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Executive Summary of

Comparing Value Added Models for Estimating Teacher Effectiveness

Technical Briefing

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COMPARING VALUE ADDED MODELS FOR ESTIMATING TEACHER EFFECTIVENESS: TECHNICAL BRIEFING

Executive Summary

In the North Carolina Race to the Top proposal, the North Carolina Department of Public Instruction (NCDPI) committed to incorporate teacher effectiveness estimates into the existing teacher evaluation process by adding a criterion for each teacher's effectiveness in raising student test scores. The first step in adding a teacher effectiveness measure is to estimate the effectiveness of individual teachers who taught tested grades and subjects.

The objective of this technical briefing report is to: (1) identify commonly used *value added models* (VAM) for estimating the effectiveness of individual teachers; (2) identify criteria for judging the accuracy (including validity, reliability and consistency in classifying high and low performing teachers) of the VAMs for estimating teacher effectiveness; (3) present the assessment of alternative VAMs for estimating individual teacher effectiveness using both simulated and actual North Carolina data; (4) provide recommendations to NCDPI for them to consider in developing the request for applications (RFA) to estimate the effectiveness of individual teachers and evaluating potential contractors responsiveness to the RFA.

We identified eight primary VAMs (Section 2 and Appendix A) and nine criteria (Section 3) for this evaluation (see Appendix B for a description of the methods). We used both simulated data and actual data from North Carolina from 2005-06 through 2009-10, spanning 3rd through 8th grades. Simulating data allowed us to generate data for which we know each teacher's "true" effect in order to see how closely the alternative VAMs estimates were to the "true" effect. The actual NC data allowed us to assess the reliability, consistency, and percentage of NC teachers that can be expected to be identified as highly effective or ineffective based on the best available data for those assessments.

Based on our findings we recommend that DPI should request contractors to propose one or more of the following value-added models for estimating teachers' effectiveness:

- Three-level hierarchical linear model (HLM3): a 3-level rich covariate multilevel model (4th grade – 8th grades)
- Univariate response model (URM): an EVAAS model developed by the SAS Institute (5th grade – 8th grades)
- Student fixed effects model (SFE): an ordinary least squares model on a 3 year panel with student fixed effects (5th grade – 8th grades)

It is important to note that the HLM3 model allows for teachers from an additional grade level (4th grade) to be included in the teacher effectiveness estimates, which neither of the other higher performing models allow, even though the other higher performing models perform better on some criteria.

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In sections 2 and 3, respectively, we describe the VAM models and criteria used to make these recommendations. In section 4, we provide a summary tabulation of the evidence supporting the recommendations. In the Appendices, we provide tables summarizing the key features of each VAM, explanations supporting the summary tabulation and recommendations, followed by tables developed from analysis of observed and simulated data.

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