The Effects of Kindergarten Classroom on Earnings in the United States

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Sector(s): Education

Location: United States of America

Sample: 10,992 students between kindergarten and third grade

Target group: Students

Outcome of interest: Earnings and income Enrollment and attendance Student learning

Intervention type: Early childhood education Tailored instruction

AEA RCT registration number: AEARCTR-0001022

Research Papers: The Effects of Kindergarten Classroom on Earnings: Evidence From Project STAR

Notes: This analysis was done by J-PAL affiliate Raj Chetty of a randomized evaluation run by the STAR project, using additional data collected by the authors

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The long-term impacts of early childhood education can be difficult to study given the scarcity of data linking a child's education to his or her outcomes as an adult. Researchers measured the effect of class size, teacher quality, and classroom quality on earnings and other future outcomes for children participating in the Student/Teacher Achievement Ratio (STAR) project in Tennessee. The study found that smaller class sizes raised college attendance, more experienced teachers increased future earnings of their students, and higher quality classrooms improved both college attendance and future earnings. Researchers found that the positive effects of early childhood education on test scores diminish over time, but positive effects on non-cognitive outcomes persist through adulthood.

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Evidence for the long-term impact of early childhood education remains scarce due to the limited amount of data that link educational characteristics and adult outcomes. Researchers have documented short-term impacts of education interventions such as improvements in standardized test scores; however, there is limited rigorous evidence on whether these short-term effects persist over a longer time period. Understanding whether early education interventions affect future outcomes, such as college attendance and earnings, could allow policymakers to use limited education budgets more effectively. For example,

information on earnings could have implications for the long-term benefits to students generated by teachers and accordingly for determining teacher salaries. Furthermore, knowledge of the long-term effects of class size, teacher quality, and classroom quality may shed light on how school quality can affect income equality in the United States.

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Project STAR was conducted among 79 schools in Tennessee from 1985 to 1989, and nearly all of the participating children were born in 1979 and 1980. The project targeted students from disadvantaged backgrounds between kindergarten and third grade. The STAR project students had an average household income of $48,014 as compared to an average of $65,661 among a random sample of individuals born in 1979 and 1980 in the United States. Students in the study sample took an achievement test to evaluate their performance in reading and math.



Young students play with their teacher in a classroom in the US.

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The STAR project randomly assigned students and teachers to classes with differing characteristics, enabling researchers to measure the effects of class size, teacher quality, and class quality on future student outcomes. Upon entering school, students in the STAR project were randomly assigned to a small (13-17 students) or large (20-25 students) class in their schools. About half of the students studied joined STAR project schools in kindergarten while the other half enrolled in grades 1, 2, or 3. The class assignments (small versus large) applied up until the students entered fourth grade, at which point students returned to regular classes. Students were given a Stanford Achievement Test annually to assess math and reading ability. Additionally, for a random

subset of students in grades 4 and 8, teachers evaluated non-cognitive skills such as effort, initiative, non-participatory behavior, and the value the student ascribed to the class. The authors of this study link the data provided by project STAR with administrative data that yields information on a number of outcomes including college attendance, earnings, home ownership, and 401(k) savings.

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Impact on college attendance: The study found that early childhood education did impact long-term future outcomes. More specifically, a smaller class size increased college attendance by 1.8 percentage points (a 6.7 percent increase relative to the average college attendance of about 26 percent among the control group).

Impact on adult earnings: In addition to college attendance, childhood education also influenced adult earnings. Having a kindergarten teacher with over ten years of experience increased students' average annual wage earnings by $1,093 (6.9 percent) between 2005 and 2007. Similarly, an improvement in class quality increased average annual income earned between ages 25 and 27. The study defined class quality as the difference in standardized exam scores (administered at the end of the year) between a student's classmates and students in the same grade, but in different classes.

Impact on test scores: Researchers observed that higher class quality was associated with higher test scores in the year that students entered the STAR project, but faded by the time students reached grade 8.

Impact on non-cognitive skills: The researchers found that although kindergarten class quality had no significant effect on grade 8 test scores, it did improve grade 8 non-cognitive skills. More experienced kindergarten teachers likewise raised grade 8 non-cognitive skills. In fact, non-cognitive skills explained more of the increases in future earnings than cognitive skills (test scores) did, suggesting a potential mechanism through which early childhood education influences long-term outcomes. This merits further research on non-cognitive skills as well as classroom quality as potentially significant determinants of future life outcomes.

Chetty, Raj, John Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Schanzenbach, and Danny Yagan. 2011. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR." The Quarterly Journal of Economics 126(4): 1593-1660.