Transitional Kindergarten vs. Pre-Kindergarten: A Fuzzy Regression Discontinuity Analysis of Student Literacy Skills

Christopher Doss

Abstract

A growing body of research provides evidence that quality early childhood experiences can affect a host of life outcomes. Equally well documented is the variation in quality of prekindergarten programs (pre-K) offered to children. In this study, I employ a fuzzy regression discontinuity approach to evaluate the efficacy of Transitional Kindergarten (TK) on student outcomes in a large, urban district in California. Importantly, universal prekindergarten was already established in the city which the district serves, making this study a comparison of different prekindergarten opportunities. TK is a highly regulated, state funded, early education program designed to provide a more developmentally appropriate kindergarten curriculum. This study is a test of whether a more regulated and academically oriented pre-K program improve over a more traditional pre-K approach for young five year olds. I find that students who attended TK outperform their peers on a variety of foundational literacy skills. In addition I find some evidence that the gains are larger for minority children.

Background and Motivation

- High quality early childhood education (ECE) programs can lead to short and long term benefits for students (Currie & Thomas, 2000; Gornely et al. 2005, 2011; Garces, Thomas & Currie, 2002; Bellfield et al. 2006; Ludwig & Miller, 2007; Deming, 2009; Heckman et al. 2010; Puma et al. 2010; Huang, 2012; Campbell et al. 2012; Anderson, 2012)
- This has spurred many states and localities to invest in prekindergarten programs (Gornely et al., 2005; Huang, 2012; Wong et al., 2008)
- Despite advances there are still inequities in ECE. Economically disadvantaged and minority families are less likely to opt into formal programs or choose less effective programs (Magnuson et al. 2004; Magnuson & Waldfogel, 2005; Phillips and Lowenstein, 2011; Capiziano, 2009)
- These sorting patterns are also tied to academic outcomes (Bassok at al. forthcoming, Lee et al., 1998; Lu et al., 2004)
- There is also dramatic variation in stability, education, and compensation of teachers in the ECE sector (Bassok et al., 2013).

This Study

- Can a more highly regulated and academically oriented pre-K program produce better academic outcomes (literacy) in kindergarten?
- Also contributes to the debate as to how much we should emphasize academics in the early years (Elkind & Whitehurst, 2001; Zigler & Bishop, 2006; Stipek, 2006; Hatch, 2002)
- Analyzes effects of a new state-mandated prekindergarten program in California called Transitional Kindergarten (TK)
- Importantly, universal prekindergarten has been established in San Francisco
- 83% of four year old enrolled in pre-kindergarten in 2012

Data and Outcomes

- 6,773 kindergarten students in the 2013-2014 and 2014-2015 school years
- 3,334 classified as Limited English Proficient (LEP)
- 949 students were eligible for TK
- 336 enrolled in TK
- Main Outcome is fall kindergarten and first grade results of the Fountas and Pinnell Benchmark Assessment System
- Measures early literacy skills and ability reading books of increasing difficulty
- LEP students have fall kindergarten and first grade California English Development Test (CELDT) scores
- Overall Scale Score, Listening, Speaking, Reading, Writing

How is TK Different Than Pre-K?

<table>
<thead>
<tr>
<th>Prekindergarten</th>
<th>Transitional Kindergarten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Programs</td>
<td>Teachers</td>
</tr>
<tr>
<td>Ranges from home-based, to center-based, to Head Start, to school based</td>
<td>Must have at minimum a bachelor’s degree</td>
</tr>
<tr>
<td>Only 2-5.5 hour days are subsidized</td>
<td>6 hour program completely free</td>
</tr>
</tbody>
</table>

Structure of Day

- Children start at different times based on contract
- 1 hour of outdoor time
- Curriculum map and timeline exist
- Whole group instruction lasts no more than 10 minutes
- Whole group instruction used less frequently
- Maximum class size of 24 students

Identification Strategy

- Maximum class size of 24 students
- 1 adult for every 4 children
- Paraprofessional for first 6 weeks

Results

Fall Kindergarten Fountas And Pinell Results

- Individual Pre-Literacy Skills
- Heterogeneity of Fall Kindergarten F&P By Subgroup
- Total Items Missed

Transitional Kindergarten

<table>
<thead>
<tr>
<th>Fall Kindergarten CELDT Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
</tr>
<tr>
<td>0.141*</td>
</tr>
<tr>
<td>0.217</td>
</tr>
</tbody>
</table>

Robustness

- First stage shows a robust 33% take up of the program
- Good balance of covariates across threshold
- McCrady density test (2008) fails to detect a discontinuity in density of observations around threshold. Point estimate is 0.110 with standard error of 0.089
- Functional form is a linear spline and results are robust to a variety of bandwidths including local linear regressions
- Placebo regressions fail to detect effects at false values of the birthdate cutoff
- Results are robust to eliminating heaps of observations of various sizes (Barreca et al., 2015)

Conclusions

- A more highly regulated pre-kindergarten program improved pre-literacy outcomes
- Low income and minority students now have access to a free, full day early childhood program
- Decrease in labor market credential variation
- Decrease in curriculum variation
- More academic curriculum
- Evidence that Asian and Hispanic subgroups benefited the most and white the least
- Without TK minority students may choose less pre-K or less effective pre-K
- Results only valid for children near the December 2nd threshold

* p<0.10, ** p<0.05, *** p<0.01