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Revisiting the impact of Head Start

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Overview

This policy brief discusses new evidence regarding the effectiveness of Head Start. Head Start is the largest federal early intervention and education program in the United States, serving almost one million children in 2015. It was created in 1965 to narrow the gap between disadvantaged and more privileged children as they entered kindergarten, by providing comprehensive programming in preschool to improve children's school readiness.

Early studies of Head Start and other pre-school programs found large positive effects on both cognitive and non-cognitive skills. But the first randomized experimental study of Head Start (the Head Start Impact Study, or HSIS), conducted in 2002, indicated that the program produced smaller benefits that faded out quickly. Some have interpreted this as evidence that Head Start is ineffective. Several recent studies by Berkeley authors¹, however, have shown that the HSIS data, when interpreted appropriately, indicates that the program has significant benefits. Some of these benefits are persistent. When compared to at-home care, rather than to attending a similar program, attending a Head Start center generates positive effects on children's development. This implies that the social return to Head Start spending is larger than previous analyses of HSIS data suggested. Moreover, the small average effects of Head Start mask significant variation in its benefits across groups of children and across Head Start centers. These new analyses represent an important contribution to the question of under what circumstances and for whom does Head Start work best.

Introduction: how Head Start works and is expanding

Head Start is the nation's most comprehensive early education program for children aged three to four living in and near poverty. It was launched in 1965 with the intent of leveling the playing field at the beginning of elementary school between children most at risk for developmental problems and school failure and their more advantaged peers.

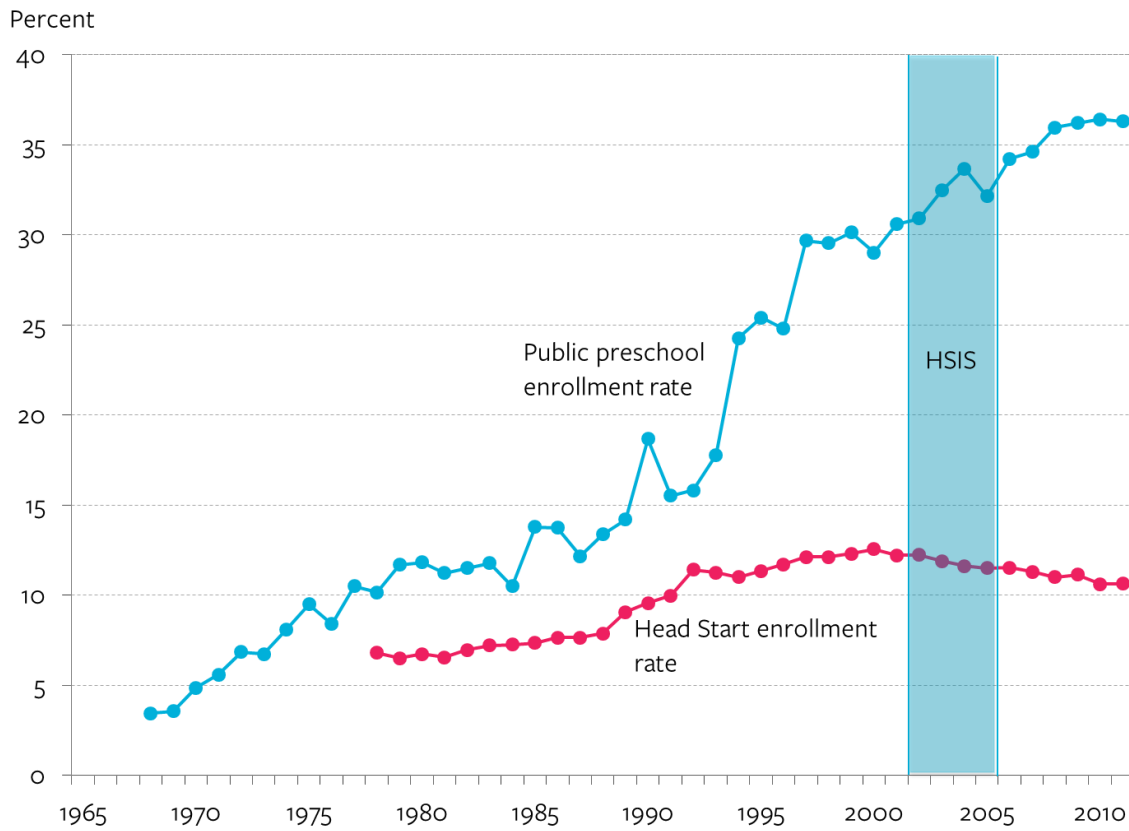
Head Start provides services to children and their parents in dedicated centers, which are funded by the federal government and run by public or private organizations.² In 2015, Head Start served nearly one million children aged three to four for a total federal budget of more than \$8bn (US DHHS, 2016³). The average per child expenditure is about \$8,000; families pay no money for Head Start services.

