Title: Impact of the Introduction of State Pre-k Programs on Head Start Enrollment of Children with Disabilities

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Abstract (non-blinded version)

Background/Context

The past two decades marked the rapid expansion of state-sponsored pre-kindergarten (pre-k) programs as an effort to promote early childhood education and invest in human capital. Pre-k programs constitute a close substitute for Head Start (HS), the federal government's preschool program for disadvantaged children. Research suggests that while pre-k brings about competition for 4-year-old children and teachers, it also provides opportunities for HS to extend services to children, such as three-year-olds, who are not typically represented in pre-k (Aikens, Klein, Tarullo, & West, 2013; Bassok, 2010; Bassok, 2012). Indeed, scholars envision that one future direction for HS to augment pre-k programs is to focus on areas that are not typically addressed in pre-k, such as serving 3-year-old children and children with disabilities (Bowman, 2004; Zigler, Gilliam, & Jones, 2006).

Our study examines the possibility that the introduction of pre-k may make more HS spaces available to children with disabilities as it differentially draws typically-developing children away from HS. Given its long-standing commitment to serving children with disabilities, this would be a natural area for HS to focus on in response to the pre-k expansion. HS requires that each program reserve at least 10% of the spaces for children with disabilities and serves a higher percentage of preschool-aged children with disabilities than found in the overall population (6%) (Administration for Children & Families, 2018). Children in HS are more likely to have multiple disabilities and have their disabilities verified by doctors than those in other types of child care (Lee & Rispoli, 2016). Because HS provides comprehensive services including health, nutrition, and social services, it may be more attractive to families of children with disabilities (Chaudry et al., 2011; Gilliam, 2008).

Existing literature on HS and pre-k focuses heavily on evaluating the average effects of the two programs, supplemented with a small literature examining the variation in treatment effects including the effects on children with disabilities (Weiland, 2016). Limited studies have examined the impact of pre-k on HS in regards to enrollment and teacher recruitment and retainment, yet this literature is fairly inconclusive and does not capture the full spectrum of the interplay between HS and pre-k.

Focus of Study/Objective

Our study aims to examine the causal impact of the introduction of state pre-k programs on the HS enrollment of children with disabilities using a differences-in-difference design. We also explore supplementary analyses to shed light on parental selection into pre-k or HS (i.e., the enrollment of children with disabilities identified before vs. after HS enrollment) as well as heterogeneity analyses regarding disability types and HS location.

Research questions:

1. Does the introduction of pre-k programs affect the HS enrollment of children with disabilities?
2. If so, do pre-k programs affect the HS enrollment of children with disabilities through its enrollment of children whose disabilities were identified before or after enrollment, or both?
3. Does the effect of pre-k introduction on the HS enrollment of children with disabilities vary by disability types (e.g., speech impairment) and HS location (e.g., school system)?

By focusing on children with disabilities, this study sheds light on how HS might have "repositioned" itself to target areas that are not typically stressed in state pre-k programs. The exploration of mechanisms and heterogeneous effects provide hypothesis-generating evidence related to parental selection into ECE programs with respect to children with disabilities. Taken together, results from this study will inform the federal and state governments in funding allocation and identify areas of support in serving this important population of young, low-income children.

Data and Key Measures

We use comprehensive administrative data on all HS programs nationwide, the Program Information Report (PIR), from 1988 to 2015, to identify HS enrollment of children with disabilities, with different types of disabilities, whose disabilities were identified before and after enrollment, and program location. We define the pre-k start year in each state following Barnett et al. (2009), supplemented by information in *The State of Preschool Yearbook 2018* (Friedman-Krauss et al., 2018).

Summary Statistics. Figure 1 shows that the percentage of states with pre-k programs rose sharply from 25% to over 80% as 24 states introduced pre-k between 1988 and 2015, providing sufficient variation to support our analysis. Among the states that introduced pre-k, the proportion of HS enrollment of children with disabilities dropped slightly from 15% to less than 13% (Figure 2). State-specific trends also show an overall decline in the proportion of HS enrollment of children with disabilities (Appendix Figure 1).

