

The promises and pitfalls of universal early education

Universal early education can be beneficial, and more so for the poor, but quality matters

Keywords: early education, preschool, childcare, universal early education

ELEVATOR PITCH

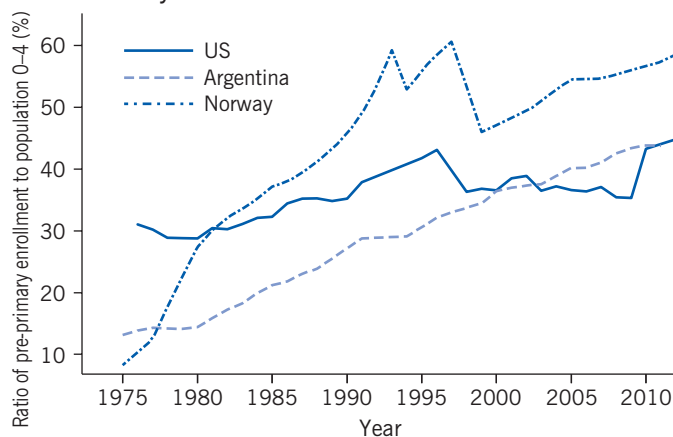
There is widespread interest in universal early education, both to promote child development and to support maternal employment. Positive long-term findings from small-scale early education interventions for low-income children in the US have greatly influenced the public discussion. However, such findings may be of limited value for policymakers considering larger-scale, more widely accessible programs. Instead, the best insight into the potential impacts of universal early education comes from analysis of these programs themselves, operating at scale. This growing research base suggests that universal early education can benefit both children and families, but quality matters.

KEY FINDINGS

Pros

- ⊕ High-quality universal early education raises test scores.
- ⊕ High-quality universal early education improves other markers of school readiness that may be critical for generating long-term impacts.
- ⊕ High-quality universal early education may increase adult educational attainment and employment and reduce welfare dependency.
- ⊕ The benefits of high-quality universal early education are larger for disadvantaged children.
- ⊕ Availability of early education can increase maternal employment, providing revenue to offset program costs.

Trends in early education attendance rates in selected countries



Source: Calculations based on data from UNESCO Institute for Statistics and *World Population Prospects: The 2012 Revision*.

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Cons

- ⊖ The test score advantage from universal early education declines as children progress through school.
- ⊖ For children from more advantaged families, the costs of universal early education may exceed the benefits.
- ⊖ Universal early education that is oriented more toward childcare than preschool and is lower quality may make even disadvantaged children worse off.
- ⊖ Maternal labor supply impacts are larger for programs that are less beneficial for children.
- ⊖ Universal early education provides income support to relatively high-income families where mothers are already working.

AUTHOR'S MAIN MESSAGE

Policymakers interested in expanding access to early education face tradeoffs in policy design. High-quality universal early education can promote more equitable outcomes, both in school and in adulthood. However, the benefits for the most advantaged children may be lower than the costs of their participation. While the overall program benefits may still exceed program costs, policymakers should consider the possibility that income-targeted policies could yield the same benefits for less cost. This is important, since programs that deliver benefits over the long term will not fund themselves in the short term.

MOTIVATION

There is widespread interest today in universal early education, both as an investment in future economic productivity and as a means of relieving financial pressures on working families. Since the 1970s, several Nordic countries have offered high-quality childcare at a low price to all families, regardless of need. By the 1990s, many countries across the world were following suit, either by extending public education systems downward to include younger children or by using government subsidies to promote the growth of the childcare sector. There is pressure for this trend to continue. For example, in a recent initiative, the Obama administration proposed using federal grants to encourage states to introduce high-quality, high-access pre-kindergarten (“pre-K”) programs for four-year-olds. Further, in the early 2000s, the EU set out a goal for childcare to reach 90% of young children aged three and older by 2010.

Public discussion of universal early education has been greatly influenced by the positive long-term findings of social experiments on small-scale “model” preschool interventions conducted in the US starting in the 1960s [1]. When correctly executed and analyzed, social experiments can yield compelling evidence on the impacts of the program being evaluated. But these particular social experiments have limited applicability to universal early education today, for at least three reasons.