Head Start is a comprehensive school readiness program, with attention to social and academic skills as well as health and wellness and parent engagement.⁴ Three types of services are offered: (i) developmentally appropriate learning for children focused on social, personal regulation and academic skills implemented by trained educators; (ii) children's dental and health check-ups to detect and design intervention for any developmental delay or disability or problems of nutrition or mental health; and (iii) support and training for parents on how to become engaged in their children's education (such as reading aloud).

The program is generally limited to families with incomes below the federal poverty line (\$20,160 for a family of three in 2015). Families above this threshold are eligible only if they meet other criteria, such as participation in other federal need-based programs like Temporary Assistance for Needy Families. As a result, Head Start serves a fragile population: children who participate are more likely to have disabilities than in the overall population and to live in families experiencing homelessness.

Head Start expanded rapidly in the early 1990s as a result of major federal investments, but has stabilized since (Figure 1). Despite this growth, the program is heavily oversubscribed: there are more applicants than available seats in the majority of Head Start centers (Puma et al., 2010⁵). In part to meet this need, states have created and expanded their own public preschool programs, in particular for four-year-old children (Cascio and Schanzenbach, 2013⁶). These programs are collectively much larger than Head Start: In 2011, over 35 percent of four year-old children were enrolled in a public-funded preschool program, as compared to only 10 percent in Head Start. This has broadened the options for low-income children in some communities, in many cases making the alternative to Head Start not at-home care but another high-quality pre-school program.

FIGURE 1 Growing share of 4-Year-Olds enrolled in public preschool programs



Source: Cascio and Schanzenbach (2013), using October CPS (public enrollment rate), Head Start Bureau (numerator of Head Start enrollment rate), and Vital Statistics (denominator of Head Start enrollment rate), and Puma et al. (2010).

Note: In the HSIS experiment, data were collected from 2002 to 2006.

1. Evaluation of Head Start via a large randomized control trial: the Head Start Impact Study (HSIS)

Most early evaluations of Head Start were based on non-experimental data. Currie and Thomas (1995)⁷, Garces et al. (2002)⁸ and Deming (2009)⁹ compared the outcomes of Head Start participants with those of their siblings, and found that Head Start had large benefits for children.

In an effort to better understand the impact of Head Start, Congress mandated a major randomized experimental evaluation of the program in 1998. The trial was designed to determine “the impact of Head Start on children’s school readiness and parental practices,” as well as “under which circumstances Head Start achieves its greatest impact and for which children.” (Puma et al. 2005¹⁰).

The HSIS randomly assigned nearly 5,000 children aged three and four to a Head Start center (the “treatment group”) or to be denied access to Head Start at the center where they applied.¹¹ The random assignment took place in 383 Head Start centers, selected from 84 Head Start programs. Because the selected centers were representative of all oversubscribed Head Start centers, the results of this study could be generalized to the US as a whole.

Puma et al. (2010) reported four main findings:

1. Head Start improved both cognitive development for the three and the four year-old cohort and behavior for the three-year-old cohort: children who were enrolled in Head Start demonstrated better pre-literacy skills and fewer challenging behaviors than those who did not;
2. However, these results were small in magnitude. Even with the benefits of Head Start, children who were enrolled in the program remained disadvantaged compared to their same-age peers;
3. Head Start’s observed effects on cognitive skills dissipated by kindergarten;
4. There is no clear evidence that Head Start improved non-cognitive outcomes for the four-year-old cohort and the health benefits are concentrated on dental care receipt.

