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SOUTH CAROLINA TEACHER VALUE-ADDED TECHNICAL REPORT

Academic Year 2024-2025

CONTENTS

INTRODUCTION

This report describes the value-added model used by Education Analytics to measure student growth at the teacher level in South Carolina public schools using South Carolina College-and-Career-Ready Assessments (SC READY) and End of Course Examination Program (EOCEP) test score data. The report is divided into two sections. The first section describes the value-added estimates produced for grades 4 through 8. The second section describes the value-added estimates produced for EOCEP assessments in Algebra 1 and English 2.

Conceptually, value-added analysis is the use of statistical techniques to isolate the component of measured student knowledge that is attributable to teachers. In practice, value-added models focus on the improvement students make on annual assessments from one year and grade to the next.

The model used in South Carolina for teacher value-added controls for up to two years of prior student achievement in English language arts and mathematics, as well as for a selection of student demographic characteristics. It also controls for average prior student achievement in English language arts and mathematics and average demographic characteristics among students associated with the same group of teachers.

VALUE-ADDED MODEL (GRADES 4-8)

Analysis Data Set

Before estimation can take place, a substantial amount of work is required to assemble the analysis data sets used to produce the value-added estimates. A separate analysis data set is produced for each grade and subject. In total, ten analysis data sets are produced, covering grades 4 through 8 for SC READY English language arts (ELA) and math in 2024-25.

Each analysis data set includes students who have a posttest in the grade and subject being considered, who have at least one year of pretests in both ELA and math, and who were tested in consecutive grades.

Student-Level Variables

ASSESSMENTS

The test scores used are from the 2022-23, 2023-24 and 2024-25 SC READY assessments. The value-added system produces teacher-level measures for grades 4 through 8 in ELA and math based on performance on the 2024-25 SC READY. The 2024-25 value-added model in ELA uses the 2024-25 ELA score as the posttest, while the 2024-25 value-added model in math uses the 2024-25 math score as the posttest. All value-added models include pretests in both ELA and math. The assessment scores were used to produce overall value-added measures in both math and ELA for each teacher and for each combination of teachers with students in common.

All test scores were linearly normalized to have a mean equal to zero and standard deviation equal to one by grade and subject. Thus, in the value-added analyses, all test scores were measured relative to the state mean, and in units of the statewide standard deviation of test scores across students by grade and subject. The normalization is used to make it easier to interpret estimated coefficients in the value-added models, but it does not affect the statistical properties of the model or the ranking of teacher measures.

Demographic Variables

In addition to controlling for prior achievement, the value-added model also controls for the following student demographic variables:

- Economic status: Economically disadvantaged; Not economically disadvantaged
- English proficiency: English learner, not English learner
- Disability: With disability, Without disability
- Race: Asian, Black, Hispanic, Native American, and White
- Gender: Female, male

Teacher-Student Matching

In order to create value-added models for teachers, it is necessary to link teachers to the students they teach. The source for this information is school rosters pulled from PowerSchool. School districts were given the opportunity to review and make changes to the students that were assigned to teachers in ELA and mathematics courses. Data from the rosters were used to associate students with teachers in the value-added models.

Descriptive Statistics

Tables 1 and 2 describe the sample used for the 2024-25 school year in Math and ELA, respectively.

Table 1. Sample for 2025 Math Growth

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	All
Number of Students	53545	54078	53774	54315	54634	270346
Number of Schools	668	659	367	350	346	947
Number of School Districts	75	76	76	77	77	77
Percent Economically Disadvantaged	64.34	63.58	63.84	62.90	61.72	63.27
Percent English Learners	9.27	8.80	8.81	8.98	8.89	8.95
Percent with Disability	14.92	14.58	13.83	12.94	12.62	13.77
Percent Asian	3.09	2.94	3.11	2.86	2.84	2.97
Percent Black	34.69	34.82	35.15	35.46	35.12	35.05
Percent Hispanic	13.99	13.44	13.50	13.81	13.84	13.72
Percent Native American	0.89	0.83	0.81	0.81	0.78	0.82
Percent White	47.34	47.97	47.43	47.06	47.42	47.44
Percent Female	49.60	48.94	49.20	49.25	49.22	49.24
2025 Posttest Mean	503.27	543.98	531.13	549.97	581.40	n/a
2025 Posttest Standard Deviation	117.26	109.74	109.46	106.00	101.05	n/a
2024 Math Pretest Mean	468.42	495.30	541.54	527.90	547.62	n/a
2024 ELA Pretest Mean	462.40	527.82	575.44	587.57	621.99	n/a
2024 Math Pretest Standard Deviation	125.41	116.39	113.76	112.09	106.08	n/a
2024 ELA Pretest Standard Deviation	134.94	126.49	125.01	133.30	131.60	n/a
2023 Math Pretest Mean*	n/a	462.13	490.40	538.52	524.65	n/a
2023 ELA Pretest Mean*	n/a	464.36	536.70	579.43	590.55	n/a
2023 Math Pretest Standard Deviation*	n/a	117.59	122.91	111.54	107.12	n/a
2023 ELA Pretest Standard Deviation*	n/a	128.14	122.76	126.00	128.42	n/a

*2023 assessment data are included for students who have the additional year of test data.

Table 2. Sample for 2025 English Language Arts (ELA) Growth

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	All
Number of Students	53384	53938	53649	54223	54512	269706
Number of Schools	669	660	367	349	346	947
Number of School Districts	75	76	75	76	77	77
Percent Economically Disadvantaged	64.28	63.53	63.80	62.86	61.67	63.22
Percent English Learners	9.21	8.78	8.79	8.95	8.88	8.92
Percent with Disability	14.78	14.42	13.72	12.87	12.55	13.66
Percent Asian	3.08	2.94	3.12	2.86	2.85	2.97
Percent Black	34.68	34.79	35.12	35.43	35.10	35.03
Percent Hispanic	13.96	13.42	13.49	13.80	13.84	13.70
Percent Native American	0.89	0.83	0.81	0.81	0.79	0.83
Percent White	47.39	48.01	47.46	47.10	47.43	47.48
Percent Female	49.64	48.94	49.23	49.28	49.26	49.27
2025 Posttest Mean	539.56	557.46	571.47	588.37	611.11	n/a
2025 Posttest Standard Deviation	110.68	95.69	102.42	88.21	94.22	n/a
2024 Math Pretest Mean	468.72	495.57	541.78	528.07	547.79	n/a
2024 ELA Pretest Mean	462.80	528.17	575.71	587.86	622.26	n/a
2024 Math Pretest Standard Deviation	125.38	116.35	113.73	112.09	106.08	n/a
2024 ELA Pretest Standard Deviation	134.79	126.36	124.93	133.19	131.52	n/a
2023 Math Pretest Mean*	n/a	462.41	490.61	538.71	524.80	n/a
2023 ELA Pretest Mean*	n/a	464.69	536.94	579.69	590.78	n/a
2023 Math Pretest Standard Deviation*	n/a	117.52	122.88	111.49	107.14	n/a
2023 ELA Pretest Standard Deviation*	n/a	128.04	122.71	125.91	128.34	n/a

*2023 assessment data are included for students who have the additional year of test data.

