

Putting “Pre” in “School”: The Institutionalization of Preschool in Elementary Schools

Introduction

High-quality early childhood education is a promising intervention that has been shown to boost children’s school readiness (see Kholoptseva, 2016, for a comprehensive meta-analysis), ameliorate school readiness gaps (Reardon & Portilla, 2016), improve health outcomes in later life (e.g., Reynolds et al., 2007), and pay dividends to society writ large through reduced incarceration rates, for example (Deming, 2009; Heckman et al., 2010). Many of these promising findings, however, come from a series of small experimental interventions that took place over 40 years ago, such as the Perry Preschool Project in Ypsilanti, Michigan. Since that time, Pre-K programs have been brought to scale in states across the country; today, nearly 32 percent of 4-year-olds are served through publicly-funded Pre-K programs (Barnett et al., 2017). Unfortunately, these programs are not providing the promising impacts of the smaller, experimental interventions (Bailey et al., 2017; Yoshikawa et al., 2013). While many have shown initial, positive impacts on child outcomes, the impacts do not reliably persist into elementary school—a pattern referred to as the *fade-out effect* (Bailey et al., 2017).

Researchers have been working in recent years to help identify the components that constitute high-quality Pre-K programs and the features that sustain their effect. One understudied element relates to the *physical location of Pre-K settings*—namely, whether or not Pre-K programs are located in school buildings or stand-alone centers. The purpose of this study is to address this issue through analysis of nationally-representative data from Early Childhood Longitudinal Study-Kindergarten Cohort of 2010-11 (ECLS-K).

Research Questions

1. Do students have different educational outcomes in grades Pre-K through 3 if they attend school-based versus non-school-based Pre-K?
2. Do students who attend school-based Pre-K have different educational outcomes if they remain in the same elementary school that they attended Pre-K in versus those who switched to another elementary school?

Methodology

Data Source

Data for this study come primarily from the Early Childhood Longitudinal Study: Kindergarten Class of 2010-11 (ECLS-K:2011) along with supplemental data from the Common Core of Data and GIS. The ECLS-K:2011 is a longitudinal, nationally-representative panel survey that documents children’s experiences from kindergarten through fifth grade.

Measures

Preschool Setting. In the fall of kindergarten, parents of sampled children responded to survey items about their child’s educational experiences in the year before kindergarten. Specifically, they were asked whether their child attended center-based child care, relative care, non-relative care, or Head Start. To distinguish between school-based and non-school based Pre-K, I rely on parent reports from the ECLS-K survey as well as merged data from the Common Core of Data (CCD). If a child attended center-based child care, their parent was also asked about whether the program was in its own building or within an elementary school. The parent was also asked if the program was located in the school where the child now attends kindergarten. Thus, I have two specifications of the independent variable. The first indicates

children who attended school-based Pre-K, generally. The second indicates children who attended school-based Pre-K and also attended kindergarten in the same location. It is in this latter specification that I link the ECLS-K: 2011 data to the CCD to confirm that these respondent's schools indeed offered Pre-K, thus reducing measurement error and attenuation of estimates to the null.

Outcomes. A key benefit of the ECLS-K:2011 is that it includes a wide range of academic and non-academic outcome measures, enabling me to take a holistic view of the association between Pre-K setting type and child outcomes. Academic outcomes include direct assessments of mathematics and reading achievement using ECLS-K:2011-developed assessments. Item Response Theory scores from these assessments are included and analyzed for the fall of kindergarten as well as the spring of kindergarten, first, second, and third grade.

The ECLS-K:2011 also includes a set of teacher-reported non-academic outcomes that I include as outcomes. Specifically, I include measures of internalizing and externalizing problem behaviors, approaches to learning, self-control, and interpersonal skills. Consideration of non-academic skills alongside academic skills is critical as some previous analyses have found that Pre-K attendance may positively impact academic outcomes while adversely impacting non-academic outcomes (Yoshikawa et al., 2013).

Covariates. The ECLS-K:2011 includes an extensive amount of information about children's backgrounds, parent practices, and early-school experiences that I leverage to control for the non-random selection of children into school-based and non-school-based Pre-K settings. A detailed list of these measures is provided in Table 1.

Analysis

The central challenge in this analysis is how to address that children are not randomly assigned to either school-based or non-school-based Pre-K settings. To determine causal effects, all omitted variables that are simultaneously related to the outcome of interest and the independent variable needs to be addressed or else estimates could be biased (Schneider et al., 2007). I use a range of econometric techniques to address this challenge. First, I estimate a baseline Ordinary Least Squares (OLS) model with saturated controls. Second, I build on this baseline OLS model with fixed effects models that control for time-invariant unobservables at the classroom, school, district, and state levels. In fixed effects models, coefficients are estimated using variation within each unit held fixed (e.g. schools), essentially like how dummy variables operate.

The third model specification uses propensity score methods. Propensity score methods first model selection into "treatment" of either school-based or non-school-based Pre-K. These scores were then be used for two different ways: (1) propensity score matching and (2) propensity score weighting (Dehejia & Wahba, 2002). In the latter, saturated controls and fixed effects were added to variations of the model.

A fourth model uses instrumental variables. In this model, I link respondent census block IDs and elementary school addresses using GIS software and use the distance between the two as an instrument for attending school-based preschool.

Results

Initial results indicate large, positive effects of school-based Pre-K on academic outcomes compared to non-school-based Pre-K (0.17 SD Reading; 0.23 SD Math). Furthermore, the effects for academic achievement are more sustained in early-elementary school for children who attended school-based Pre-K and stayed in the same elementary school. In terms of non-

academic outcomes, I find few differences in outcomes between children who attended school-based Pre-K versus non-school-based Pre-K.

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Table 1. Variables List

	Variable Description	ECLS-K Variable Name	Variable Type
<i>Outcomes</i>			
	Mathematics Achievement	X*MSCAL	Continuous
	Reading Achievement	X*RSCAL	Continuous
	Internalizing Problem Behaviors	X*TCHINT	Continuous
	Externalizing Problem Behaviors	X*TCHEXT	Continuous
	Approaches to Learning	X*TCHAPP	Continuous
	Self-Control	X*TCHCON	Continuous
	Interpersonal Skills	X*TCHPER	Continuous
<i>Independent Variables</i>			
	School-Based Pre-K Attender	Derived from X12PRIMPK	Indicator
	School-Based Pre-K Attender, Same Elementary School K-3	Derived from X12PRIMPK, School IDs	Indicator
<i>Covariates</i>			
	Socioeconomic Status	X**SESL	Continuous
	Child Race	X_RACETH_R	Indicator
	Home Language	X**LANGST	Indicator
	Gender	X_CHSEX_R	Indicator
	IEP Status	T*IEP	Indicator
	Birthweight	PIWEIGHO	Continuous
	Parental Education	X**PAR*ED_I	Continuous
	Single-Parent Family	X*NUMSIB	Indicator
	Number of Siblings	X*NUMSIB	Continuous
	Region of County	X*REGION	Indicator
	Urbanicity	X*LOCALE	Indicator
	Home Cognitive Stimulation	Scale derived from HEQ010A-I	Continuous
Note. When wave-specific variables are listed, I replace the wave number with a "**".			