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Preschool and Prosperity*

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Abstract

Substantial research shows that high-quality early childhood education programs have a large economic payoff. This payoff is increased earnings for former child participants, increased earnings for parents, and increased earnings for all workers when average worker skills improve. A program package of universal pre-K, combined with child care and parenting support for all low-income families, would cost \$80 billion annually. But each dollar invested in this package would yield future economic benefits of over 10 times as great.

Key Words: Early childhood education, preschool, prekindergarten, pre-K, child care, parenting programs, skill spillovers, benefit-cost analysis

*This policy brief summarizes my book, *From Preschool to Prosperity: The Economic Payoff to Early Childhood Education*. Where not otherwise noted, all figures and assertions of facts in this policy brief are documented in the full book. All references in the endnotes are taken from the book, and full citations to sources can be found there.

Preschool and Prosperity

WHY PRESCHOOL FOR PROSPERITY?

Research shows that universal pre-kindergarten (pre-K) for all 4-year-olds, coupled with child care and parenting programs for low-income children from birth through age 5, would create large economic benefits. A full-scale national investment in these early childhood programs would cost \$80 billion annually, or 2 percent of overall taxes. However, the future economic benefits would be 10 times as great.

The economic benefits of early childhood education occur in three ways: effects on former child participants, effects on parents, and spillover benefits for other workers. First, early childhood education increases the adult earnings of former child participants, by increasing their skills. One year of full-day pre-K can increase adult earnings by 10 percent. More intensive child care and pre-K from birth to age 5 can increase adult earnings by 25 percent.

Second, early childhood education helps increase parents' earnings. Free child care allows more parental work and education. Parenting programs also empower parents to improve their own life situation. Research shows that high-quality child care and parenting programs often provide earnings benefits to parents of a similar order of magnitude to benefits for former child participants.

Third, better skills of former child participants and parents lead to increased wages for other workers. My employer will be better able to pay me high wages if my co-workers are skilled, because then my employer can more easily introduce new technologies. My employer's competitiveness also increases if my employer's suppliers

have better-skilled workers. Finally, in local economies such as Silicon Valley, my employer gains new ideas and skilled workers from other employers. These “skill spillovers” are large enough to more than double the direct effects of early childhood programs on earnings.

An \$80 billion annual investment in universal pre-K, and early child care and parenting programs for all low-income families, would boost the lifetime earnings of former child participants by over \$200 billion.¹ Earnings benefits to parents would add at least another \$100 billion. Earnings benefits for other workers would increase total economic benefits to over \$800 billion.

Even if I feel that my child does not need government support for early childhood education, investing in “other people’s children” can benefit me and my child by boosting our wages. We’re all in this economy together.

WHAT DOES THE RESEARCH SAY AND WHY IS IT CREDIBLE?

Rigorous research shows that high-quality early childhood programs can build children’s skills and increase their lifetime earnings. This research is credible because many studies use good comparison groups. Child participants in early childhood programs are compared to otherwise similar non-participants. This comparability means that differences in outcomes, such as earnings or test scores, between the two groups are due to the program, not to these groups’ pre-existing differences. While random assignment is considered the gold standard to ensure good comparison groups, “natural experiments”—natural accidents that result in similar groups having different access to early childhood programs—also provide good comparison groups.

Random-Assignment Studies

The most-cited research on preschool comes from random-assignment studies of experimental income-targeted preschool programs: Perry Preschool, the Abecedarian Program, and the Nurse-Family Partnership (NFP). Perry, a half-day pre-K program at ages 3 and 4 that operated in Ypsilanti, Michigan from 1962 to 1967, increased lifetime earnings of former child participants by 19 percent.² Abecedarian, a full-time, full-year child care and pre-K program from birth to age 5 that operated in North Carolina in the 1970s, helped former child participants to significantly increase adult educational attainment and employment rates.³ These effects predict average lifetime earnings increases of 26 percent.⁴ The Nurse-Family Partnership, a parenting program, led to improved test scores and reduced crime for former child participants; these effects predict average lifetime earnings increases of three percent.⁵ Abecedarian and the Nurse-Family Partnership also show evidence of strong benefits for parental earnings.

Although these studies had small sample sizes and focused on programs run many years ago, they show early childhood programs had significant benefits, and their methodology meets the highest standards of social science research. Furthermore, these studies have enough similarities to current early childhood programs to remain relevant. NFP is currently active. The Abecedarian program is similar to today's Educare program, sponsored by the Buffett Early Childhood Fund and the Ounce of Prevention Fund. Although Perry had smaller class sizes than many current pre-K programs, and operated at both ages 3 and 4, many current pre-K programs are similar to Perry in using trained teachers and a well-developed curriculum. As discussed below, current pre-K programs

also boost former participants' future earnings, although perhaps not by as high a percentage as Perry.