The Model Framework

The value-added model describes the achievement of student *i* in classroom *c* in year *t* as in equation (1):

$$y_{ict} = \zeta + \lambda_1 y_{ict-1} + \lambda_1^{alt} y_{ict-1}^{alt} + \lambda_2 y_{ict-2} + \lambda_2^{alt} y_{ict-2}^{alt} + \gamma \bar{y}_{ct-1} + \gamma^{alt} \bar{y}_{ct-1}^{alt} + X_{ict}\beta + \bar{X}_{ct}\theta + \alpha_{ct} + \varepsilon_{ict} \quad (1)$$

where

- *c* is the classroom associated with student *i* in year *t*;
- y_{ict}, y_{ict-1}, and y_{ict-2} are the achievement of student *i* in years *t*, *t*-1, and *t*-2;
- y_{ict-1}^{alt} and y_{ict-2}^{alt} are the achievement of student *i* in the subject other than that of y_{ict} (e.g., y_{ict-1}^{alt} is math achievement if y_{ict} is ELA achievement, and vice versa) in years *t*-1 and *t*-2;
- $\bar{y}_{ct-1}$ and $\bar{y}_{ct-1}^{alt}$ are the averages of y_{ict-1} and y_{ict-1}^{alt} among students in the same classroom and grade in year *t* as student *i*;

- X_{ict} is a vector of characteristics of student *i* at time *t*, including gender, race/ethnicity, English language learner status, economic disadvantage, and special education status;
- $\bar{X}_{ct}$ is the average of X_{ict} among students in the same classroom and grade in year *t* as student *i*;
- α_{ct} is the impact on student achievement y_{ict} of classroom *c* at time *t*; and
- ε_{ict} is the impact of non-school, non-classroom factors on student achievement y_{ict} that cannot be explained with the other variables on the right-hand-side of (1).

In practice, we define classrooms as unique combinations of teachers associated with students. These combinations are defined not only by the set of teachers included in the combination, but also by the proportions of student instruction associated with each teacher in the set. For example, we may define one classroom as including all students associated 70 percent with teacher A and 30 percent with teacher B. We may define another classroom as including all students associated 50 percent with teacher A and 50 percent with teacher B, and a third classroom as including all students associated 100 percent with teacher A.

The student achievement variables y_{ict}, y_{ict-1}, y^{alt}_{ict-1}, etc. in the model above are assumed to be measured without error. In practice, student achievement is inevitably measured with error. Consequently, we define measured achievement – the actual assessment scores used in the data analysis – using the variables:

- Y_{ict}, Y_{ict-1}, and Y_{ict-2} are the measured achievement of student *i* in years *t*, *t*-1, and *t*-2;
- Y^{alt}_{ict-1} and Y^{alt}_{ict-2} are the measured achievement of student *i* in the subject other than that of Y_{ict} (e.g., Y^{alt}_{ict-1} is measured math achievement if Y_{ict} is measured ELA achievement, and vice versa) in years *t*-1 and *t*-2;
- $\bar{Y}_{ct-1}$ and $\bar{Y}^{alt}_{ct-1}$ are the averages of Y_{ict-1} and Y^{alt}_{ict-1} among students in the same classroom and grade in year *t* as student *i*.

We estimate this model separately by subject and grade. This allows the coefficients ζ, λ, γ, β, and θ to vary by subject and grade. It also produces classroom growth measures α_{ct} that differ across subjects and grades within classrooms. We normalize all of the measured assessment score variables Y to have a mean of zero and a standard deviation of one across students by grade and subject.

Estimating the Model Coefficients and Producing Student Growth Residuals

The model described in (1) cannot be estimated in a single step if the classroom effects α_{ct} are fixed. This is because the average prior achievement scores $\bar{y}_{ct-1}$ and $\bar{y}^{alt}_{ct-1}$ and average

demographics $\bar{X}_{ct}$ are perfectly correlated with classroom assignment. Consequently, we estimate the coefficients in (1) in several steps.

First, over a sample of students with measured scores in all three years (*t, t*-1, and *t*-2), we estimate a regression of the posttest score Y_{ict} on the pretest scores Y_{ict-1}, Y_{ict-2}, Y^{alt}_{ict-1}, and Y^{alt}_{ict-2}, the demographic variables X_{ict}, and a full set of classroom fixed effects. We estimate this regression using errors-in-variables (EIV) regression to account for measurement error in the pretests Y_{ict-1}, Y_{ict-2}, Y^{alt}_{ict-1}, and Y^{alt}_{ict-2} using a reliability of 0.94. (For discussion of errors-in-variables regression, see Fuller, 1987.) This produces estimates of the coefficients on the pretests λ_1, λ^{alt}_1, λ_2, and λ^{alt}_2 and the coefficients on the demographics β.

Second, over the same sample of students, we produce a growth residual that controls for student-level prior achievement equal to:

$$q_{ict} = Y_{ict} - \hat{\lambda}_1 Y_{ict-1} - \hat{\lambda}^{alt}_1 Y^{alt}_{ict-1} - \hat{\lambda}_2 Y_{ict-2} - \hat{\lambda}^{alt}_2 Y^{alt}_{ict-2} - X_{ict}\hat{\beta} \qquad (2)$$

where $\hat{\lambda}_1$, $\hat{\lambda}^{alt}_1$, $\hat{\lambda}_2$, $\hat{\lambda}^{alt}_2$, and $\hat{\beta}$ are the estimates of λ_1, λ^{alt}_1, λ_2, λ^{alt}_2, and β produced in the previous step.

Third, we regress q_{ict} on $\bar{Y}_{ct-1}$, $\bar{Y}^{alt}_{ct-1}$, and $\bar{X}_{ct-1}$ using ordinary least squares, producing estimates of the coefficients on the average pretests γ and γ^{alt} and of the coefficients on the average demographics θ. The residual from this regression, which we denote w^{*}_{ict}, is a growth residual that controls for student-level and classroom-level prior achievement and demographics. It is an estimate of the sum of the classroom effect α_{ct} and the residual term ε_{ict}.

Incorporating Students With Only Two Years of Scores

The estimation approach above produces growth residuals for students with measured scores in all three years (*t*, *t*-1, and *t*-2). To include students with measured scores in the two most recent years only (*t* and *t*-1), we repeat the steps in the previous section above by grade and subject over a sample of students with measured scores in the two most recent years (*t* and *t*-1) using a version of (1) that does not include Y_{ict-2} and Y^{alt}_{ict-2} on the right-hand-side. This sample of students includes all students included in the estimation steps described in the previous section, as well as an additional group of students with measured scores in years *t* and *t*-1 but not in year *t*-2. This produces another set of growth residuals, which we denote $w^{\dagger}_{ict}$, which covers all students with measured scores in the two most recent years (*t* and *t*-1).

