Paper #2: "Experimental Evidence on the Effect of Childhood Investments on Postsecondary Attainment and Degree Completion"

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Aims of the study and theoretical framework

Education is intended to pay off over a lifetime. Economists conceive of education as a form of "human capital," requiring costly investments in the present but promising a stream of returns in the future. Economists looking backward at a number of education interventions (e.g., Head Start, compulsory schooling) have identified causal links between these policies and long-term outcomes such as adult educational attainment, employment, earnings, health and civic engagement (Ludwig and Miller, 2007; Deming, 2009; Angrist and Krueger, 1991; Dee, 2004; Lleras-Muney, 2005). But decision-makers attempting to gauge the effectiveness of current education inputs, policies and practices in the present can't wait decades for these long-term effects to emerge. They therefore rely upon short-term outcomes – primarily standardized test scores – as their yardstick of success.

A critical question is the extent to which short-term improvements in test scores translate into long-term improvements in well-being. This is the question we address in this paper. Puzzling results from several evaluations make this a salient question. Three small-scale, intensive preschool experiments produced large effects on contemporaneous test scores that quickly faded (Schweinhart et al., 2005; Anderson, 2008). Non-experimental evaluations of Head Start, a preschool program for poor children, reveal a similar pattern, with test score effects gone by middle school. In each of these studies, treatment effects have re-emerged in adulthood as increased educational attainment, enhanced labor market attachment, and reduced crime (Deming, 2009; Garces et al., 2002; Ludwig and Miller, 2007).

Methods and data sources

We examine the effect of smaller classes on educational attainment in adulthood, including college attendance, degree completion and field of study. We exploit random variation in class size in the early grades of elementary school created by the Tennessee Student/Teacher Achievement Ratio (STAR) Experiment. Participants in the STAR experiment are now in their thirties, an age at which it is plausible to measure completed education. Our postsecondary outcome data is obtained from the National Student Clearinghouse (NSC), a national database that covers approximately 90% of students enrolled in colleges in the U.S.

Results and discussion

We find that attending a small class increases the rate of postsecondary attendance by 2.7 percentage points. Black students and students eligible for free lunch show larger impacts, 5.8 and 4.4 percentage points, respectively. Among those with the lowest predicted probability of attending college, the effect is 11 percentage points. Attending a small class increases the probability of earning a college degree by 1.6 percentage points; among those with the lowest *ex ante* probability of degree completion the effect is 4.2 percentage points. Smaller classes shift students toward earning degrees in high-earning fields such as science, technology, engineering and mathematics (STEM), business and economics.

Our analysis identifies the effect of manipulating a single educational input on adult educational attainment. By contrast, the early-childhood interventions for which researchers have identified lifetime effects (e.g., Head Start, Abecederian) are multi-pronged, including home visits, parental coaching and vaccinations in addition to time in a preschool classroom. We cannot distinguish which dimensions of these treatments generate short-term effects on test scores, and whether they differ from the dimensions that generate long-term effects on adult well-being. The effective dimensions of the treatment are also ambiguous in a recent paper (Chetty et al., 2011) that estimates (using the STAR data) very large effects of kindergarten classroom assignment on adult well-being. In that analysis, the "treatment" that produces significant variation in adult outcomes excludes random assignment to small vs. regular classes, consisting of anything else that varies at the classroom level, such as teacher quality and peer quality. By contrast, the effects we measure in this paper, both short-term and long-term, can be attributed to a well-defined and replicable intervention: reduced class size.

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