Research Design

To address the endogeneity of states' pre-k policies, we exploit variation in the timing of states' pre-k program implementation using a differences-in-differences design. We use program-level data with state-year fixed effects to capture state- and program-level confounders but also estimate state-level models as a robustness check. We include a wide range of time-varying program and state covariates to account for any remaining bias. The event study of pre-trends shows no evidence of the violation of the parallel trends assumption (Figure 3).

Preliminary Results

Preliminary results show that, contrary to our hypotheses, the state-level introduction of pre-k programs decreases the HS enrollment of children with disabilities. This does not differ by whether children's disabilities were identified before *or* after enrollment (Table 1). The estimates are robust in the state-level analysis, albeit with reduced significance level (Appendix Table 2). Particularly, pre-k programs seem to draw children with speech impairment, intellectual disability, and autism away from HS (Table 2). Investigation of the heterogeneous effects of program location reveals that HS programs operated by private providers bear most of the impact of pre-k, whereas HS programs located in school systems are able to circumvent some of the competition brought about by pre-k (Table 3). Our results suggest that parents of children with disabilities who would choose center care may select into pre-k programs with the expansion of pre-k.

Next Steps

We will conduct robustness checks such as using different pre-k start year definitions, restricting the sample to states with more pre-treatment years, and grouping disability types to reduce the probability of false positives.

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Table 1. Effects of Pre-k Introduction on Head Start Enrollment of Children with Disabilities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Proportion of children with disabilities			Proportion of children whose disabilities were identified before program enrollment			Proportion of children whose disabilities were identified after program enrollment		
Pre-k adoption	-1.273*	-1.264**	-1.367**	-0.605+	-0.580+	-0.693*	-0.685*	-0.711**	-0.696*
	(0.523)	(0.432)	(0.446)	(0.348)	(0.298)	(0.290)	(0.287)	(0.254)	(0.278)
Observations	51,081	51,081	51,081	51,081	51,081	51,081	51,081	51,081	51,081
R-squared	0.126	0.128	0.170	0.143	0.145	0.172	0.127	0.129	0.137
State-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
State covariates	N	Y	Y	N	Y	Y	N	Y	Y
Program covariates	N	N	Y	N	N	Y	N	N	Y

Note. Program-level data used to capture program-level differences that might correlate with HS enrollment. State covariates include proportion of SNAP benefits recipients, proportion of AFDC recipients, gross state product (in 2015 dollars), poverty rate, K-12 pupil-teacher ratio, K-12 per pupil expenditure, majority party in the House, and population. HS program covariates include cumulative enrollment, full-day, program location, proportion of teachers with a Bachelor degree or higher, whether having a full-time disability manager, and proportion of non-English speaking children enrolled. Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2. Effects of Pre-k Introduction on HS Enrollment of Children with Different Types of Disabilities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)
VARIABLES	Proportion of children diagnosed with health impairment	Proportion of children diagnosed with emotional/ behavioral disorder	Proportion of children diagnosed with speech impairment	Proportion of children diagnosed with intellectual disability	Proportion of children diagnosed with hearing impairment	Proportion of children diagnosed with orthopedic impairment	Proportion of children diagnosed with visual impairment	Proportion of children diagnosed with learning disabilities	Proportion of children diagnosed with autism	Proportion of children diagnosed with traumatic brain injury	Proportion of children diagnosed with other disabilities	Proportion of children diagnosed with multiple disabilities
Pre-k adoption	-0.185+	-0.018	-1.300**	-0.047+	0.036+	-0.022	0.014	0.041	-0.070*	-0.012	0.005	-0.011
	(0.102)	(0.038)	(0.384)	(0.028)	(0.020)	(0.016)	(0.016)	(0.065)	(0.029)	(0.009)	(0.419)	(0.086)
Observations	51,081	51,081	51,081	51,081	51,081	51,081	51,081	51,081	40,466	40,466	40,466	45,487
R-squared	0.083	0.055	0.169	0.043	0.017	0.047	0.024	0.040	0.097	0.004	0.297	0.167
State-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State covariates	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Program covariates	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: Only the most restricted models with state-year FE and the full set of controls are shown due to limited space. Enrollment of children with autism, traumatic brain injury, and other disabilities are only available from 1994 onward. Enrollment of children with multiple disabilities are unavailable from 1999 to 2001. Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 3. Effects of Pre-k Introduction on HS Enrollment of Children with Disabilities by HS Location