Over a sample of all students with measured scores in years *t* and *t*-1, we create a combined growth residual equal to:

$$w_{ict} = \begin{cases} w^{*}_{ict} & \text{if student } i \text{ has measured scores in years } t, t\text{-1, and } t\text{-2} \\ w^{\dagger}_{ict} & \text{if student } i \text{ has measured scores in years } t \text{ and } t\text{-1 only} \end{cases} \qquad (3)$$

The growth residual w_{ict} includes all students with scores in years *t* and *t*-1 and controls for student achievement in year *t*-2 when possible. This growth residual is demeaned to have a mean of zero by grade and subject.

Producing Classroom and Teacher Growth Measures by Grade

We produce classroom growth measures by regressing, by ordinary least squares, the combined student growth residual w_{ict} on a full set of clasroom indicator variables. Recall, as noted above, that classroom is defined in practice as a unique combination of teachers. As before, this regression is estimated separately by grade and subject. This produces a fixed effect estimate $\hat{\alpha}_{ct}$ for each classroom by grade and subject. This estimates the impact of classroom *c* on student achievement in year *t* relative to the average classroom impact across students. It is measured in units of standard deviations of achievement across students in the measured posttest Y_{ict}.

From the classroom growth measures by grade, we produce growth measures for each individual teacher by grade by computing a weighted average of classroom growth measures across all classrooms associated with the teacher. The weight used in this average is the number of students associated with the classroom multiplied by the proportion of instruction associated with the teacher among the students in the classroom. We can express this mathematically in equation (4) below:

$$\hat{\alpha}_{jt} = \frac{\sum_c p_{jct} n_{ct} \hat{\alpha}_{ct}}{\sum_c p_{jct} n_{ct}} \qquad (4)$$

where $\hat{\alpha}_{jt}$ is the growth measure for teacher *j* in year *t*; n_{ct} is the number of students associated with classroom *c* at time *t*; and p_{jct} is the proportion of instruction of students in classroom *c* that is associated with teacher *j*. For example, if teacher *j* is associated with a classroom with 12 students, and 75 percent of the instruction of those students is associated with teacher *j*, then the weight with which that classroom enters into teacher *j*'s growth measures is equal to 12 × 0.75 = 9. If teacher *j* is associated with another classroom with 6 students, and 100 percent of the instruction of those students is associated with teacher *j*, then the weight with which that classroom enters into teacher *j*'s growth measures is equal to 6 × 1.00 = 6. If those are the only two classrooms associated with teacher *j*, then teacher *j*'s growth measure is equal to the sum of 9 / (9 + 6) = 0.60 times the growth measure of the first classroom and 6 / (9 + 6) = 0.40 times the growth measure of the second classroom.

We estimate the variance, corrected for sampling error, of the teacher measures $\hat{\alpha}_{jt}$ using the following equation:

$$\hat{\omega}^2 = Var\left[\hat{\alpha}_{jt}\right] - Mean[\hat{\sigma}_{jt}^2] \qquad (5)$$

where $\hat{\omega}^2$ is the estimate of the variance of $\hat{\alpha}_{jt}$ across teachers that is not the result of randomness in individual student growth and $\hat{\sigma}_{jt}^2$ is the square of the estimated standard error of $\hat{\alpha}_{jt}$. We use this variance estimate for two purposes. First, we use it to produce a shrinkage estimate of each teacher's effect on student achievement using Empirical Bayes shrinkage, using the following formula:

$$\tilde{\alpha}_{jt} = r_{jt}\hat{\alpha}_{jt} \qquad (6)$$

where r_{jt}, the reliability of the value-added measure $\hat{\alpha}_{jt}$, is equal to $\hat{\omega}^2\left(\hat{\omega}^2 + \hat{\sigma}_{jt}^2\right)^{-1}$. The shrinkage has the effect of tempering teacher estimates based on small numbers of students, which are typically overrepresented among the highest and lowest values of $\hat{\alpha}_{jt}$ as a result of randomness in individual student growth, toward the average growth measure of zero. The standard error of the shrunk growth measure $\tilde{\alpha}_{jt}$ is equal to:

$$\tilde{\sigma}_{jt} = r_{jt}^{1/2}\hat{\sigma}_{jt} \qquad (7)$$

Second, we use the variance estimate $\hat{\omega}^2$ to rescale both the unshrunk growth measure $\hat{\alpha}_{jt}$ and the shrunk growth measure $\tilde{\alpha}_{jt}$ to be measured in standard deviations of growth across teachers. This is accomplished by dividing the growth measure by the square root of $\hat{\omega}^2$:

$$\hat{\alpha}_{jt}^{tier} = \hat{\alpha}_{jt}/\hat{\omega} \qquad (8a)$$

$$\tilde{\alpha}_{jt}^{tier} = \tilde{\alpha}_{jt}/\hat{\omega} \qquad (8b)$$

where $\hat{\alpha}_{jt}^{tier}$ and $\tilde{\alpha}_{jt}^{tier}$ are the rescaled growth measures, with the *tier* superscript indicating that the growth measures have been rescaled to occupy "tiers" that are for the most part in a range between -3 and +3. The standard errors of the rescaled growth measures are similarly estimated by dividing their standard errors before rescaling by the standard deviation estimate $\hat{\omega}$.

Producing Teacher Team Growth Measures by Grade

In addition to the teacher growth measures described above, we also produce growth measures for each team of teachers by grade. A team of teachers is defined as a set of teachers with shared students. The growth measure of a team of teachers is based on the growth of the set of students who are associated to at least some degree with all of the teachers in the team and who are not associated with any other teachers outside of the team. The difference between a classroom and a team of teachers (as defined for the purposes of the model) is that a classroom is defined both by a set of teachers with shared students and by the proportion of instruction of those shared students associated with each teacher, while a team of teachers is defined only by a set of teachers with shared students regardless of the proportion of instruction of those students associated with each teacher. The growth measures for each team of teachers is computed using a weighted average of the classroom growth measures across all of the

classrooms associated with the team of teachers, using the number of students associated with the classroom as a weight.

After producing growth measures for teacher teams from averaging classroom growth measures, we produce shrunk and/or tiered estimates of the effects of teacher teams using equations (6) through (8) as described in the previous section. When implementing equations (6) through (8) to shrink and tier the teacher team growth estimates, we use the same variance estimate $\widehat{\omega}^2$ as that used to shrink and tier the teacher growth estimates. This variance estimate is employed to ensure that teacher and teacher-team estimates are identical when both are based on the same single classroom of students.

Producing Multi-Grade Teacher Growth Measures

To produce multi-grade teacher growth measures, we compute a weighted average, by subject, of the rescaled, shrunk growth measures $\tilde{\alpha}_{jt}^{tier}$ across grades by teacher. The weight used is the number of students associated with that teacher by grade and subject, multiplied by the average proportion of instruction of those students associated with that teacher by grade and subject.

Properties of the Value-added Results

COEFFICIENT ESTIMATES

The coefficients estimated in the value-added model are presented in Tables 3 through 6. To interpret these coefficients, note that both pretest and posttest are measured using scores that have been standardized to have a mean of zero and a standard deviation of one. For example, note, in the model of 2025 fourth-grade math, that the coefficient on the 2024 math pretest is 0.787 (see Table 3). This means that, at the student level, a one standard deviation increase in the 2024 third-grade math assessment is associated with a 0.787 standard deviation increase in the 2025 fourth-grade math assessment.

