

Returns to Large-Scale Public School Pre-K Programs: Evidence from Within All States

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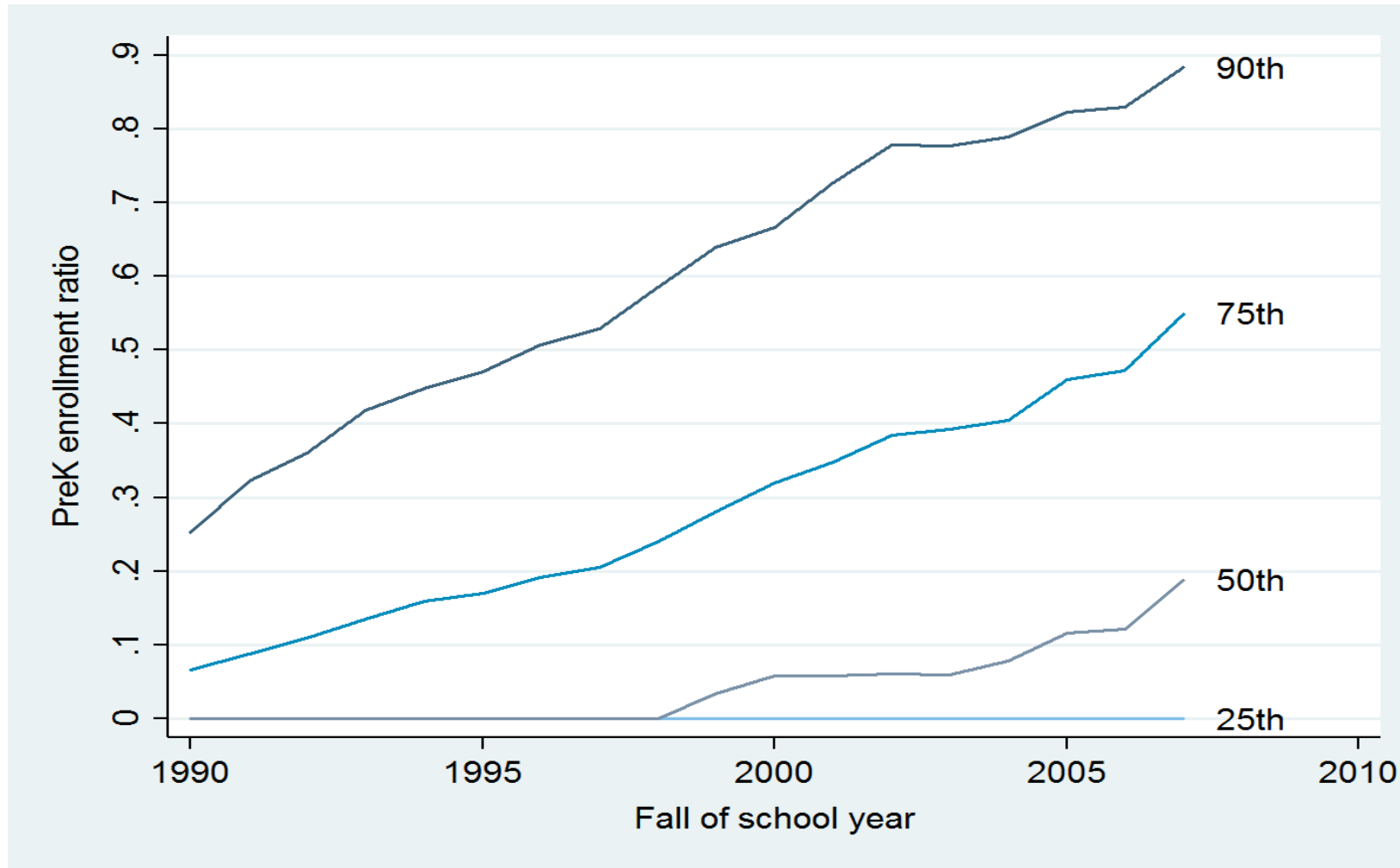
What is this paper's contribution?