The small magnitude of the benefits found by Puma et al. (2010) is at odds with both previous studies of Head Start and studies of similar early childhood programs focused on school readiness, such as the Perry Preschool Program, the Abecedarian Carolina Project, or the Chicago Child-Parent Centers. This has led to skepticism about the program among researchers and policymakers.

2. Reanalyses of the HSIS data paint a more positive picture

This brief reviews several recent studies, each suggesting that the HSIS study's conclusions are too pessimistic and substantially underestimate the benefits of Head Start:

1. Feller et al. (2016)¹² and Kline and Walters (2016)¹³ stress the importance of understanding the alternative to Head Start participation. The HSIS experiment compared children admitted to Head Start to those who were not. But many children in the control group wound up enrolling in alternative subsidized pre-school programs, many comparable in their quality to Head Start. When Head Start is compared to at-home care, rather than to other center-based care, its impacts are much larger.
2. Bitler, Domina and Hoynes (2015)¹⁴ and Walters (2015)¹⁵ have studied the heterogeneity of the impact of Head Start. First, Bitler, Domina and Hoynes (2015) show that Head Start has heterogeneous effects across different groups of children; in particular, the program has larger impacts on children at the lowest skill levels than on those higher in the distribution. This helps to reconcile the HSIS results with those of experimental studies of other early childhood programs, such as the Perry Preschool Program, which served even more fragile populations than Head Start and yielded larger impacts.¹⁶ Second, Walters (2015) shows there is a large variation in the program's short-run effectiveness across Head Start centers only partly due to observed program features.
3. Gelber and Isen (2013)¹⁷ show that Head Start raises parental involvement, and that this effect occurs for the duration of the period children and parents had been observed in the study, up to several years after children have left Head Start.

Head Start is best evaluated when compared to the next best alternative – whether it is home-care or other preschool programs

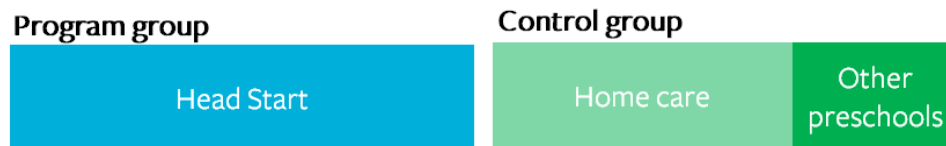
Experimental results from HSIS show smaller benefits of Head Start than previous non-experimental studies. There have been two dominant explanations for this gap:

1. Previous studies suffered from bias because the treatment and the control groups were not randomly assigned.

2. Head Start effectiveness has changed over time. In particular, Head Start might be less effective at its current large scale than in the early years of the program when it was focused on a small number of children.

But there is a third explanation: Unlike in previous studies, HSIS compares Head Start participants to children in a broad range of childcare arrangements, many quite similar. About one third of the HSIS control group participated in alternative preschool programs, and the rest of the children in the control group were cared for at home (see Figure 2). In other words, one third of the control group in the randomized experiment received preschool services that in many cases were similar to or even better than those provided by Head Start. This contrasts with earlier studies of the program, which primarily compared Head Start to home-care, as there were few other alternatives for low-income families before the mid-1990s (see Figure 1).

FIGURE 2 Head Start Impact Study’s control group includes children in other public preschools



Source: Author, stylized representation of the composition of the program and the control group.

How does the composition of the control group affect the evaluation of HSIS results? Feller et al. (2016) and Kline and Walters (2016) argue that the question of interest is whether Head Start benefits children relative to home care, rather than comparing it to center-based care operated under alternative programs. Identifying the effect relative to home care requires moving beyond the simple HSIS experimental analysis. The two studies take different approaches to this, but find very similar results. Each finds that Head Start makes a large difference for children who would otherwise have been cared for at home, consistent with what earlier non-experimental studies have found. By contrast, alternative center-based pre-school programs are roughly as effective as Head Start, so for children who would otherwise attend them, being admitted to Head Start makes little difference.