It is important to keep in mind the standard errors of the coefficients when interpreting them. A span of 1.96 standard errors in both the positive and negative directions provides a 95 percent confidence range for a coefficient. Continuing with the previous example, note that, in the model of 2024 fourth grade math, the estimated coefficient on 2023 math pretest has a standard error of 0.006. This means that, while our best estimate of the standardized impact on 2024 third-grade math achievement on 2025 fourth grade math achievement is 0.787, a 95 percent confidence interval for this estimated impact ranges from 0.775 to 0.799.

Note that coefficients are presented below for models that include two lags of prior achievement, as well as for models that include only one lag of prior achievement. The coefficients from models that include two lags of prior achievement are employed when measuring the growth of students for whom two lags of prior achievement are available. The coefficients from models that include only one lag of prior achievement are employed when measuring the growth of students for whom only one lag of prior achievement is available.

Table 3. Coefficient Estimates in Double-Lag Model, 2024-25 SC READY Math

	Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Math Pretest	0.787	0.006	0.604	0.009	0.516	0.009	0.658	0.009	0.640	0.012
2024 ELA Pretest	0.063	0.006	0.107	0.010	0.126	0.011	0.091	0.011	0.080	0.012
2024 cl. avg. Math Pretest	-0.113	0.015	-0.078	0.016	0.051	0.015	-0.107	0.011	-0.059	0.015
2024 cl. avg. ELA Pretest	0.135	0.017	0.112	0.017	-0.030	0.017	0.125	0.013	0.106	0.017
2023 Math Pretest	n/a	n/a	0.233	0.008	0.290	0.009	0.195	0.009	0.291	0.011
2023 ELA Pretest	n/a	n/a	-0.031	0.010	-0.023	0.010	0.006	0.011	-0.090	0.011
Econ. Disadv.	-0.067	0.005	-0.041	0.005	-0.059	0.005	-0.018	0.005	-0.016	0.005
Eng. Learners	0.055	0.010	0.050	0.010	0.058	0.010	0.005	0.009	0.048	0.010
Students with Disabilities	-0.076	0.008	-0.018	0.007	0.077	0.007	0.021	0.007	-0.022	0.008
Asian	0.064	0.013	0.110	0.013	0.120	0.012	0.076	0.012	0.118	0.013
Black	-0.067	0.006	-0.009	0.006	-0.030	0.006	-0.029	0.005	0.013	0.006
Hispanic	-0.019	0.008	0.017	0.008	-0.008	0.008	-0.017	0.008	0.013	0.008
Native American	-0.017	0.023	-0.051	0.023	-0.041	0.023	-0.007	0.023	0.006	0.024
Female	-0.103	0.005	0.011	0.004	0.028	0.004	0.000	0.004	0.047	0.004
Econ. Disadv. cl. avg.	-0.116	0.021	-0.107	0.022	-0.116	0.022	-0.122	0.018	-0.039	0.022
Eng. Learners cl. avg.	0.040	0.042	0.119	0.048	-0.099	0.045	0.044	0.037	0.154	0.049
Students with Disabilities cl. avg.	-0.014	0.025	-0.024	0.025	0.022	0.023	0.059	0.018	0.035	0.021
Asian cl. avg.	0.025	0.062	-0.135	0.071	0.137	0.073	0.101	0.062	-0.028	0.076
Black cl. avg.	-0.006	0.019	0.091	0.018	-0.084	0.018	0.014	0.014	0.080	0.017
Hispanic cl. avg.	0.019	0.036	0.017	0.039	0.037	0.038	-0.042	0.031	-0.104	0.041
Native American cl. avg.	-0.131	0.117	-0.300	0.125	-0.091	0.149	0.050	0.098	0.048	0.127
Female cl. avg.	0.007	0.025	0.021	0.026	0.000	0.023	-0.024	0.018	-0.027	0.022

Table 4. Coefficient Estimates in Single-Lag Model, 2024-25 SC READY Math

	Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Math Pretest	0.787	0.006	0.770	0.005	0.726	0.005	0.814	0.006	0.867	0.006
2024 ELA Pretest	0.063	0.006	0.113	0.005	0.142	0.005	0.109	0.005	0.026	0.006
2024 cl. avg. Math Pretest	-0.113	0.015	-0.116	0.015	0.029	0.015	-0.139	0.011	-0.058	0.015
2024 cl. avg. ELA Pretest	0.135	0.017	0.155	0.017	0.009	0.017	0.160	0.013	0.125	0.017
Econ. Disadv.	-0.067	0.005	-0.050	0.005	-0.067	0.005	-0.023	0.005	-0.024	0.005
Eng. Learners	0.055	0.010	0.053	0.010	0.060	0.010	0.001	0.009	0.058	0.010
Students with Disabilities	-0.076	0.008	-0.046	0.007	0.037	0.008	-0.019	0.007	-0.021	0.008
Asian	0.064	0.013	0.110	0.013	0.126	0.012	0.079	0.012	0.126	0.013
Black	-0.067	0.006	-0.023	0.006	-0.052	0.006	-0.037	0.005	0.006	0.006
Hispanic	-0.019	0.008	0.008	0.008	-0.013	0.008	-0.022	0.008	0.017	0.008
Native American	-0.017	0.023	-0.052	0.023	-0.048	0.023	-0.014	0.022	0.002	0.024
Female	-0.103	0.005	0.010	0.004	0.003	0.004	-0.015	0.004	0.035	0.004
Econ. Disadv. cl. avg.	-0.116	0.021	-0.095	0.021	-0.116	0.021	-0.136	0.017	-0.042	0.021
Eng. Learners cl. avg.	0.040	0.042	0.135	0.044	-0.105	0.042	0.045	0.035	0.160	0.046
Students with Disabilities cl. avg.	-0.014	0.025	-0.049	0.025	0.046	0.022	0.049	0.018	0.047	0.021
Asian cl. avg.	0.025	0.062	-0.086	0.067	0.157	0.070	0.094	0.060	0.009	0.072
Black cl. avg.	-0.006	0.019	0.073	0.018	-0.116	0.018	0.014	0.014	0.069	0.017
Hispanic cl. avg.	0.019	0.036	0.001	0.038	0.013	0.037	-0.036	0.030	-0.100	0.039
Native American cl. avg.	-0.131	0.117	-0.336	0.121	-0.005	0.140	0.045	0.097	0.109	0.125
Female cl. avg.	0.007	0.025	0.003	0.025	-0.010	0.023	-0.033	0.018	-0.022	0.022