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Proportion of children with disabilities			Proportion of children whose disabilities identified before program enrollment			Proportion of children whose disabilities identified after program enrollment		
Pre-k adoption	-1.411*	-1.418**	-1.558***	-0.790*	-0.764*	-0.876**	-0.644*	-0.688**	-0.713**
	(0.528)	(0.446)	(0.426)	(0.340)	(0.298)	(0.270)	(0.296)	(0.250)	(0.253)
School system provider	1.429*	1.411*	0.959	0.368	0.362	0.297	1.080+	1.067+	0.692
	(0.675)	(0.665)	(0.639)	(0.325)	(0.319)	(0.366)	(0.553)	(0.551)	(0.554)
Government agency provider	1.110*	1.076*	0.977+	0.440	0.443	0.374	0.588	0.551	0.503
	(0.497)	(0.486)	(0.574)	(0.312)	(0.315)	(0.409)	(0.397)	(0.393)	(0.386)
Tribal provider	-0.735	-0.674	-0.784	-0.904	-0.864	-1.130*	0.135	0.159	0.302
	(0.977)	(0.983)	(1.011)	(0.546)	(0.554)	(0.540)	(0.586)	(0.585)	(0.610)
School system*Pre-k	0.440	0.472	0.556	0.765*	0.769*	0.692+	-0.319	-0.289	-0.131
	(0.735)	(0.731)	(0.710)	(0.323)	(0.318)	(0.350)	(0.589)	(0.589)	(0.603)
Government provider*Pre-k	-1.052	-0.963	-0.590	-0.347	-0.333	-0.088	-0.596	-0.517	-0.368
	(0.655)	(0.666)	(0.707)	(0.404)	(0.409)	(0.469)	(0.441)	(0.448)	(0.443)
Tribal provider*Pre-k	2.644*	2.575*	2.105+	1.055+	1.004+	0.896	1.591*	1.571*	1.221
	(1.145)	(1.153)	(1.141)	(0.578)	(0.587)	(0.563)	(0.766)	(0.766)	(0.781)
Observations	51,081	51,081	51,081	51,081	51,081	51,081	51,081	51,081	51,081
R-squared	0.136	0.138	0.165	0.150	0.152	0.168	0.133	0.135	0.136
State-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
State covariates	N	Y	Y	N	Y	Y	N	Y	Y
Program covariates	N	N	Y	N	N	Y	N	N	Y

Note: Private provider is the reference group. Robust standard errors in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Figure 1. Pre-k Program Rollout across States 1988 - 2015