The mean effects of Head Start as measured by HSIS masks a variation in its benefits across groups of children

Two studies have attempted to understand the heterogeneity of the impact of Head Start. Bitler, Domina and Hoynes (2015) measured the variation in Head Start effectiveness across groups of children. Walters (2015) measured variation in the impact of Head Start across Head Start centers.

First, Bitler, Domina, Hoynes (2015) use the HSIS data to study the variation in Head Start's effectiveness across different groups of children. Using data on the three-year old-cohort of the HSIS, they find that Head Start benefits are concentrated among a relatively small subgroup of participants.

Who might benefit the most from Head Start? There are two theories about this, leading to contradictory conclusions:

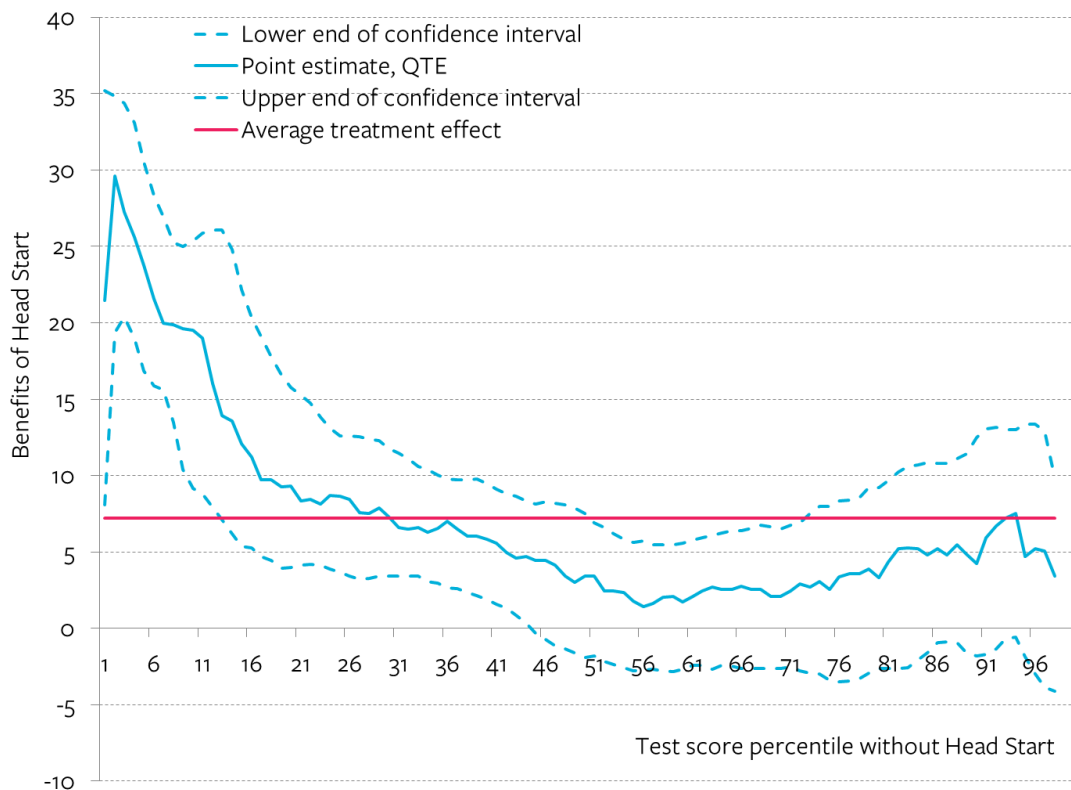
- On one hand, the “skills-begets-skills” theory predicts that the best students benefit the most from educational programs such as Head Start; in this view, skills are cumulative and achievement inequalities will tend to increase over time;
- On the other hand, the “compensatory” theory predicts that children who struggle the most upon entering the program benefit the most from early education programs, which are by nature designed to provide the very skills that struggling children with experiences not available to them compared to their more advantaged peers.

Bitler, Domina, Hoynes (2015) show that Head Start helps the most disadvantaged students improve their school readiness. They thus validate the “compensatory” view. They report two striking findings:

- Head Start leads to large and statistically significant gains in vocabulary skills in the preschool period, and the gains are the largest at the lowest skill level (Figure 3). The effect size for students at the bottom of the distribution is an enormous 0.8 standard deviations.
- Head Start effects on cognitive skills fade away by first grade for children as a whole.¹⁸ However, these effects are persistent through first grade for Spanish speakers.