Table 5. Coefficient Estimates in Double-Lag Model, 2024-25 SC READY ELA

	Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Math Pretest	0.140	0.005	0.110	0.009	0.081	0.009	0.109	0.010	0.120	0.012
2024 ELA Pretest	0.776	0.006	0.577	0.010	0.604	0.011	0.566	0.012	0.557	0.012
2024 cl. avg. Math Pretest	0.072	0.011	0.012	0.011	0.039	0.011	-0.005	0.010	0.029	0.012
2024 cl. avg. ELA Pretest	-0.082	0.012	-0.038	0.012	-0.089	0.011	-0.014	0.010	-0.039	0.012
2023 Math Pretest	n/a	n/a	-0.002	0.008	0.001	0.009	-0.041	0.009	-0.027	0.011
2023 ELA Pretest	n/a	n/a	0.260	0.010	0.258	0.010	0.278	0.012	0.282	0.012
Econ. Disadv.	-0.063	0.005	-0.030	0.005	-0.043	0.005	-0.011	0.005	-0.013	0.005
Eng. Learners	0.056	0.010	0.065	0.010	0.038	0.010	0.025	0.011	0.075	0.011
Students with Disabilities	0.050	0.008	0.052	0.008	0.034	0.008	-0.033	0.008	-0.019	0.008
Asian	-0.008	0.013	0.024	0.013	0.078	0.012	0.064	0.013	0.063	0.013
Black	-0.045	0.006	-0.035	0.006	-0.016	0.006	-0.012	0.006	0.023	0.006
Hispanic	-0.023	0.008	0.002	0.008	0.004	0.008	0.020	0.008	0.014	0.008
Native American	-0.043	0.023	0.003	0.024	-0.026	0.023	0.025	0.025	0.046	0.025
Female	0.036	0.004	0.012	0.004	0.053	0.004	0.085	0.004	0.069	0.004
Econ. Disadv. cl. avg.	-0.118	0.015	-0.080	0.015	-0.108	0.014	-0.049	0.015	-0.022	0.015
Eng. Learners cl. avg.	-0.058	0.029	-0.001	0.031	-0.091	0.026	0.015	0.027	-0.049	0.028
Students with Disabilities cl. avg.	-0.001	0.017	-0.090	0.017	-0.082	0.014	-0.067	0.015	-0.072	0.015
Asian cl. avg.	0.129	0.045	0.125	0.049	-0.011	0.047	0.103	0.049	0.205	0.052
Black cl. avg.	0.025	0.014	0.055	0.013	-0.017	0.012	-0.006	0.013	0.071	0.012
Hispanic cl. avg.	0.080	0.026	0.040	0.027	-0.001	0.024	-0.077	0.025	0.044	0.027
Native American cl. avg.	0.086	0.085	-0.169	0.086	-0.093	0.091	0.043	0.079	0.013	0.090
Female cl. avg.	0.024	0.018	0.023	0.018	0.010	0.014	0.022	0.015	0.009	0.015

Table 6. Coefficient Estimates in Single-Lag Model, 2024-25 SC READY ELA

	Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Math Pretest	0.140	0.005	0.110	0.005	0.087	0.005	0.093	0.006	0.110	0.006
2024 ELA Pretest	0.776	0.006	0.799	0.006	0.829	0.006	0.797	0.006	0.789	0.006
2024 cl. avg. Math Pretest	0.072	0.011	0.040	0.011	0.076	0.011	0.025	0.010	0.070	0.012
2024 cl. avg. ELA Pretest	-0.082	0.012	-0.066	0.012	-0.114	0.011	-0.035	0.010	-0.065	0.011
Econ. Disadv.	-0.063	0.005	-0.040	0.005	-0.049	0.005	-0.011	0.005	-0.022	0.005
Eng. Learners	0.056	0.010	0.007	0.010	0.017	0.010	-0.005	0.011	0.038	0.011
Students with Disabilities	0.050	0.008	-0.003	0.008	0.006	0.008	-0.078	0.008	-0.074	0.008
Asian	-0.008	0.013	0.026	0.013	0.066	0.012	0.055	0.013	0.045	0.013
Black	-0.045	0.006	-0.043	0.006	-0.022	0.006	-0.025	0.006	0.006	0.006
Hispanic	-0.023	0.008	-0.002	0.008	-0.004	0.008	0.012	0.008	0.008	0.008
Native American	-0.043	0.023	0.001	0.024	-0.040	0.023	0.010	0.024	0.037	0.025
Female	0.036	0.004	0.006	0.005	0.054	0.004	0.073	0.005	0.068	0.005
Econ. Disadv. cl. avg.	-0.118	0.015	-0.080	0.015	-0.101	0.014	-0.053	0.015	-0.017	0.015
Eng. Learners cl. avg.	-0.058	0.029	-0.035	0.029	-0.123	0.024	-0.052	0.026	-0.101	0.027
Students with Disabilities cl. avg.	-0.001	0.017	-0.109	0.017	-0.074	0.014	-0.068	0.015	-0.086	0.015
Asian cl. avg.	0.129	0.045	0.182	0.047	0.005	0.046	0.149	0.048	0.202	0.050
Black cl. avg.	0.025	0.014	0.038	0.013	-0.034	0.012	-0.009	0.013	0.067	0.013
Hispanic cl. avg.	0.080	0.026	0.022	0.026	0.004	0.023	-0.066	0.024	0.049	0.025
Native American cl. avg.	0.086	0.085	-0.223	0.085	0.033	0.083	-0.020	0.076	0.001	0.088
Female cl. avg.	0.024	0.018	0.035	0.018	0.022	0.014	0.034	0.015	0.026	0.015

VARIANCE AND RELIABILITY OF VALUE-ADDED MEASURES

Tables 7 and 8 present the variance and reliability of the value-added estimates. The first three rows present the three terms in equation (5). The first row is the variance across teachers in the value-added estimates $\hat{\alpha}_{jt}$, which includes both the variance in the impacts of teachers on student achievement as well as variance in the sampling error with which those impacts are estimated. The second row is an estimate of the variance of that sampling error, which is equal to the average of the squared standard errors across the value-added estimates. The third row is an estimate of the variance across teachers in the actual impacts of teachers. This is estimated by subtracting the second row from the first row, as described in equation (5).

The fourth row of Tables 7 and 8 is an estimate of the standard deviation across teachers in their impacts on student achievement and is equal to the square root of the third row. The fifth row is an estimate of the reliability of the value-added measures. It is equal to the proportion of the variance in the value-added measures that is due to actual differences in the impacts of teachers rather than variance from sampling error. It is computed by dividing the third row by the first row. Finally, the last row of Tables 7 and 8 present the number of teachers used to compute the variance of teacher value-added.

The results in the first four rows of Tables 7 and 8 are measured in units of standard deviations of student achievement the posttest. For example, note that the estimated standard deviation of value-added in fourth-grade math is 0.218. This means that the standard deviation across teachers in their impacts on student achievement is estimated to be 21.8% the size of the standard deviation across students in student achievement in fourth grade math.