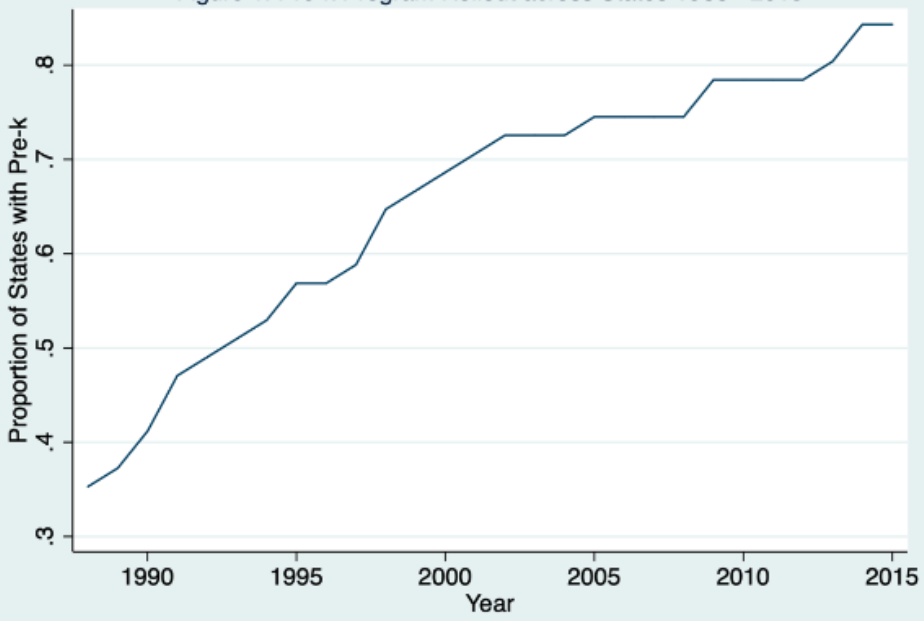


Figure 2. State Trends of Head Start Enrollment of Children with Disabilities by Switching Status

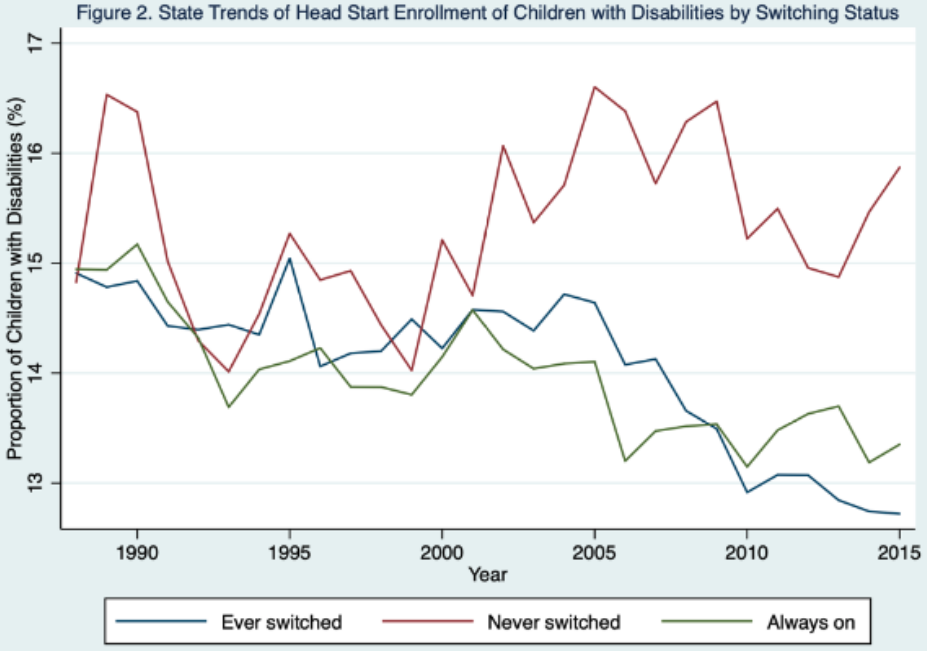
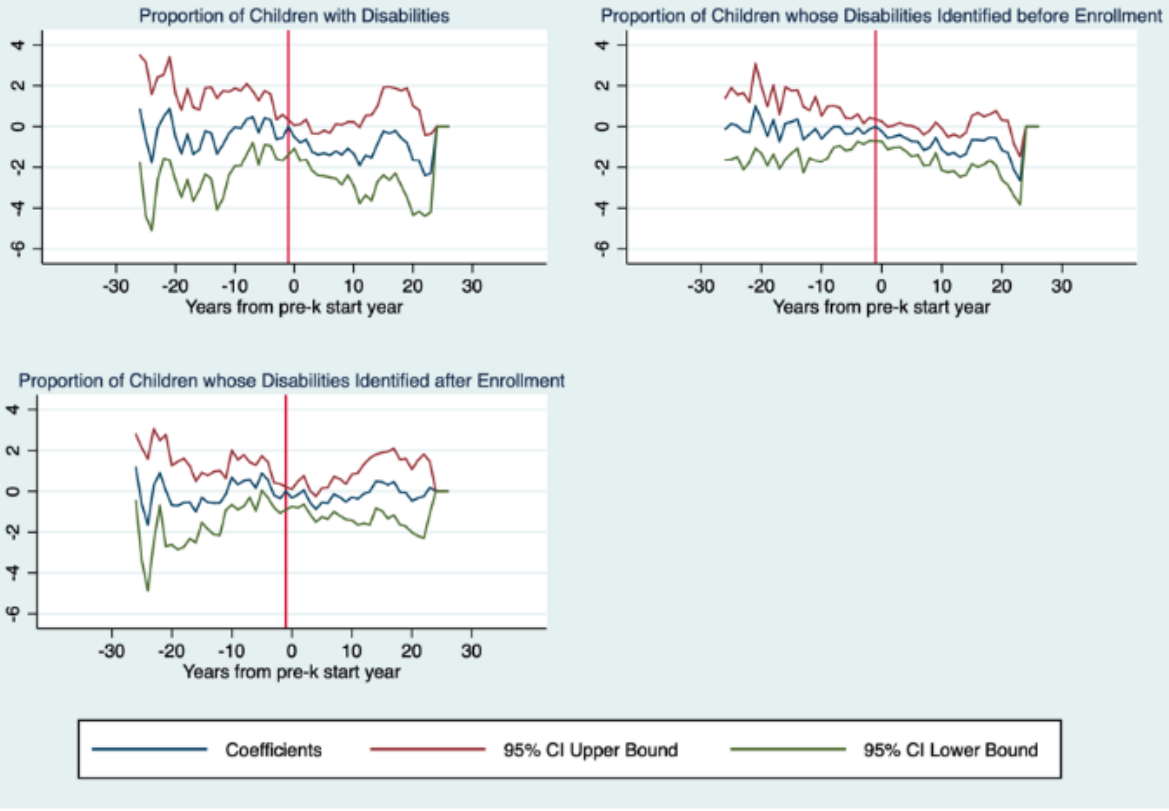