First, these small-scale programs served only very disadvantaged children. Second, participants would have been at home with their mothers in the absence of the experimental program. This situation would not occur as frequently today, at least not in the US, where there are now public early education programs that serve poor children. Participation in private preschool is also widespread in higher-income groups. Third, large-scale early education programs may have impacts on educational opportunities that small-scale programs do not. For example, if universal early education better equips children to learn in primary school, curricula in primary school may become more rigorous. By displacing private early education or existing public programs, universal early education programs may also have implications for the care of infants and toddlers. The best insight into the impacts of universal early education thus comes from analyzing the programs themselves, operating at scale.

Social experiments

A social experiment assigns study subjects, randomly or by lottery, to a “treatment group” whose members receive an intervention, such as preschool, or to a control group, whose members do not receive the treatment. Random assignment ensures that the treatment and control group are on average identical in all other respects aside from exposure to the treatment itself. As a result, any difference on average in later outcomes between the two groups can be safely attributed to the treatment, not to other factors.

DISCUSSION OF PROS AND CONS

Scope of the evidence

For the evidence, the focus here is on both universal preschool programs and universal childcare programs that serve children within a few years of entering primary school (mostly aged three to five). Attention is also limited to empirical research that has made substantial progress toward estimating true causal impacts. This is a challenging condition because enrollment in such programs is voluntary, and a parent’s choice could be related to other factors that influence child development. A social experiment would sidestep the problem by removing

the element of choice: by design, whether a child participates in early education is decided by the researcher to ensure that all other factors are held constant. However, it is difficult to design a social experiment to estimate the returns to participation in large-scale universal early education.

Instead, researchers have attempted to obtain variation in participation in universal early education that is “as good as” random by taking advantage of policy-imposed constraints on parental decision-making. Two policies have been central to this research. First, parents can enroll their children in universal early education only if a program exists. As a result, the difference in outcomes between children who reach the age of eligibility before the program is introduced and those who reach eligibility after it is introduced has the potential to capture the effects of attendance. Studies that use as a basis of comparison the difference in outcomes between children in the same cohorts but who are unaffected (or less affected) by the program’s introduction are said to use a “difference-in-differences” (DID) design. Second, like school systems, most universal preschool programs have entry requirements based on a child’s exact day of birth. As a result, children with birthdays right after the cutoff have to wait an entire year before they can enroll, but they are likely to be similar in characteristics to the children with birthdays right before the cutoff. Differences in the outcomes between these two groups of children one year later are thus likely to reflect preschool attendance. Studies that compare differences between these two groups use a “regression discontinuity” (RD) design.

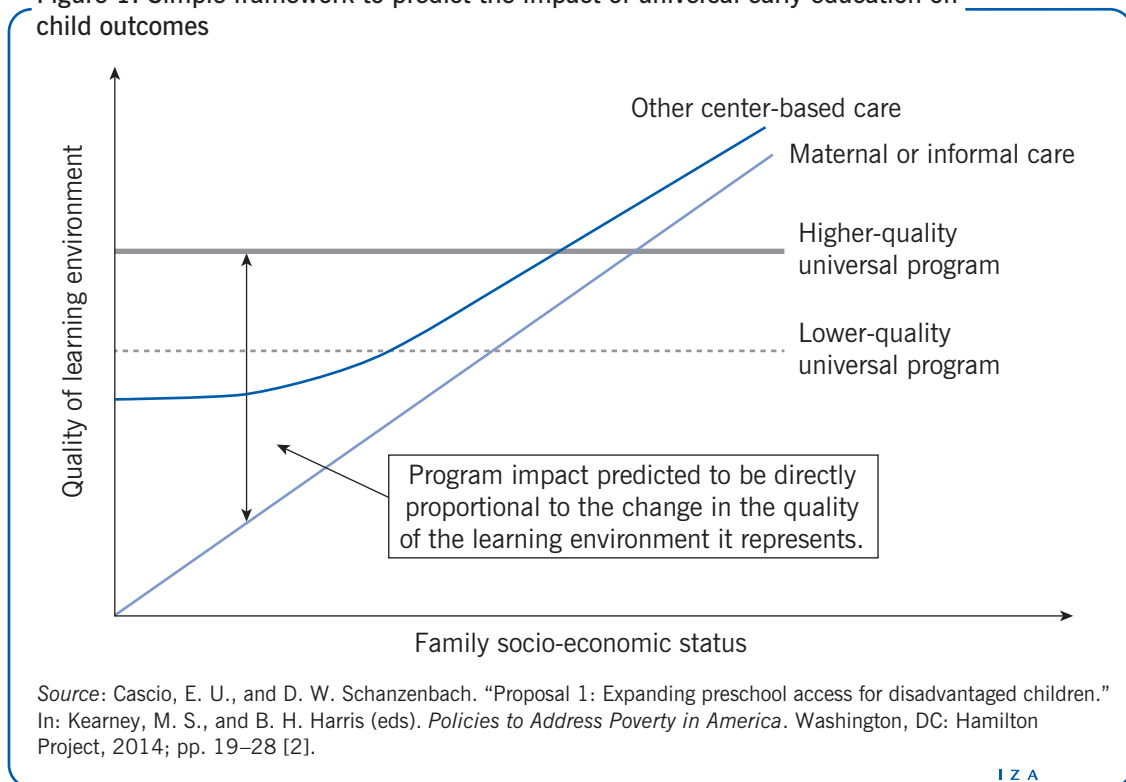
The discussion that follows is based on a database of 34 studies of these two varieties, most of them published, spanning ten countries across Europe, North America, and South America.