Table 7. Variance and Reliability of Math Value-Added

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Variance of estimates ($Var[\hat{\alpha}_{jt}]$)	0.058	0.050	0.040	0.022	0.037
Noise variance ($Mean[\hat{\sigma}_{jt}^2]$)	0.010	0.008	0.004	0.004	0.004
Estimated variance ($\hat{\omega}^2$)	0.048	0.042	0.036	0.019	0.033
Estimated standard deviation ($\hat{\omega}$)	0.218	0.206	0.191	0.137	0.180
Reliability ($\hat{\omega}^2$ / $Var[\hat{\alpha}_{jt}]$)	0.824	0.838	0.900	0.830	0.885
Number of teachers	2775	2594	1466	1567	1601

Table 8. Variance and Reliability of ELA Value-Added

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Variance of estimates ($Var[\hat{\alpha}_{jt}]$)	0.030	0.023	0.016	0.014	0.014
Noise variance ($Mean[\hat{\sigma}_{jt}^2]$)	0.010	0.009	0.005	0.005	0.005
Estimated variance ($\hat{\omega}^2$)	0.019	0.014	0.011	0.009	0.010
Estimated standard deviation ($\hat{\omega}$)	0.139	0.120	0.107	0.097	0.098
Reliability ($\hat{\omega}^2$ / $Var[\hat{\alpha}_{jt}]$)	0.649	0.623	0.714	0.672	0.669
Number of teachers	3117	2948	1903	1782	1780

NEUTRALITY

Correlation with Demographic Variables

The correlations between the value-added measures and demographic variables were generally very low. In other words, teacher value-added and average student characteristics were not substantively empirically related. This is expected given that the value-added model explicitly controls for average student demographics at the classroom level. These correlations are presented in Tables 9 and 10.

Table 9. Correlations between Student Demographics and Math Value-Added

Characteristic	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Overall
Economic Disadvantage	-0.01	0.00	-0.04	-0.02	0.01	-0.02
English Learner	0.01	0.02	-0.02	-0.01	0.01	0.00
Disability	0.01	0.02	-0.06	0.00	0.04	0.00
Asian	0.01	0.00	0.02	0.01	-0.01	0.01
Black	0.00	0.02	-0.04	-0.01	0.02	0.00
Hispanic	0.00	0.00	0.00	-0.02	-0.02	-0.01
Native American	-0.01	-0.03	0.00	0.02	0.03	0.00
White	0.00	-0.02	0.03	0.02	-0.01	0.01
Female	-0.02	0.01	0.00	0.03	0.00	0.01

Table 10. Correlations between Student Demographics and ELA Value-Added

Characteristic	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Overall
Economic Disadvantage	-0.02	0.00	-0.02	-0.02	0.02	-0.01
English Learner	0.01	-0.01	-0.03	-0.01	-0.01	-0.01
Disability	-0.01	-0.01	-0.01	0.04	0.02	0.00
Asian	0.03	0.03	0.00	0.05	-0.01	0.02
Black	-0.01	0.02	0.03	0.00	0.04	0.02
Hispanic	0.02	-0.01	-0.03	-0.04	-0.02	-0.02
Native American	0.00	-0.05	-0.02	0.01	0.01	-0.01
White	-0.01	-0.02	-0.01	0.02	-0.03	-0.01
Female	0.01	0.01	0.01	0.00	0.00	0.01

Correlation with Average Prior Proficiency

The correlation between value-added and prior proficiency (e.g., the correlation between the growth of a teacher's students between third and fourth grade and the third-grade proficiency rate from which those students began their growth) is close to zero. This is an expected result given that average prior achievement, measured using average classroom pretest score, is explicitly controlled for in the model. The correlations are presented in Table 11.

Table 11. Correlations between Prior Attainment and Value-Added

Subject	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Overall
Math	0.01	-0.01	0.04	0.05	0.03	0.03
ELA	0.02	-0.01	-0.01	0.02	0.02	0.01

Correlation between Math and ELA

There were substantive positive correlations between math and ELA value-added. Teachers that were high value-added in math were also more often than not high value-added in ELA. This implies that teachers with a higher-than-average impact in mathematics also had a higher-than-average impact in English language arts. These correlations are presented in Table 12.

Table 12. Correlations in Value-Added between Subjects

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Overall
2025 Math/ELA	0.62	0.57	0.23	0.56	0.15	0.55

VALUE-ADDED MODEL (HIGH SCHOOL)

The value-added model employed for high school teachers in South Carolina is structured very similarly to the value-added model employed for grades 4-8. These models use student growth between a posttest and a pretest, averaged to the teacher level, to measure the impacts of teachers on student achievement. Growth is used to capture the experience of student learning. Averaging growth among students associated with the same teacher reflects the impact on learning of the teacher the students have in common.

The model is operationalized at the teacher level using a regression model structured in the same way as (1), in which the outcome variable is a student's score on an assessment and the predictor variables are a student's scores on prior assessments, a set of student characteristics, the average of those prior assessments and characteristics at the classroom level, and a set of classroom fixed effects. As in (1), we define classrooms as unique combinations of teachers associated with students. One substantive difference is that the outcome assessments are different from the predictor assessments. An advantage of the regression specification is that it does not require the posttest and pretest assessments to be measured using the same scale, or even to be the same assessment.

As in the case of grades 4-8, student growth at the high school level can be understood as the difference between the outcome assessment y_{ict} and the sum of the products of the predictor variables and their coefficients, excluding the classroom fixed effects α_{ct}. The estimated classroom effects, $\hat{\alpha}_{ct}$, are aggregated, shrunk, and standardized to produce teacher value-added growth measures. Some modifications are made to this basic model to measure teacher value-added growth at the high school level. We discuss these modifications below.

High School Growth Outcomes

In the model of teacher growth at the high school level, the outcome (posttest) assessment is the fall or spring End of Course Examination Program (EOCEP) assessments in Algebra 1 and English 2. Students are only included in the growth model if they attempted a given EOCEP assessment in high school. This excludes students who attempted the assessment in middle school. Separate growth models are estimated for fall Algebra 1, spring Algebra 1, fall English 2, and spring English 2.

Rank-Based Z-Scores

The outcome assessments in high school teacher growth are transformed from their native scales to rank-based z-scores before estimating the high school teacher growth models. Rank-based z-scores reshape the distribution of test scores to the standard normal distribution by computing the percentile rank corresponding to each score and converting that rank to a value on the normal distribution using the inverse standard normal cumulative distribution function.

Rank-based z-scores are employed when it is plausible to assume that student content knowledge is distributed normally across students, a distribution that may not necessarily be reflected in the distribution of the untransformed test scores. The decision to employ rank-based z-scores, which are not used in models of growth in grades 4-8, was prompted in part by a distribution of EOCEP scores that was visibly truncated at its maximum score.

Matching Students to Prior Achievement

The most important control variables in a growth model are usually the measures of prior achievement, especially those in the same content area as the posttest. In the model of teacher growth, the pretest assessments are the SC READY assessments in math and English language arts administered at the end of 8th grade. However, given that different students may take the EOCEP assessments at the end of different grades, students may be matched to 8th grade SC READY scores from 2024, 2023, or 2022. These will generally correspond to students attempting the EOCEP assessments in 9th, 10th, and 11th grade. This is accommodated by including, among the growth model's predictor variables, indicator variables for year of pretest assessments and interactions between those indicators and scores on the pretest assessments. This has the effect of incorporating in the model separate intercepts and pretest coefficients by year of pretest assessment.