These results help reconcile the HSIS findings with studies of earlier programs such as Perry Preschool. The Perry Preschool program was targeted at a very disadvantaged population, even more disadvantaged than Head Start. If the effects of Head Start are larger for the most struggling children, then these positive effects are consistent with the large positive effects found for the Perry Preschool Program.

FIGURE 3 Head Start has large impacts on Peabody Picture Vocabulary Test Scores of students who would do poorly without it



Source: Bitler, Domina, Hoynes (2015).

Notes: Figure shows QTE for effect of an offer of a Head Start slot on PPVT IRT scores at end of the first year in spring 2003 (at the end of the Head Start year) for the 3-year old cohort. 90% confidence intervals are obtained by bootstrapping by Head Start center.

Second, Walters (2015) uses the HSIS data to study the variation in Head Start’s effectiveness across different Head Start centers. He shows that there is a large variation in Head Start short-run effectiveness. Part of this variation is linked to observed program characteristics: centers that offer home visiting and full-day service have larger impacts than other centers. Overall, one third of the variation in Head Start effectiveness is explained by observed program features.

Head start fosters parental involvement

HSIS found scant evidence that Head Start services improve parents' involvement in their children's education. On the contrary, Gelber and Isen (2013) find persistent effects on parent's involvement with children. The increase in parents' involvement caused by participation in Head Start is more pronounced when children are actually enrolled in the program, and fades by the time children leave for elementary school.

Gelber and Isen (2013) used HSIS data to revisit the study in two main ways:

- They investigated the impact of Head Start services on a wider set of outcomes; the Head Start Impact Study examined the impact of Head Start services on five parental involvement outcomes. Gelber and Isen (2013) added 84 other parent involvement outcomes in the analysis.
- HSIS examines effects in each cohort and time period separately, and does not include outcome data from all time periods in its analysis. Gelber and Isen examine pooled cohorts and time periods in their main analysis—which is appropriate to measure average impacts of Head Start—and include outcome data from all relevant time periods.

These increases in parental involvement occur not only during the time children are enrolled in Head Start, but also up to several years later. Since one explicit goal of Head Start is to raise parents' involvement with their children, these results demonstrate that Head Start succeeds in this goal.

Some of their most striking findings are that Head Start increases the time parents spent reading to children by 20 percent, and causes absent fathers to spend one day more per month with their children. They also show that Head Start leads to more substantial increases in parental involvement for Black and Hispanic parents than for White parents.

3. Expanding Head Start would be a good investment that would pay for itself

Measuring the costs and the benefits of Head Start

The HSIS results have led many researchers and policymakers to question the effectiveness of Head Start (Barnett, 2011¹⁹; Klein, 2011²⁰). The new analyses, however, paint a more positive picture.

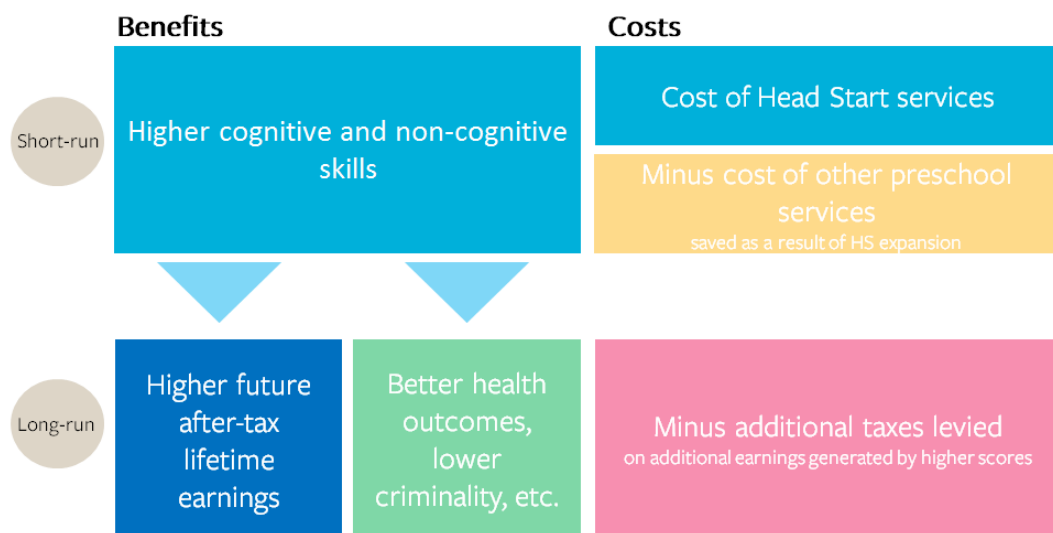
Kline and Walters (2016) conduct a cost-benefit analysis of the program. They show that previous analyses, by failing to account for the large number of children who would have enrolled in an alternative preschool had they not been admitted to Head Start, have overestimated the net costs of providing Head Start care. The alternative preschools are also costly and are largely publicly funded. It therefore costs little, on net, to shift a child from one of these programs into Head Start.