An organizing framework

Theoretically, universal early education would be expected to have different impacts depending on family background. Figure 1 illustrates this prediction using a stylized graphic [2]. For simplicity, first consider a universal program that would displace maternal care or informal care that is an equivalent investment in a child’s human capital. Suppose that the quality of this program (solid gray line) does not vary with a family’s socio-economic status but that the quality of maternal care does, with mothers of a higher socio-economic status creating a higher quality learning environment for their children (light blue line). Under these conditions, the universal program would have less of an effect on the quality of learning environments for children from a higher socio-economic background. If the impacts of the program on a child’s human capital are directly proportional to the change in the quality of the learning environment (represented by the vertical distance between the light blue line and the solid gray line), universal early education would be expected to have larger effects on the human capital of disadvantaged children.

The situation becomes more complicated when a universal program could displace private or other public early education programs. In the US, for example, there is a large market for private preschool education, and public early education programs, such as Head Start, already serve many poor children. The impacts of a new universal program in this setting would depend on the relationship between socio-economic status and the quality of a child’s alternative learning environment, accounting for time spent in these other programs and their quality. Figure 1 depicts a situation where existing public early education programs have made substantial progress toward shoring up the human capital of disadvantaged children but where the quality of a child’s alternative learning environment still increases with socio-economic status (dark blue line). The same universal program would have less of an impact on

Figure 1. Simple framework to predict the impact of universal early education on child outcomes



children’s human capital in this situation than it would if it displaced only maternal care, but even here the impacts of universal early education should be larger for disadvantaged children.

Theoretically, the quality of the universal program should also affect the magnitude of program impacts on children’s human capital. “High-quality” early education programs are identified on the basis of process, rather than inputs, and involve interactions between children and adults that are nurturing and supportive of learning and development. Regardless of the alternative use of a child’s time, the effects should be larger for everyone the more a program achieves such “process quality,” as can be seen by comparing scenarios under the solid and dashed gray lines. Even so, there are theoretical situations in which high-quality universal programs can make a child worse off. This is a particular possibility for children from a higher socio-economic background, whose families might decide to trade off program quality for savings on private early education or care [3], [4].

To frame the discussion that follows, Figure 2 characterizes the universal programs in the database by the type of care or education they displace and by whether their primary orientation is preschool or childcare [3], [4], [5], [6], [7], [8], [9], [10], [11]. The figure also gives the target age group of each country’s program, whether the program is full day, and whether head teachers are required to have a college degree, a condition widely thought to be necessary but not sufficient for generating process quality, as defined above. Programs that have high teacher education requirements are referred to below as “high-input” or as having “high standards,” so as to make clear that they are not necessarily ones with high process quality. However, high-input programs should have a greater chance of delivering high-quality learning environments.