Figure 3. Event Study of Head Start Enrollment of Children with Disabilities



Appendix Table 1. Pre-k Start Year by State and Switching Status between 1988 and 2015

Ever-switched States		Always-on States		Never-on States	
Alabama	2000	California	1965	Idaho	no
Alaska	2009	Colorado	1988	Indiana	no
Arizona	1991	DC	1960s	Minnesota	2016
Arkansas	1991	Illinois	1985	Montana	2017
Connecticut	1997	Louisiana	1988	New Hampshire	no
Delaware	1994	Maine	1983	North Dakota	2016
Florida	2005	Maryland	1979	South Dakota	no
Georgia	1995	Massachusetts	1985	Utah	no
Hawaii	2014	Michigan	1985	Wyoming	no
Iowa	1989	New York	1966		
Kansas	1998	Oklahoma	1980		
Kentucky	1990	Oregon	1987		
Mississippi	2013	South Carolina	1984		
Missouri	1998	Texas	1985		
Nevada	2002	Vermont	1987		
Nebraska	1992	Washington	1985		
New Jersey	1999	West Virginia	1983		
New Mexico	1991	Wisconsin	1873		
North Carolina	2001				
Ohio	1990				
Pennsylvania	1993				
Rhode Island	2009				
Tennessee	1998				
Virginia	1995				

Note: Indiana was considered as having a state pre-k program from 2014 t0 2017 in the State of Preschool Yearbooks series. In the latest version of this report (2018), NIEER no longer considers its state program as a state pre-k program using new criteria. We follow their definition here.

Appendix Table 2. Robustness Check: Effects of Pre-k Introduction on Head Start Enrollment of Children with Disabilities (State Aggregation)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Proportion of children with disability		Proportion of children whose disabilities identified before program enrollment		Proportion of children whose disabilities identified after program enrollment	
Pre-k adoption	-0.936+	-0.797+	-0.447	-0.423	-0.513+	-0.404
	(0.470)	(0.451)	(0.361)	(0.352)	(0.281)	(0.280)
Observations	1,428	1,428	1,428	1,428	1,428	1,428
R-squared	0.709	0.727	0.762	0.774	0.680	0.692
State-year FE	Y	Y	Y	Y	Y	Y
State covariates	N	Y	N	Y	N	Y

Note. Outcome variables are aggregated at the state level. Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1