median as for the Poor (bottom 20%)
Effects of Today’s Programs

- Two new rigorous studies
- Large scale (state) public programs
- One year of quality public Pre-K at 4
- Effects of *policy* at entry to Kindergarten
- Universal and targeted programs
- Standardized tests
- Estimate effects by income and ethnicity
Oklahoma’s Universal Pre-K

- 3,028 children in Tulsa public schools
- Rigorous RD design
- Gains for all SES & ethnic groups
- Literacy and Math gains
  - Smaller than Perry and Abecedarian
  - Similar to CPC
- Larger gains for minority and poor children

Source: Gormley et al. (2004). CROCUS/Georgetown University
NIEER Evaluation of 5 State Pre-K Programs

- 5,071 children in 5 States
- OK and WV are universal
- MI, NJ, & SC targeted
- Gains from Pre-K in all 5 states
- Gains in language, literacy & math
- All children gain, low-income gain more

Source: Barnett et al. (2005). NIEER/Rutgers University
# Oklahoma 4th Grade NAEP Scores Before and After UPK

<table>
<thead>
<tr>
<th>YEAR</th>
<th>White</th>
<th>Black</th>
<th>Hisp.</th>
<th>Indian</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 Read</td>
<td>220</td>
<td>188</td>
<td>197</td>
<td>209</td>
</tr>
<tr>
<td>2003 Read</td>
<td>220</td>
<td>195</td>
<td>200</td>
<td>206</td>
</tr>
<tr>
<td>2005 Read</td>
<td>219</td>
<td>196</td>
<td>204</td>
<td>211</td>
</tr>
<tr>
<td>2000 Math</td>
<td>229</td>
<td>205</td>
<td>207</td>
<td>221</td>
</tr>
<tr>
<td>2003 Math</td>
<td>235</td>
<td>211</td>
<td>220</td>
<td>225</td>
</tr>
<tr>
<td>2005 Math</td>
<td>240</td>
<td>217</td>
<td>226</td>
<td>229</td>
</tr>
</tbody>
</table>

Reading gains are not statistically significant; math gains are statistically significant for Whites and Hispanics (2000-05).
Georgia 4th Grade Math NAEP Scores Before and After UPK

<table>
<thead>
<tr>
<th>YEAR</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>224</td>
<td>201</td>
<td>205</td>
</tr>
<tr>
<td>2000</td>
<td>230</td>
<td>204</td>
<td>217</td>
</tr>
<tr>
<td>2003</td>
<td>241</td>
<td>217</td>
<td>219</td>
</tr>
<tr>
<td>2005</td>
<td>243</td>
<td>221</td>
<td>229</td>
</tr>
</tbody>
</table>

Gains from before to after UPK are statistically significant.
Georgia 4th Grade Reading NAEP Scores Before and After UPK

<table>
<thead>
<tr>
<th>YEAR</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>221</td>
<td>191</td>
<td>Not Avail.</td>
</tr>
<tr>
<td>2002</td>
<td>226</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>2003</td>
<td>226</td>
<td>199</td>
<td>201</td>
</tr>
<tr>
<td>2005</td>
<td>226</td>
<td>199</td>
<td>203</td>
</tr>
</tbody>
</table>

Gains from 1998 to 2005 are statistically significant.
Is Targeting More Cost-Effective?

Targeting is costly and imperfect
  - Poverty is a moving target
  - Need is not defined by targeting alone
  - Targeting is not perfect

Benefits do not stop at the poverty line
  - Middle class has similar problems
  - Benefits decrease gradually with income
Economic Comparison of Targeted and Universal Pre-K

- Targeted Programs Have Lower Total Cost
- Universal Programs Have Higher Benefits
  -- they can reach more of the target children
  -- greater diversity in the classroom increases gains for disadvantaged children
  -- some benefits gained for all or most children

Under Plausible Assumptions Universal is Better Investment

High Quality Preschool Programs Needed to Produce Benefits

- Well-educated preschool teachers
- Adequate teacher compensation
- Small classes and reasonable teacher:child ratios
- Strong supervision
- High standards and accountability
Conclusions

- Preschool can be a sound investment
- Returns depend on who is served
- Returns depend on effective education
- Context matters also
- Universal can be more cost-effective