Figure 2 shows that, except in the US, the programs under consideration appear to substitute primarily for maternal or informal care. Among such programs, however, there are both

Figure 2. Early education programs by alternative learning environment and preschool or childcare orientation, with selected program attributes

		Alternative learning environment:	
		Maternal or informal care	Some center-based care
Preschool orientation		Argentina (ages 3–5)	US/pre-kindergarten (age 4)
		Denmark/preschool (age 3) *†	Georgia *†
		France (ages 3–5) †	Oklahoma *(partial)†
		Netherlands (age 4) †	Boston *†
		Spain (age 3) *†	US/kindergarten (age 5) *(partial) †
Childcare orientation		Uruguay (ages 4–5)	Norway/kindergarten (age 6) *†
		Canada (ages 0–4) *	
		Denmark/daycare contemporary (age 3) *	
		Denmark/daycare historical (ages 0–6)	
		Germany (age 3)	
	Norway/childcare (ages 3–6) *†		

Notes: The ages of eligible children are denoted in parentheses. * Full-day program (may be length of school day in programs with preschool orientation). † Head teachers required to have at least three (and most often four) years of post-secondary education. Teacher education requirements were not reported in the programs for Argentina and Uruguay. Teacher education and length of school day are not reported for Denmark’s historical childcare program.

Source: Author’s compilation based on information from nine of the key references plus materials listed in the additional references (available online).

childcare and preschool-oriented programs. In general, programs that are delivered through downward extensions of the public school system, rather than through childcare centers, appear to have higher education requirements for teachers. For example, the school-based universal preschool programs in the Netherlands and Spain require teachers to have a college degree, whereas the childcare-based programs in Denmark and Germany serving children of roughly the same age do not. Yet, there are important exceptions. For example, Norway introduced a universal childcare program in the 1970s that met many of the same standards as the school-based programs in other countries.

Short-term effects on children’s human capital

Based on the framework presented in Figure 1, universal early education would be expected to have larger positive effects on disadvantaged children, and higher-input programs would be expected to have larger impacts, provided higher inputs translate into higher process quality. These predictions have been borne out in the research. First, high-input universal early education programs have substantial positive effects on cognitive test scores, particularly for disadvantaged children. However, consistent with research on targeted early intervention [1], these test score gains appear to diminish as children progress through school. Second, though the evidence is weaker, high-input universal early education also appears to have positive impacts (that are larger for disadvantaged children) on non-cognitive skills—such as self-control, motivation, and perseverance—that are thought to be critical for generating long-term socio-economic impacts of early childhood initiatives [1]. Third, high inputs and an orientation toward preschool appear to matter for the magnitude of these short-term effects. In fact, relatively low-input programs that have a childcare orientation may not only have a lower effect; they may even make children worse off.

Test score impacts

A series of RD studies of universal pre-K programs for four-year-olds in the US provide the best available evidence on the immediate test score gains from universal preschool, based on testing participants as they are about to enter kindergarten and slightly younger children who are newly eligible to participate in pre-K programs. The programs under study, in the states of Georgia and Oklahoma and the city of Boston, meet high standards for teacher qualifications, staffing ratios, and curricula. It is not uncommon for such studies to show that the youngest children who have just finished pre-K score upwards of half a standard deviation higher on assessments of early literacy and mathematics skills than the oldest children in the next cohort of pre-K participants; this is a large effect. Estimates have tended to be larger for children from lower-income households or of a racial/ethnic minority, but more advantaged children have also shown significant short-term cognitive test score gains, even when the program displaces private early education [5].

Such findings have figured prominently in recent advocacy for expansion of universal pre-K programs in the US. Yet, these RD studies have some methodological limitations that may lead to biased estimates. For example, the ideal implementation of the RD design requires testing students who do not ultimately enroll in the program, but this has never been done [12]. And even if problems in implementation could be addressed, RD can yield evidence only on the shortest of short-term impacts, not whether impacts on test scores persist or whether the program leaves a mark on other longer-term outcomes.

The evidence on the impacts of universal early education on later test scores has therefore had to rely on other research designs, most notably DID. Studies of the preschool programs in Argentina, the Netherlands, Spain, and the US states of Georgia and Oklahoma all point to test score gains that persist for at least a few years and possibly as late as grade eight (which generally serves 13- to 14-year-olds) [3], [6]. These estimated gains tend to be larger for disadvantaged children, but many studies lack the statistical power to conclude so definitively. The test score advantages from universal preschool participation also appear to decline or fade out as children age. In particular, the impacts of the Georgia and Oklahoma pre-K programs decline between the start of kindergarten, the spring of grade four (when children are generally aged nine or ten), and the spring of grade eight [3]. And although it is somewhat difficult to compare, a pattern of declining effect sizes emerges across studies of different countries.