Other Direct Evidence of Long-Term Economic Benefits of Early Childhood Education: the Chicago Child Parent Centers and Head Start

The Chicago Child-Parent Centers (CPC) and Head Start are income-targeted programs where researchers have used natural experiments to compare program participants with nonparticipants.

The CPC studies compare children in otherwise similar neighborhoods that differed in access to the CPC program, a high-quality half-day pre-K program at ages 3 and 4.⁶ Long-term follow-up on these children from similar neighborhoods suggests that CPC boosted adult earnings by 8 percent.⁷

Evidence regarding Head Start's long-term effects comes from two types of studies with good comparison groups—geographic natural experiments and comparisons of siblings, one of whom participated in Head Start while the other did not. A 2007 study compares long-run outcomes for children in counties that adopted Head Start in its early years and children from otherwise similar counties that did not. Children in early-adopter Head Start counties showed lower mortality rates and higher educational attainment later than children from otherwise similar counties.⁸

Siblings who did not participate in Head Start make a good comparison group because they have similar unobserved family characteristics, making it more likely that differences in their adult outcomes are due to Head Start participation.

A 2009 sibling comparison study found Head Start effects on adult outcomes that predict an average lifetime earnings increase of 11 percent.⁹

Research on State Pre-Kindergarten

In recent years, state pre-K programs have significantly expanded. From 2002 to 2013, the percentage of all U.S. 4-year-olds in state pre-K programs doubled, from 14 percent to 28 percent. As of 2012–13, state pre-K programs served 1.3 million children, at an annual cost of over \$6 billion.¹⁰

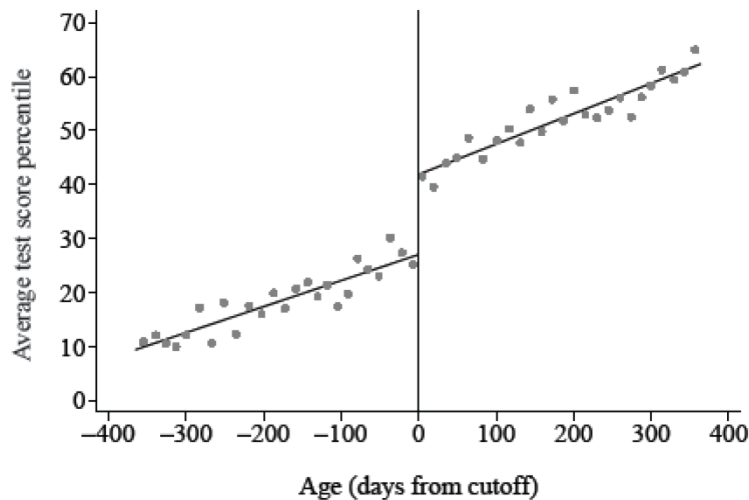
Evaluating state pre-K programs faces two challenges, but both challenges can be overcome. First, the large scale of these programs makes random assignment difficult. But variation in program access by geography or age can and has been used to examine program effects. Second, state pre-K programs are too recent to directly measure effects on adult outcomes. However, test score effects can predict adult earnings effects.

A good natural experiment is North Carolina's More at Four program, which provided state funds for full-day pre-K. Because More at Four was gradually rolled out to different counties, county differences in test scores can be related to county differences in More at Four funding.¹¹ Extrapolating test score effects implies a county that increased its More at Four enrollment from zero to 100 percent would increase future county earnings by 11 percent.¹²

Other state pre-K programs have been evaluated by seeing how test scores vary with age. Test scores are compared between students who just made the age cutoff for kindergarten and were already in pre-K for a year, versus students just a few days younger, who missed the kindergarten entry date and are just entering pre-K.¹³ Test scores mostly rise smoothly with age, but abruptly jump at the age cutoff between pre-K entrants and kindergarten entrants. This jump suggests that pre-K raises test scores.

Tulsa pre-K offers an example. [See below diagram.] The students to the left of the vertical line are too young to enter kindergarten and are just entering Tulsa pre-K. The students to the right of the vertical line are former Tulsa pre-K participants who are just entering kindergarten. All of these children were given the same test at the same time in the fall.¹⁴

How Test Scores of Tulsa Pre-K Entrants and Former Pre-K Students Vary with Age



SOURCE: Bartik, Gormley, and Adelstein (2012).

The Tulsa test score effects suggest that low-income children might have their adult earnings boosted by 10 percent. Similar studies of other state pre-K programs produce test score effects that predict adult earnings effects between 6 and 15 percent. The best results are for Boston's pre-K program, where test score effects predict adult earnings effects for low-income children of 15 percent.