Kline and Walters (2016) develop a framework to analyze the costs and the benefits of a program with close substitutes (see Figure 4):

- On the benefit side, they take into account the effect of Head Start on children's future after-tax lifetime earnings. Extrapolating from short-term test score effects, they project that children that are enrolled in Head Start can expect a discounted after-tax lifetime earnings gain of \$5,513.
- On the cost side, they take into account not only the costs of providing Head Start services today for the federal government and the savings from reduced enrollment in other programs, but also the additional revenues generated by future taxes paid by children who benefitted from the program.

Their cost-benefit analysis is likely to yield a lower bound for Head Start's benefits as it does not account for the program's effects on future health outcomes, civic engagement (Milligan et al., 2004²¹), crime (Lochner and Moretti, 2004²² and Heckman et al., 2010²³) or inequality.

FIGURE 4 List of costs and benefits of Head Start for the federal government and the society as a whole



Source: Author, based on Kline and Walters (2016)

The calculations in Kline and Walters (2016) show that the social return to Head Start is likely to be positive. The exact value depends on what happens to the spaces in alternative programs that are freed up. If alternative public preschool programs are oversubscribed (“rationed”), an expansion of Head Start that draws some children from these programs yields open seats that can be occupied by new children. Alternatively, if competing preschool programs contract when Head Start expands (i.e. in the “no rationing” case), Head Start expansion yields cost savings in competing programs for the federal government. Overall, Kline and Walters (2016) estimate that one dollar invested in Head Start services generates \$1.84 in future after-tax earnings when competing programs are not rationed, and \$2.02 when they are rationed.

Kline and Walters also consider the impact of expansions of the Head Start program that target new populations. Because the program has the largest effects on the most disadvantaged participants, expansions targeted at those children would have larger social benefits than would expansions that reach the same population as is currently served.

TABLE 1 Social return of a Head Start expansion in different scenarios

	Head start expansion	
	Does not attract more disadvantaged children	Does attract more disadvantaged children
Rationing	2.02	>2
No rationing	1.84	>2

Source: Author, based on Kline, Walters (2016). 1.84 taken from table IV (marginal value of public funds, preferred assumption); 2.02 taken from table IX (marginal value of public funds, model-based prediction); values in the case of a change in the mix of Head Start participants taken from Figure 1, Panel B “marginal value of public funds”.

The cost-benefit calculations in Kline and Walters (2016) apply to the time period during which the HSIS was conducted. Alternative public preschool programs have continued to expand in recent years, so the social return to expansion of the contemporary Head Start program depends increasingly on its cost-effectiveness relative to these competing programs, and on its capacity to reach the most disadvantaged children and those least likely to enroll in an alternative.²⁴ This is an important area for future research.

Conclusion

Recent studies have dramatically changed our understanding of the Head Start Impact Study results. These new studies, which take more careful account of the alternatives to Head Start and the range of potential impacts, consistently show that Head Start, like other early education programs, has large impacts on disadvantaged children with larger benefits for children that struggle the most at entry of the program. Head Start not only benefits children and helps improve school readiness, but also helps get parents more involved in their children’s education for the long-run. Early pessimism about the results of the Head Start Impact Study was not warranted; to the contrary, this study validates the important impact of this program and shows that high quality early childhood programs can have important beneficial effects when delivered at scale.