- Prior research: pre-K works in both **short-term and long-term in small-scale, high quality programs** (e.g., Perry).
- Prior research: pre-K can work in **short-term and medium-term in large-scale, high-quality programs** (e.g., Tulsa).
- This paper:
 - (1) Does pre-K work on large-scale for **“average” state program, for typical students?**
 - (2) Does pre-K work on large-scale for **“average” state program, for disadvantaged groups?**

This paper's methodology

- We estimate effect of a school district's pre-K enrollment rate in a given year on average 4th grade student outcomes in that school district 5 years later.
- Outcomes: math/reading scores; special ed. & over-age for grade rates.
- Outcome data from National Assessment of Educational Progress, 1998-2013, on over 1 million students in over 5,000 school districts.
- Enrollment rate: Ratio of pre-K to grade 1 enrollment in district, 1993-2008, from Common Core of Data.
- Model controls for student characteristics, district K-12 spending, Head Start & private pre-K enrollment rates.

Variation in Pre-K Enrollment Rate Across Districts, 1990-2007: Quantiles

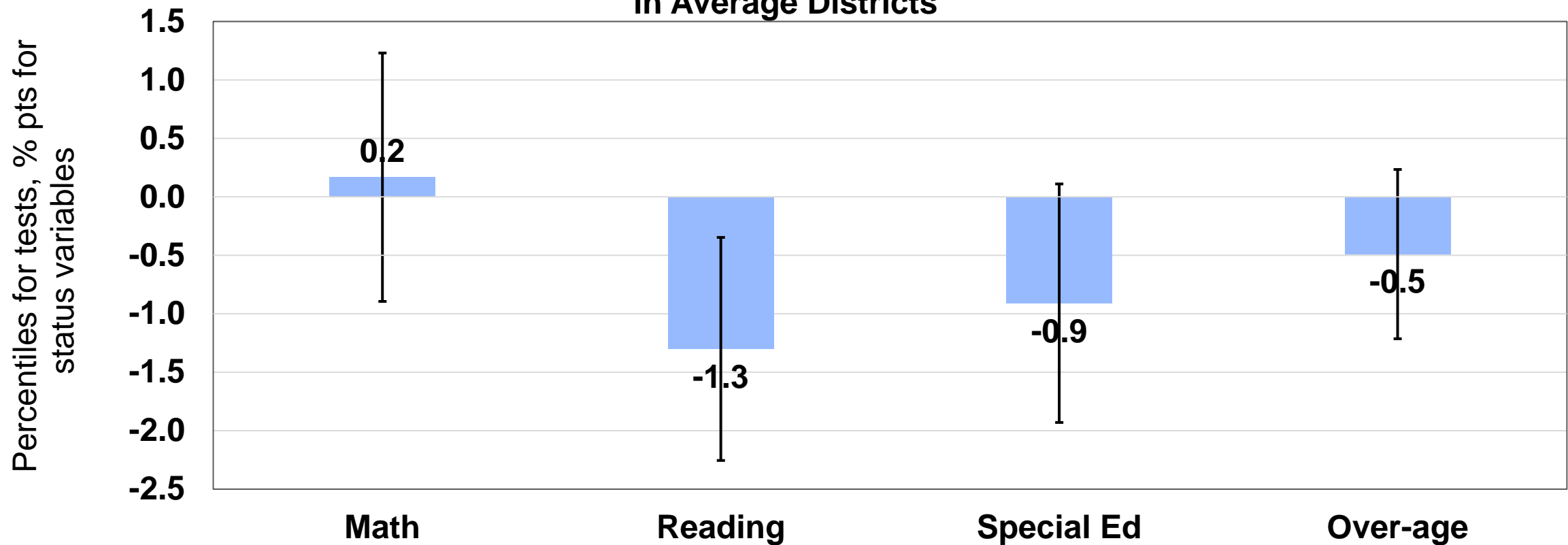


Only modest effects of pre-K needed for pre-K to pass benefit-cost test, because benefits potentially lifelong

- Average cost of typical state pre-K program is about \$5,000/student
- Increase of 1.3 percentiles in avg. test scores at 4th grade would be predicted to increase present value of lifetime earnings by \$5,000.
- Reduction of 3.3 percentage points in % of students in special education sufficient to reduce special education costs by \$5,000, averaged over all pre-K participants.
- Reduction of 2.7 percentage points in grade retention provides benefits from increased earnings & reduced crime of \$5,000.
- Challenge: more difficult to detect modest effects.