Debating the Critics

Two criticisms of the research evidence for early education are:

- Test score increases among preschool participants fade quickly, by third grade or even earlier.
- Oklahoma and Georgia, two prominent states that have adopted large-scale pre-K, have not seen dramatic improvement in test scores.

Many early childhood programs show fading test score effects in the early elementary years, yet still significantly improve adult outcomes. Initial test score effects have proven to be better predictors of adult earnings than test scores at third grade, when effects have faded.¹⁵ This re-emergence of adult earnings effects may be due to social and character skills that are not measured by standardized tests.¹⁶

As for Oklahoma or Georgia, one state's test scores have a lot of noise. Any one state's test scores are so frequently buffeted by demographic and economic changes that detecting policy effects on test scores by comparing one or two states with other states is difficult. Better evidence is provided by studies with larger sample sizes of participants, for example the studies cited above that compare numerous individual participants with similar non-participants.

RESEARCH AND PRESCHOOL DESIGN

Which Early Childhood Programs Offer the Most Benefits for the Least Expense?

The table below compares program costs and benefits, in terms of adult earnings effects for former child participants from low-income families, of three well-researched early childhood programs.¹⁷

Per-Child Earnings Benefits versus Costs of Three Early Childhood Programs

	Full-day pre-K at age four	Educare	NFP
Earnings benefits	\$53,000	\$134,000	\$16,000
Program costs	\$10,000	\$87,000	\$11,000
Ratio of benefits to costs	5.3	1.5	1.5

NOTE: Benefits and costs are rounded to nearest thousand, in present-value 2012 dollars. Present value is calculated at age four for pre-K, at birth for Educare/NFP. All benefits and costs are average effects per child participant.

SOURCE: Author's calculations based on research, as described in text and endnotes of book.

Full-day pre-K at age 4 for low-income children shows the highest ratio of adult earning benefits to program costs, at over 5-to-1. Because 4-year-olds can be in larger groups than infants and younger children, pre-K can be more cost-effective than programs geared to younger children.

However, high-quality child care like Abecedarian or Educare and targeted parenting support like the Nurse-Family Partnership can increase parental earnings significantly. For these two programs, including parental earnings roughly doubles the ratio of the present value of earnings benefits to costs. Adding spillover effects of skill increases on the wages of other workers causes another doubling of benefits. Total ratios of the present value of earnings benefits to costs are around 13-to-1 for high-quality pre-K, 9-to-1 for Abecedarian/Educare, and 7-to-1 for NFP.

In addition to benefit-cost ratios, policymakers might want to consider which programs yield the largest benefits. Although pre-K yields a bigger “bang for the buck” than full-time child care from birth to age 5, the more expensive Educare approach yields higher lifetime benefits for former child participants.

What Makes Good-Enough Preschool?

While direct research on the effect of class size and teacher credentials on student learning has so far proved inconclusive, research shows that better interactions between

teacher and child produce test score gains.¹⁸ Common sense suggests that better teacher-child interactions are easier to attain if class sizes are smaller and teachers have better training. Pre-K programs with the most favorable evaluations (Perry, CPC, Tulsa, Boston) are or were staffed by teachers with bachelor's degrees and paid public school salaries, teaching modest average class sizes.

Even costly investments in preschool quality pay off with only modest effects on future earnings. A disadvantaged child can expect to earn more than \$500,000 in today's dollars over a lifetime. Even modest percent increases in these earnings, summed over an entire preschool class, and possibly over multiple years, adds up to large benefits.

Do Early Childhood Programs Only Pay Off for the Poor, or Do Middle-Class Children Benefit?

For Educare/Abecedarian-style child care programs from birth to age 5, low-income children benefit, but not middle-class children.¹⁹ For the Nurse-Family Partnership, research evidence also suggests benefits are restricted to lower-income families.²⁰ Middle-class families may have greater resources to replace such public services with good substitutes, such as private child care or their own parenting.

In contrast, for pre-K programs, benefits for middle-class and low-income children are similar, if we measure these benefits as the dollar boost in future earnings. The evidence is sparse, as most pre-K research has only included lower-income children. But the Tulsa and Boston pre-K programs boost test scores almost as much for middle-class children as for lower-income children.

These test score boosts would predict adult earnings benefits for middle-class children that are a large percentage of the dollar earnings benefits for lower-income

children: 70 percent in Boston, 90 percent in Tulsa.²¹ Middle-class families may not be able to easily replace pre-K's effects on social skills with their own resources, as high-quality pre-K can cost \$10,000 annually for a full-day program.

Even for pre-K, the percentage earnings boost for lower-income children would be much greater than for middle-class children. A similar dollar boost to future earnings means a larger percentage boost for lower-income children, as their expected future earnings would be lower.

SUMMING UP

How Can We Pay for This?