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Endnotes

¹ This brief does not attempt to be exhaustive about the recent Head Start research, but rather focuses on contributions by Berkeley faculty.

² A minority of Head Start services are provided at home, in a family child care setting or in a combination of centers and home visits.

³ US Department of Health and Human Services, Administration for Children and Families (2016). “Head Start Services.”: <https://eclkc.ohs.acf.hhs.gov/hslc/data/factsheets/docs/head-start-fact-sheet-fy-2015.pdf>.

⁴ There is also a program for infants and toddlers called Early Head Start, which is not included in the HSIS evaluation.

⁵ Puma, M., Bell, S., Cook, R., and Heid, C. (2010). “Head Start Impact Study: Final Report.” U.S. Department of Health and Services. Administration for Children and Families. Washington, DC.

⁶ Cascio, E., and Schanzenbach, E. (2013). “The Impacts of Expanding Access to High-Quality Preschool Education.” *Brookings Papers on Economic Activity*.

⁷ Currie, J., and Thomas, D. 1995. “Does Head Start Make a Difference?” *American Economic Review* 85(3).

⁸ Garces, E., Currie, J. and Thomas, D. (2002). “Longer-term effects of Head Start”, *American Economic Review* 92(4), 999–1012.

⁹ Deming, D. (2009). “Early Childhood Intervention and Life-Cycle Skill Development: Evidence from Head Start.” *American Economic Journal: Applied Economics* 1(3).

¹⁰ Puma, M., Bell, S., Cook, R., Heid, C. & Lopez, M. (2005). “Head Start Impact Study: First year findings”, Prepared for USDHHS, ACF.

¹¹ If families are denied access to one particular Head Start center, they have the possibility to apply to another center.

¹² Feller, A., Grindal, T., Miratrix, L., and Page, L. (2016). “Compared to What? Variation in the Impact of Early Childhood Education by Alternative Care-Type Settings.” *Annals of Applied Statistics*. In press.

¹³ Kline, P. and C. Walters .(forthcoming), “Evaluating Public Programs with Close Substitutes: The Case of Head Start” *Quarterly Journal of Economics*.

¹⁴ Bitler, M., Domina, T., and Hoynes, H. (2014). “Experimental Evidence on Distributional Effects of Head Start.” *NBER Working Paper* No. 20434.

¹⁵ Walters, C. (2015), “Inputs in the Production of Early Childhood Capital: Evidence from Head Start” *American Economic Journal: Applied Economics* 7(4).

¹⁶ There are also important differences between Head Start and Perry that could help explain the differences in their impact. For example, the Perry Preschool program used higher qualified, better paid teachers than does Head Start.

¹⁷ Gelber, A., and Isen, A. (2013). “Children’s Schooling and Parents’ Investment in Children: Evidence from the Head Start Impact Study.” *Journal of Public Economics* 101.

¹⁸ The question of whether Head Start effects on cognitive skills fade away or not is still discussed among researchers. In particular, Kline and Walters (2016) find that when non-compliance with experimental assignments is taken account of, the fadeout is less dramatic and not precisely estimated. They conclude that HSIS does not provide strong evidence that impacts fade out quickly.

¹⁹ Barnett, W. (2011). “Effectiveness of Early Educational Intervention.” *Science* 333(6045).

²⁰ Klein, J. (2011). “Time to Ax Public Programs That Don’t Yield Results.” Time Magazine.

²¹ Milligan, K., Moretti, E., and Oreopoulos, P. (2004). “Does Education Improve Citizenship? Evidence from the United States and the United Kingdom.” *Journal of Public Economics* 88(9).

²² Lochner, L., and Moretti, E. (2004). “The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports.” *American Economic Review* 94(1).

²³ Heckman, J., Moon, S. H., Pinto, R., Savelyev, P. and A. Yavitz. (2010). “The Rate of Return to the High/Scope Perry Preschool Program,” *Journal of Public Economics* 94, 114-128.

²⁴ Another difficulty in assessing the effectiveness of Head Start comes from the fact that early childhood programs are increasingly blended together.



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