For average student in average pre-K program, pre-K has scant benefits at 4th grade

Effects of Average State Pre-K on Average 4th Grade Outcomes in Average Districts

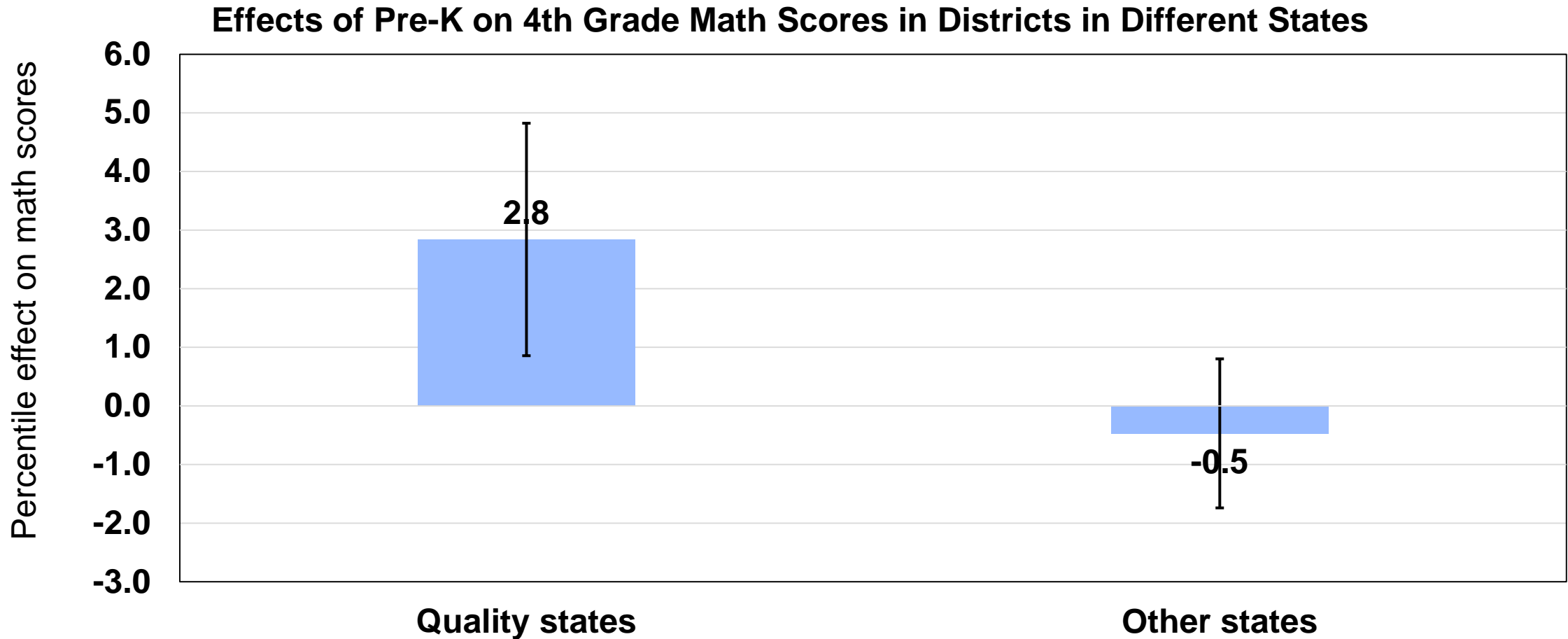


NOTE: 90% confidence intervals are shown.