Impacts on non-cognitive outcomes

Test score “fadeout”—the pattern of test score impacts that decline with age—is a common finding in the literature on targeted early intervention. So, too, is the finding that such interventions raise educational attainment, employment, and earnings and reduce welfare dependency and criminal activity. This suggests that non-cognitive skills—developmental attributes that are not strongly reflected in test scores—are responsible for producing these long-term improvements [1]. There is limited evidence on the truly long-term impacts of universal early education, so assessing its impacts on non-cognitive skills is important for drawing insights into its long-term potential.

Evidence on the impacts of universal early education on non-cognitive skills is less extensive and its implications more mixed than the evidence on test scores. For example, a study taking advantage of waiting-list induced variation in universal preschool attendance among three-year-olds in Denmark yielded no impact on a summary index of children’s behavioral, emotional, and social problems at age seven [7]. Likewise, the same RD studies that show such large positive impacts on cognitive test scores yielded at best small positive impacts of pre-K

attendance on tests of socio-emotional skills, attentiveness, and self-control, though impacts are larger for disadvantaged students on some metrics [5]. On the other hand, the Argentine program increased teacher reports of students' class participation, effort, and attention in grade three [6], and the universal preschool programs in France, Georgia, Spain, and Uruguay reduced grade retention in primary school among disadvantaged students. Taken as a whole, the evidence is suggestive of positive impacts of universal early education on non-cognitive skills, with larger impacts for disadvantaged children, but more research is needed.

The importance of high inputs and preschool orientation

Not all universal early education programs have positive short-term effects. Indeed, the focus of most of the studies reviewed above has been on programs that were either high-input or operated through the public school system, suggesting that the programs were oriented more toward promoting school readiness than providing childcare. When the scope of the evidence is broadened, the potential importance of high inputs and preschool orientation (or perhaps both) becomes clearer.

Consider, for example, the universal childcare program in the Quebec Province, Canada. Not only did the roll-out of this program not generate any immediate positive cognitive test score impacts, but it also had detrimental short-term effects on children's non-cognitive skills, particularly among children whose parents had lower levels of education [8]. The Quebec program does not require all head teachers to have a college degree; moreover, provision of subsidized childcare was as central a goal of the program as provision of early education. Danish family daycare, which has lower quality standards than Danish preschool, also appears to have negative impacts on the later behavior of boys whose mothers had lower levels of education [7]. The fact that negative effects are larger for more disadvantaged children in both cases suggests that it might be difficult for governments to ensure that childcare quality does not decline with socio-economic status.

Longer-term impacts

Most of the programs for which there is substantial evidence on short-term effects began in the 1990s and are thus not quite mature enough to support analyses of their impacts on participants' adult lives. The evidence on longer-term impacts of universal early education instead relies on programs introduced in the 1970s and earlier; most notably, these include universal kindergarten programs in the US and subsidized high-input early education programs in Europe (specifically, in Denmark, France, and Norway). The findings of both of these lines of inquiry can again be understood in light of the simple framework presented in Figure 1: both program quality and the quality of the "counterfactual" condition (what would have happened without the program) matter.

Owing to rich data and a fairly clean policy experiment, findings from the introduction of the Norwegian childcare program may be the most conclusive. The first cohorts to be fully eligible for the program ended up with higher levels of education and were less likely to be on welfare in their thirties than cohorts that just missed eligibility, and more so in municipalities where childcare expanded relatively rapidly. However, the impacts were larger for individuals whose mothers had low levels of education, for whom the care displaced was probably of lower quality [10]. Qualitatively similar results for educational attainment have emerged from DID studies of the Danish and French systems. The Norwegian reform also reduced earnings inequality relatively more among affected cohorts in highly-affected municipalities but did not significantly increase their earnings on average and even reduced earnings at the top of

the distribution [4]. For the highest potential earners, which included children from higher-income households, the care that the program displaced was arguably developmentally more productive than the program itself, a sacrifice that parents may have been willing to make to save on childcare expenses.