Among students for whom 8th grade SC READY scores are from 2023 or 2024, the model of teacher growth also controls for 7th grade SC READY scores from the year preceding the 8th grade SC READY scores, when these scores are available. This is executed in the same way as in the teacher growth models for grades 4-8: by estimating versions of the growth model with and without the extra lag of pretest assessments; measuring student growth using the model with the extra lag when possible and using the model without the extra lag otherwise; and regressing student growth on classroom indicators to measure classroom growth.

Attributing Growth to Teachers

In the teacher growth model, all growth is attributed to teachers associated with courses that were listed as a graduation requirement in the content area of the EOCEP assessment (math in

Algebra 1, ELA in English 2) attended by the student in the year in which the student attempts the EOCEP assessment, and only up until the student took the EOCEP assessment. For example, if a student took the EOCEP assessment in the Fall, only Fall courses are considered. However, many students are associated with multiple teachers for that content area for that year. We weight student growth toward a teacher's growth measure in a way that is proportionate to the amount of the student's instructional time that is associated with that teacher. For example, if a teacher is associated with three-quarters of a student's instructional time in math, then that student's growth enters that teacher's growth measure for Algebra 1 with three-quarters weight.

This is operationalized in the same way as it is in the teacher growth model for grades 4-8, with the value-added regression estimated with fixed effects for combinations of teachers, with combinations defined not only by the identities of the teachers but also by the proportions of instructional time associated with the teachers. Student growth from these regressions are used to produce growth measures for combinations of teachers, which are aggregated into growth measures for teachers using a weighted average, with weights equal to the product of the number of students associated with the combination and the weight in the combination associated with the teacher.

Control Variables Included in the Model

We list below the predictor variables in the teacher-level value-added growth models, other than the fixed effects for combinations of teachers (see *Attributing growth to teachers,* above).

Teacher-level model (baseline "single-lag" specification)

- Indicator for 8th grade SC READY scores from 2023 (=1 if yes, =0 if no)
- Indicator for 8th grade SC READY scores from 2022 (=1 if yes, =0 if no)
- 2024 8th grade SC READY math, multiplied by indicator for 8th grade scores from 2024
- 2023 8th grade SC READY math, multiplied by indicator for 8th grade scores from 2023
- 2022 8th grade SC READY math, multiplied by indicator for 8th grade scores from 2022
- 2024 8th grade SC READY ELA, multiplied by indicator for 8th grade scores from 2024
- 2023 8th grade SC READY ELA, multiplied by indicator for 8th grade scores from 2023
- 2022 8th grade SC READY ELA, multiplied by indicator for 8th grade scores from 2022
- Indicator variables for economic disadvantage, ELL, gender, race/ethnicity, and special education
- All of the above variables, averaged by combination of teachers

Teacher-level model (augmented "double-lag" specification)

- All variables in the "single-lag" specification of the teacher-level model
- 2023 7th grade SC READY math, multiplied by indicator for 8th grade scores from 2024
- 2022 7th grade SC READY math, multiplied by indicator for 8th grade scores from 2023

- 2023 7th grade SC READY ELA, multiplied by indicator for 8th grade scores from 2024
- 2022 7th grade SC READY ELA, multiplied by indicator for 8th grade scores from 2023

Four analysis data sets are produced, covering the fall and spring administrations of the EOCEP assessments in Algebra 1 or English 2 in 2024-25. Each analysis data set includes students who have an EOCEP assessment score in the subject and term being considered and who have 8th grade SC READY scores in both ELA and math in 2021-22, 2022-23, or 2023-24.

As noted above, in the teacher-level model, both the baseline "single-lag" and augmented "double-lag" specifications are estimated, and student growth is measured from each model, measured as the difference between the outcome assessment and the sum of the products of the predictor variables and their coefficients, excluding the fixed effects for combinations of teachers. A compiled student growth measure, equal to student growth from the double-lag model when available and from the single-lag model otherwise, is produced and regressed on a full set of fixed effects of combinations of teachers to produce growth measures for combinations of teachers. An exception to the preference for student growth measures from double-lag models is made when the student growth measure from the single-lag model uses a more recent pretest.

Combining Measures Across Fall and Spring Terms

As noted above, separate growth models are estimated for the fall and spring administrations of either EOCEP outcome variable. As a final step, after aggregation from classroom to teacher level, shrinkage, and standardizing growth measures, teacher growth measures are averaged across fall and spring term to produce single growth measures each for EOCEP Algebra 1 and English 2. This average is computed as a weighted average, with weights set to a count of students associated with the teacher in that term that is itself weighted by the proportion of instructional time for those students associated with that teacher.

Other Aspects of the Growth Model

Other aspects of the growth model are largely the same between high school models and models for grades 4-8. These include the use of errors-in-variables regression to estimate the value-added model; the use of shrinkage methods; and standardizing growth measures using their variance across teachers. Properties of the high school teacher growth model are presented in the Appendix.

REFERENCES

Fuller, W. (1987). *Measurement Error Models*, John Wiley and Sons.

APPENDIX

Table 13. Sample for 2025 HS Math Growth

	Fall	Spring	All
Number of Students	14821	26721	41542
Number of Schools	205	254	256
Number of School Districts	69	77	77
Percent Economically Disadvantaged	69.27	72.79	71.53
Percent English Learners	9.76	10.43	10.19
Percent with Disability	14.32	17.39	16.29
Percent Asian	1.81	1.59	1.67
Percent Black	40.23	42.94	41.97
Percent Hispanic	16.40	15.82	16.03
Percent Native American	0.75	0.88	0.83
Percent White	40.81	38.77	39.50
Percent Female	49.21	48.75	48.91
2025 Posttest Mean	67.44	67.51	n/a
2025 Posttest Standard Deviation	14.09	13.52	n/a
2024 Grade 08 Math Pretest Mean	556.30	535.73	n/a
2024 Grade 08 ELA Pretest Mean	630.49	605.98	n/a
2024 Grade 08 Math Pretest Standard Deviation	79.50	73.36	n/a
2024 Grade 08 ELA Pretest Standard Deviation	103.72	102.32	n/a
2023 Grade 08 Math Pretest Mean	495.82	492.38	n/a
2023 Grade 08 ELA Pretest Mean	562.12	551.54	n/a
2023 Grade 08 Math Pretest Standard Deviation	55.30	52.04	n/a
2023 Grade 08 ELA Pretest Standard Deviation	96.12	92.68	n/a
2022 Grade 08 Math Pretest Mean	474.55	466.29	n/a
2022 Grade 08 ELA Pretest Mean	517.01	491.47	n/a
2022 Grade 08 Math Pretest Standard Deviation	51.80	48.77	n/a
2022 Grade 08 ELA Pretest Standard Deviation	83.43	76.59	n/a
2023 Grade 07 Math Pretest Mean	522.04	503.67	n/a
2023 Grade 07 ELA Pretest Mean	604.52	579.11	n/a
2023 Grade 07 Math Pretest Standard Deviation	71.39	68.04	n/a
2023 Grade 07 ELA Pretest Standard Deviation	103.71	100.78	n/a
2022 Grade 07 Math Pretest Mean	468.22	463.61	n/a
2022 Grade 07 ELA Pretest Mean	515.91	504.18	n/a
2022 Grade 07 Math Pretest Standard Deviation	54.28	53.79	n/a
2022 Grade 07 ELA Pretest Standard Deviation	81.68	80.20	n/a

