# Examining the Denver Preschool Program Tuition Credit

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## Background

Although the most common strategy for improving children's participation in high-quality early childhood education (ECE) is through the expansion of pre-kindergarten (pre-k) programs, most pre-k programs have not been universally available due to income restrictions or lack of funding (Friedman-Krauss et al., 2019; Karoly et al., 2016). To address these challenges, many cities have established tuition credit initiatives to improve families' access to high-quality preschools. A unique aspect of tuition credit initiatives is that they are designed to operate within the ecosystem of existing ECE programs. Thus, tuition credit models do not govern the participating programs, nor do they require participating programs to follow a common set of operating and pedagogical standards.

Many tuition credit initiatives rely on a mixed-delivery system in which preschool services are provided in different program settings or auspices, ranging from publicly-funded pre-k programs to non-public community-based centers (Kagan & Kauerz, 2012). A growing body of research suggests that program auspices may be related to program quality (Weiland, 2017), with pre-k programs tending to demonstrate higher instructional quality (Bassok & Galdo, 2016; Winsler et al., 2012) and employ more highly qualified teachers (National Study of Early Care and Education Team, 2013). Thus, initiatives that broaden preschool access across a range of settings may need to examine outcomes separately by program auspice.

## Objective

Despite the growth of tuition credit models, there have been few evaluations that have examined outcomes at kindergarten or beyond. The purpose of this study is to further our understanding of tuition credit models by addressing the following research questions:

1. How is the receipt of a preschool tuition credit related to kindergarten reading achievement?

2. Is there a relationship between receipt of a tuition credit and grade retention and chronic absenteeism at kindergarten?
3. Do the associations vary by the preschool setting that tuition credit recipients had attended?

## Setting/Participants/Intervention

This study examines the Denver Preschool Program (DPP). Established in 2006, the DPP is a voter-approved sales tax initiative that provides a tuition credit to all four-year old children, regardless of income, to attend a preschool of their families' choosing. Tuition credits are based on family income, family size, and the quality of the preschool that families select. Tuition credits are tiered so that lower-income families in higher quality rated programs receive the highest amount of tuition credit. Nearly 80% of Denver's community-based preschools, 100% of pre-k programs that are managed by Denver Public Schools (DPS), and 1% of Denver's licensed family child care homes participate in the DPP. On average, approximately 61% of Denver's four-year old children participate in the DPP.

## Research Design/Data Collection/Analysis

Denver Public Schools provided data for the population of children who were enrolled in kindergarten from the 2009-10 academic year through the 2017-18 academic year. The analytic sample consisted of nine cohorts of kindergartners totaling 64,294 students, of which DPP participants comprised 55% of the sample. The outcome measures included the percentage of students who (a) performed at grade level or higher on a standardized reading achievement test administered at the fall and spring of kindergarten; (b) were retained at the end of kindergarten; and (c) were classified as chronically absent at kindergarten. The covariates included the year in which students were enrolled in kindergarten, student demographics, the percent of the school population who were eligible for free- or reduced-price lunch, and neighborhood wealth indices associated with the students' home zip code (e.g., percent of families living in poverty).

We used a generalized boosted model to estimate the propensity of each student to be a DPP participant. Each DPP student was assigned a weight of 1 and each non-DPP student was assigned a weight equal to the odds of their being in a treatment case. In addition, we re-weighted the data to generate weights for the program setting DPP participants had attended. Following Gormley et al. (2018), we estimated the average treatment effect on the treated.

For achievement, we used the weights in a generalized logistic regression model. For retention, which has a low incidence of occurring, we used penalized logistic regression with a Firth correction. In our outcome models, we adjusted the standard errors to account for students who attended the same school.

## Findings

We achieved substantial balance between DPP participants and non-participants, with the absolute standardized differences no larger than 0.05 across all covariates. Tables 1 provides results for the main effects and Table 2 provides the analogous results by program setting. DPP participants were significantly more likely to have scored at least at grade level in reading than their non-DPP counterparts, and DPP participants were significantly less likely to be chronically absent or to be retained at kindergarten (see Table 1). In addition the effect sizes were considerably stronger for DPS pre-k programs than for community-based preschools, particularly

on achievement, where the effect size for pre-k programs was twice that of the effect size for community-based preschools (see Table 2).

**Conclusions**

The results suggest that tuition credits may be an effective policy for supporting children's short-term outcomes, and at least within this study, effect sizes are larger in DPS pre-k programs than in community-based preschools. Differences in quality between program settings likely account for these findings. Approximately 92% of DPS pre-k programs were rated in the top two quality tiers of the state's quality rating and improvement system, compared to 61% of community-based preschool programs. Additionally, all DPS pre-k teachers have at least a bachelor's degree and hold a teaching license, whereas community-based preschool teachers vary more widely in their preparatory experiences.

Despite being a universal preschool access program, close to 40% of families are not participating. Little is known about the characteristics of the non-participating families, and these unobserved differences may explain the findings. For example, DPP parents may have better understood the importance of early learning experiences, and were therefore more motivated to participate in the DPP. The DPP is currently undertaking efforts to interview non-DPP families to understand their reasons for not enrolling and to identify barriers to participation.

# References

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**Table 1. DPP Participants in Comparison to Non-DPP Students for Academic and Behavioral Outcomes**

| Outcome | Non-DPP | | DPP | | B (S.E.) | Cohen's $h$ |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | | |
| Chronic absenteeism | 28,689 | 26.7% | 35,599 | 17.9% | -0.533 (0.020) ** | -0.214 |
| Retention | 28,692 | 2.4% | 35,602 | 1.3% | -0.648 (0.060) ** | -0.084 |
| Reading (fall) | 21,886 | 35.3% | 25,577 | 47.0% | 0.593 (0.044) ** | 0.239 |
| Reading (spring) | 21,886 | 61.2% | 25,577 | 71.5% | 0.536 (0.024) ** | 0.218 |

Note.

** denotes statistical significance at the 0.01 level.

**Table 2. DPP Participants in Comparison to Non-DPP Students for Academic and Behavioral Outcomes by Program Setting**

| Outcomes | Non-DPP | | DPP: DPS pre-k | | | | DPP: Community-based preschool | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | B (S.E.) | Cohen's $h$ | N | Percent | B (S.E.) | Cohen's $h$ |
| Chronic absenteeism | 28,689 | 27.2% | 26,130 | 18.4% | -0.539 (0.021) ** | -0.210 | 7,866 | 20.1% | -0.411 (0.022) ** | -0.168 |
| Retention | 28,692 | 2.4% | 26,169 | 1.2% | -0.381 (0.044) ** | -0.095 | 7,830 | 1.7% | -0.027 (0.040) | -0.047 |
| Reading (fall) | 21,886 | 36.6% | 17,889 | 49.1% | 0.666 (0.045) ** | 0.253 | 6,437 | 42.5% | 0.303 (0.046) ** | 0.120 |
| Reading (spring) | 21,886 | 62.5% | 17,889 | 74.0% | 0.632 (0.025) ** | 0.249 | 6,437 | 68.3% | 0.317 (0.025) ** | 0.122 |

Notes.

** denotes statistical significance at the 0.01 level.

Results are not comparable to Table 1 due to the data being re-weighted.