

Evaluating Public Education Programs with Close Substitutes: The Case of Head Start

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Project Description

Studies of small-scale “model” early childhood programs, such as the Perry Preschool and Abecedarian Projects, show that preschool can boost educational and economic outcomes in both the short- and long-run, particularly for disadvantaged children (Anderson 2008, Berruta-Clement et al. 1984, Campbell and Ramey 1994, 1995, Heckman et al. 2010, 2013, Schweinhart et al. 2005). The striking success of these programs suggests that early-childhood educational interventions targeted to the poor are a promising means of reducing income inequality and promoting equitable growth. This idea is at the core of President Obama’s recent proposal to expand publicly provided preschool (Obama 2013).

In contrast to the evidence on model programs, evidence on the effects of Head Start, the largest early childhood program in the United States, is mixed. Despite early non-experimental studies suggesting sizeable gains (Curry and Thomas 1995, Garces et al. 2002, Deming 2009), a recent randomized evaluation of the Head Start program produced disappointing results (Barnett 2011). Specifically, results from the Head Start Impact Study (HSIS) showed that children offered Head Start outscored those denied admission to the program by only 0.1 standard deviations on measures of cognitive skill during preschool, with the estimated gains dissipating entirely by kindergarten. Moreover, the HSIS experiment showed no evidence of effects on a variety of non-cognitive and health outcomes (Puma et al. 2010).¹ On the basis of the HSIS results, critics of the program have argued that Head Start inadequately serves its target population (Burke and Muhlhausen 2013).

Our project will revisit this conclusion by accounting for the role of “substitution bias” in the HSIS experiment. This bias results from the fact that many of the households in the HSIS control group managed to attend private preschool or a Head Start center other than the one at which they were denied admission. Because many of the controls received some form of treatment, simple treatment-control contrasts will understate (perhaps dramatically) the impact of enrolling a child in Head Start who would not otherwise attend preschool. Moreover, these substitution biases may grow over the course of the experiment as denied applicants find alternate programs.

We will conduct an assessment of the extent of substitution bias in both contemporaneous program impacts, and the rate at which impacts fade out in later years. Specifically, we aim to identify the dynamic effects of shifting students (for various durations): i) from private preschool to Head Start, ii) from no preschool to Head Start, and iii) from no preschool to private preschool. All of these effects are policy relevant, as the aggregate effects of introducing a public preschool program, or scaling back an existing program, depend critically on how children are shifted between these three alternatives.

In related work, Heckman et al. (2000) addressed substitution bias in a large job-training program by applying instrumental variables techniques which essentially scale treatment-control

¹ Gelber and Isen (2013) show that Head Start participation increased parental involvement with children after the program ended.

contrasts by differences in program participation. Such an approach assumes that the effects of all sorts of training are identical. In our setting, it is likely that private preschool has different effects from Head Start, which would invalidate the instrumental variables approach. Moreover, there is substantial interest in understanding whether the duration of a child's exposure to Head Start (or its substitutes) has a nonlinear influence on the magnitude and duration of program effects – questions that cannot be answered using standard instrumental variables techniques.

Our methodological approach will be to apply non-experimental “value added” methods to the HSIS data. Previous research (e.g. Chetty et al. 2013a, 2013b) has shown that value added techniques are effective at dealing with the selection problems inherent in educational interventions in observational settings. We will study whether these methods, when applied to experimental data, can be used to identify substitution biases and nonlinearities in the dose-response relationship. To conduct this assessment, we will develop new value added models adapted to an environment with multiple treatment arms (e.g., one year of Head Start, two years of Head Start, one year of private preschool). We will then provide new results showing that, under weak assumptions (similar to those in Kline and Tartari, 2013), the experiment reveals the fraction of children pushed from no preschool to Head Start and from private preschool to Head Start. Accordingly, a weighted average of program effects estimated from the value added model should rationalize the observed experimental impacts. We will examine whether this is the case, and whether the value added model can explain heterogeneity in program impacts across subgroups observed to respond in different ways along these two margins of adjustment. Our methods will be of general interest to researchers exploiting random lottery designs likely to suffer from substitution biases (e.g. Abdulkadiroglu et al., 2011) and to researchers interested in the ability of value added methods to identify the causal effects of educational interventions (Kane et al. 2013).

We will use our estimates to conduct a cost-benefit analysis of the Head Start program and conduct a prospective assessment of the hypothetical effects of altering the program's enrollment criteria to favor more disadvantaged students. We will also provide estimates of the welfare effects of the current Head Start program and its consequences for equitable growth. The output of the project will be an academic paper which we plan to submit to a top economics journal such as the American Economic Review.

Study Timeline

We expect the project to require two years to complete. The first year will be spent obtaining and cleaning the HSIS data and applying the new econometric methods. The second year will be spent writing up the results, presenting the research findings, and submitting the working paper.