Universal pre-kindergarten is the most cost-effective of the three programs, and the broad benefits for middle-class voters mean it is most likely to be supported by state and local governments. For all states to implement universal pre-K for 4-year-olds at high quality would cost \$25 billion annually, which represents about 4 percent of current state and local spending on public education.

Federal support for pre-K is most needed to evaluate programs and provide teachers with mentors and training to improve quality. Federal support for evaluation would increase objectivity in evaluation results and encourage dissemination. Federal support for quality would help avoid the temptation to under-invest in quality.

Because the interests of the poor have limited clout in state and local policy, federal support would help fully fund income-targeted programs for child care (modeled on Educare) and parenting support (modeled on Nurse-Family Partnership). If such programs were run at a full-scale for all low-income families, this would cost about \$60

billion. While this is only a 4 percent increase in overall state and local taxes, this is hard to sell for a program which only directly benefits the poor.

In the long run, investments in pre-K pay for themselves, by increasing income tax receipts, reducing welfare spending, and reducing crime and criminal justice spending.²² But in the short-run, significant but affordable investments are required.

Why Invest in Preschool?

A large-scale investment in pre-K, child care for the poor, and parenting programs has economic benefits well worth the costs. Such an \$80 billion program package would both boost the overall economy, providing future economic benefits of over 10 times its costs, and also help reduce the problem of growing income inequality. Universal pre-kindergarten could be expected to raise earnings for the middle class by 5 percent, offsetting one-sixth of their lagging income growth over the last 30 years. Targeted child care and pre-K, like Educare, could offset five-sixths of the lagging income growth of the lowest fifth of wage earners.

Early childhood programs are not the only policies that might increase overall wages and reduce income inequality. But among policy alternatives, early childhood programs have some of the most extensive research evidence for success. Early childhood programs can be successful even if we don't solve all other social policy issues. For example, the Chicago CPC pre-K program increased adult earnings even though its participants subsequently attended Chicago Public Schools.

Early childhood investment is the good we know how to do. Given changes in the world economy, skills investment is more important than ever in allowing good wages. As our research knowledge has advanced, we understand more than before how adult

outcomes depend upon investments made in early childhood. Early childhood investments will obviously help the families receiving services. But early childhood investments also pay off for all workers in our interdependent economy.

Notes

¹ These figures for future earnings benefits are the present value of the stream of future earnings benefits associated with one annual investment of \$80 billion in preschool education for one cohort of children, with the present value calculated as of the year the investment is made. See Chapter 3 of *From Preschool to Prosperity* for more discussion of present value calculations.

² Heckman et al. 2010.

³ Campbell et al. 2012; Bartik 2011, Technical Appendix 4B.

⁴ Bartik, *From Preschool to Prosperity* 2014, note 5.

⁵ Bartik 2011 Technical Appendix 4B.

⁶ However, it must be noted that CPC studies compare voluntary participants in CPC neighborhoods with a sample of all children in comparison neighborhoods. The control sample includes both families who would have participated in a CPC had it been available and families who would not have. Despite this weakness, CPC research remains valuable because it is one of the few large-scale studies of a pre-kindergarten program that has long-term evidence of adult outcomes.

⁷ Reynolds, Temple, White et al. 2011.

⁸ Ludwig and Miller 2007.

⁹ Deming 2009.

¹⁰ Barnett et al. 2013.

¹¹ Ladd, Muschkin, and Dodge 2014.

¹² Bartik, *From Preschool to Prosperity*, p. 16 and endnote 19.

¹³ Bartik 2013; Bartik, Gormley, and Adelstein 2012; Hustedt, Barnett, and Jung 2008; Husted et al. 2010; Weiland and Yoshikawa 2013; Wong et al. 2008.

¹⁴ Bartik, Gormley, and Adelstein 2012. The figure shows average test scores of groups of Tulsa children, grouped by age. Each dot in figure corresponds to one group.

¹⁵ See Figure 4.1 in *From Preschool to Prosperity*, and accompanying discussion.

¹⁶ Heckman 2000.

¹⁷ To compare benefits and costs of early childhood programs, both benefits and costs must be expressed in today's dollars. Expressing future earnings in today's dollars requires two adjustments. First, earnings must be adjusted for inflation, and second they must be adjusted to account for the lost investment value if today's dollars were saved and invested instead of spent on early childhood programs. Economists make this second adjustment by discounting future dollars down in value using an appropriate interest rate. See *From Preschool to Prosperity*, Chapter 3.

¹⁸ LaParo, Pianta, and Stuhlman 2004; Sabol et al 2013.

¹⁹ This evidence is based on the Infant Health and Development Program (Duncan and Sojourner 2013).

²⁰ Olds et al. 1997.

²¹ Bartik, Gormley, and Adelstein 2012; and *From Preschool to Prosperity*, Chapter 5.

²² Lynch 2007; Dickens and Baschnagel 2008.