Thus, the well-resourced, high-standard Norwegian program improved later-life outcomes for many children—and more so for the most disadvantaged—but it may have made children from well-off households worse off than they would otherwise have been. On the flip side, universal kindergartens introduced in the 1960s and 1970s in the southern and western parts of the US had the perverse effect of having a greater positive impact on white children than on black children. But again, the counterfactual condition may matter for this result: for a substantial share of black children, universal kindergarten appears to have displaced Head Start [9], which might have been at least as high quality as the kindergartens of that time. The positive effects (for white children only) were also smaller and less extensive in terms of outcomes than in the Norwegian case, possibly due to the lower-intensity nature of the US programs (many programs were half-day, for example) and the scope for larger differences in quality that comes with local school finance in the US.

Impacts on the family

Maternal employment is a potential mediator of the relationship between universal early education and children's human capital. By reducing a family's prospective childcare expenses, universal early education increases a mother's potential take-home wage, providing an incentive to enter the labor force. Doing so can increase a family's income, but it can also introduce new coordination problems or stressors in family life. Even programs with no impacts on maternal labor supply subsidize childcare expenses for families where mothers would already be working, freeing up that family income for spending on other goods and services, including goods and services that promote child development [3].

In general, the universal programs with larger or more broad-based impacts on maternal employment are those with less of a positive impact on children. For example, the Quebec program, which had negative impacts on children's non-cognitive skills, had very large, broad-based impacts on maternal employment: one married mother began work for every two children who enrolled in the program [8]. At the other extreme, a RD study suggests that the pre-K programs in Georgia and Oklahoma, which had such large immediate impacts on cognitive test scores, did not draw any mothers into the labor force [11]. Likewise, the Norwegian childcare program that had such impressive long-term impacts had at most a small positive impact on maternal employment rates [10]. The maternal employment impacts of other universal preschool programs discussed above—in Argentina, Spain, and the US—generally fall somewhere in between, often with larger positive impacts for groups whose labor supply is likely restricted by a lack of affordable childcare, such as single or less educated women.

This pattern of findings might appear to suggest that, despite an increase in family income, maternal employment gains might dampen the impact of universal early education on children's outcomes. This conclusion would be hasty, however, since a country's decision to implement a childcare-oriented program might have been a response to high childcare demand. Nevertheless, the impacts of universal early education on maternal employment are independently interesting, since an additional motivation to invest in universal early education is to promote women's labor force participation. The evidence suggests that these labor supply effects can be substantial, particularly for childcare-focused programs, and they can yield tax revenues to finance the program.

LIMITATIONS AND GAPS

Knowledge of the impacts of universal preschool has grown tremendously in recent years. However, the literature has some weaknesses. For example, despite the popularity of the RD approach, there remain important unanswered questions surrounding its use to estimate the immediate test score impacts of universal preschool [12]. Regardless of methodology, estimates also tend to be less precise than would be ideal, with more uncertainty about the results than researchers often acknowledge. As a result, the literature as a whole provides stronger evidence than any individual study. Expanding the quasi-experimental research even where it is relatively strong to include more countries and more programs—following best practices with regard to implementation, presentation of findings, and assessment of their uncertainty—should therefore be a priority for future research. Developing social experiments to estimate the impacts of large-scale universal programs, so as to sidestep some of these limitations, should also be a priority.

Evidence on universal early education is also lacking in some substantive areas. For example, there is much demand to know how universal preschool transforms people's lives as adults, so it is important to lay the groundwork now to produce such studies as participants enter adulthood. In the meantime, we need to learn more about the effects of these programs on the non-cognitive skills that might be the bridge to later life outcomes, as well as about the process of test score “fadeout” more generally. We also need to learn much more about which inputs generate the types of learning environments that deliver results. Resources like teacher education and the length of the program day are easily observed and legislated, but there is considerable heterogeneity in the true process quality of programs that share these characteristics [13]. Knowing what makes for an effective program would go a long way toward designing programs that deliver greater benefits at lower cost.

SUMMARY AND POLICY ADVICE

The evidence on universal early education points to a series of potential tradeoffs in policy design. For example, childcare orientation may be more effective in raising revenue in the short term to pay for the program, though childcare programs tend not to be as beneficial for children as do preschool programs—and they may even be harmful. Furthermore, because the benefits of high-quality early education are larger for disadvantaged children, such programs can promote a more equitable distribution of outcomes. However, the costs of the program are the same for all, and the most advantaged children could even be made worse off by participation. While the overall social benefits of high-quality universal programs might still exceed the costs over the long term [3], policymakers should consider the possibility that the same benefits could be delivered at lower cost through an income-targeted program.

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Competing interests

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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