Quality: We know it when we see it, but...

- Everyone agrees “quality” programs matter
- Difficulty is defining quality: existing metrics (NIEER, CLASS, etc.) only modestly correlated with successful outcomes
- We drew upon expert opinion to designate five states as having high-quality public pre-K before we began data analysis:
 - MD, MA, NJ, NC, and OK
- We compare district pre-K adoption in these five states to district adoption in other states

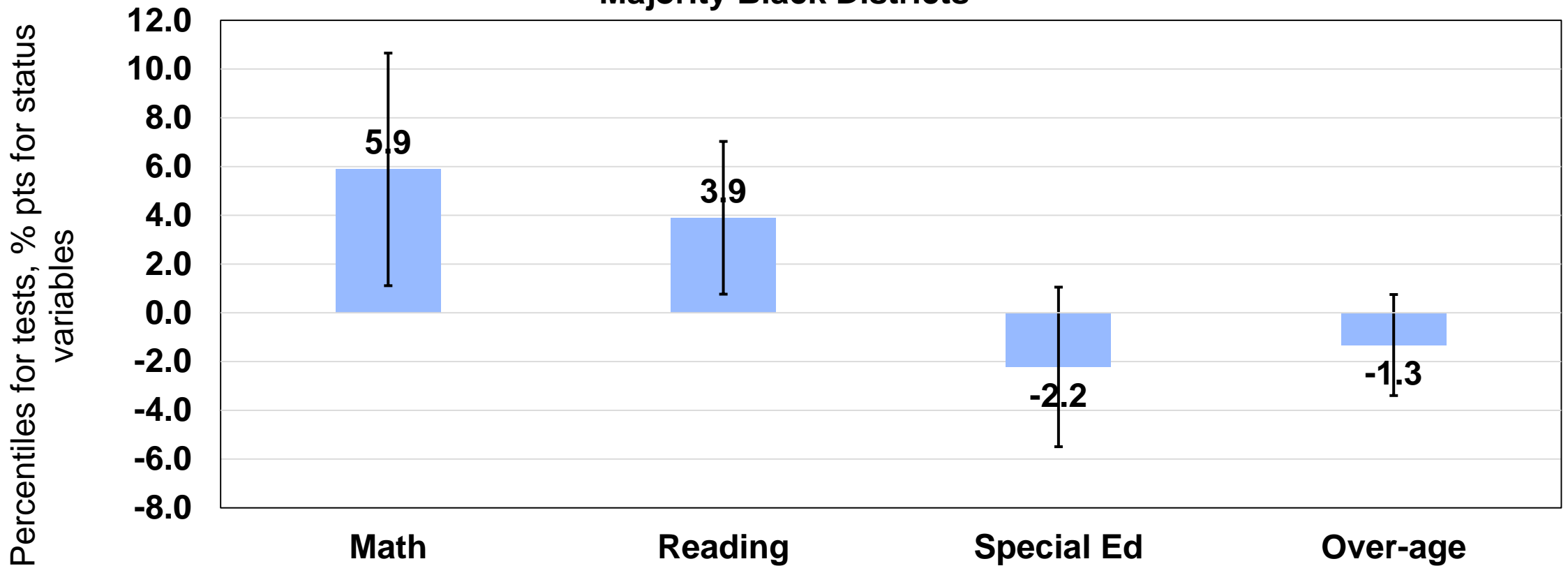
In “high-quality” states (MA,MD,NJ,NC,OK), pre-K increases math scores more than enough to pass benefit-cost test



NOTE: 90% confidence intervals are shown.

In majority Black school districts, pre-K has large effects on both math and reading test scores

Effects of Pre-K on 4th Grade Outcomes,
Majority Black Districts



NOTE: 90% confidence intervals are shown.

Summary

Pre-K on a large scale can work. But it needs to be either:

- (1) High-quality, or
- (2) Targeted at disadvantaged groups.

Caveat: None of this precludes “sleeper effects” that may not be apparent at 4th grade, e.g. high school grad rates.