Table 14. Sample for 2025 HS ELA Growth

	Fall	Spring	All
Number of Students	22506	31404	53910
Number of Schools	226	252	256
Number of School Districts	72	79	79
Percent Economically Disadvantaged	62.63	60.46	61.37
Percent English Learners	6.07	6.06	6.06
Percent with Disability	10.24	11.14	10.76
Percent Asian	2.56	2.78	2.69
Percent Black	36.76	35.39	35.96
Percent Hispanic	13.18	12.78	12.95
Percent Native American	0.76	0.72	0.74
Percent White	46.74	48.33	47.67
Percent Female	49.81	49.44	49.59
2025 Posttest Mean	76.23	80.26	n/a
2025 Posttest Standard Deviation	14.46	14.10	n/a
2024 Grade 08 Math Pretest Mean	675.64	674.07	n/a
2024 Grade 08 ELA Pretest Mean	757.35	754.10	n/a
2024 Grade 08 Math Pretest Standard Deviation	97.72	102.15	n/a
2024 Grade 08 ELA Pretest Standard Deviation	83.99	87.24	n/a
2023 Grade 08 Math Pretest Mean	546.97	550.18	n/a
2023 Grade 08 ELA Pretest Mean	620.62	620.95	n/a
2023 Grade 08 Math Pretest Standard Deviation	81.66	88.54	n/a
2023 Grade 08 ELA Pretest Standard Deviation	103.95	109.25	n/a
2022 Grade 08 Math Pretest Mean	491.18	483.03	n/a
2022 Grade 08 ELA Pretest Mean	527.35	509.96	n/a
2022 Grade 08 Math Pretest Standard Deviation	66.27	60.60	n/a
2022 Grade 08 ELA Pretest Standard Deviation	89.82	88.51	n/a
2023 Grade 07 Math Pretest Mean	649.29	646.84	n/a
2023 Grade 07 ELA Pretest Mean	744.31	740.04	n/a
2023 Grade 07 Math Pretest Standard Deviation	100.45	104.29	n/a
2023 Grade 07 ELA Pretest Standard Deviation	88.15	91.25	n/a
2022 Grade 07 Math Pretest Mean	511.70	515.86	n/a
2022 Grade 07 ELA Pretest Mean	562.79	566.07	n/a
2022 Grade 07 Math Pretest Standard Deviation	75.67	84.58	n/a
2022 Grade 07 ELA Pretest Standard Deviation	91.82	99.04	n/a

Table 15. Coefficient Estimates in Double-Lag Model, 2024-25 EOCEP Math

	Fall		Spring	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Grade 08 Math Pretest	0.471	0.022	0.405	0.015
2024 Grade 08 ELA Pretest	0.090	0.025	0.092	0.016
2024 Grade 08 cl. avg. Math Pretest	-0.035	0.039	-0.047	0.024
2024 Grade 08 cl. avg. ELA Pretest	0.151	0.046	0.095	0.028
2023 Grade 08 Math Pretest	0.328	0.043	0.295	0.070
2023 Grade 08 ELA Pretest	0.118	0.055	0.188	0.079
2023 Grade 08 cl. avg. Math Pretest	0.050	0.057	-0.073	0.042
2023 Grade 08 cl. avg. ELA Pretest	0.113	0.059	0.107	0.044
2022 Grade 08 Math Pretest	0.297	0.065	0.340	0.112
2022 Grade 08 ELA Pretest	0.152	0.052	0.148	0.087
2022 Grade 08 cl. avg. Math Pretest	0.007	0.094	-0.158	0.081
2022 Grade 08 cl. avg. ELA Pretest	-0.104	0.098	0.069	0.081
2023 Grade 07 Math Pretest	0.145	0.027	0.097	0.017
2023 Grade 07 ELA Pretest	0.043	0.028	0.027	0.018
2022 Grade 07 Math Pretest	0.180	0.056	0.094	0.084
2022 Grade 07 ELA Pretest	-0.046	0.068	-0.067	0.095
2023 Indicator	-0.573	0.020	-0.424	0.018
2023 cl. avg. Indicator	-0.017	0.035	-0.002	0.027
2022 Indicator	-0.724	0.030	-0.606	0.033
2022 cl. avg. Indicator	-0.497	0.073	-0.347	0.059
Econ. Disadv.	-0.050	0.013	-0.049	0.009
Eng. Learners	0.037	0.024	0.067	0.017
Students with Disabilities	-0.091	0.017	-0.095	0.011
Asian	0.031	0.040	0.032	0.031
Black	0.028	0.014	0.024	0.010
Hispanic	0.029	0.019	0.038	0.014
Native American	0.068	0.062	-0.006	0.040
Female	-0.002	0.011	0.012	0.008
Econ. Disadv. cl. avg.	-0.035	0.061	-0.146	0.041
Eng. Learners cl. avg.	0.123	0.134	0.278	0.081
Students with Disabilities cl. avg.	-0.057	0.064	-0.016	0.038
Asian cl. avg.	0.372	0.284	0.327	0.179
Black cl. avg.	0.187	0.050	0.194	0.032
Hispanic cl. avg.	0.246	0.107	0.154	0.069
Native American cl. avg.	0.592	0.368	0.334	0.203
Female cl. avg.	0.009	0.059	-0.024	0.038

Table 16. Coefficient Estimates in Single-Lag Model, 2024-25 EOCEP Math

	Fall		Spring	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Grade 08 Math Pretest	0.565	0.013	0.476	0.008
2024 Grade 08 ELA Pretest	0.157	0.011	0.133	0.008
2024 Grade 08 cl. avg. Math Pretest	-0.030	0.038	-0.054	0.023
2024 Grade 08 cl. avg. ELA Pretest	0.164	0.045	0.109	0.028
2023 Grade 08 Math Pretest	0.434	0.024	0.340	0.029
2023 Grade 08 ELA Pretest	0.119	0.020	0.156	0.023
2023 Grade 08 cl. avg. Math Pretest	0.083	0.054	-0.070	0.042
2023 Grade 08 cl. avg. ELA Pretest	0.086	0.057	0.112	0.044
2022 Grade 08 Math Pretest	0.310	0.065	0.317	0.110
2022 Grade 08 ELA Pretest	0.138	0.054	0.169	0.088
2022 Grade 08 cl. avg. Math Pretest	-0.016	0.099	-0.133	0.084
2022 Grade 08 cl. avg. ELA Pretest	-0.092	0.104	0.047	0.084
2023 Indicator	-0.573	0.020	-0.436	0.018
2023 cl. avg. Indicator	-0.004	0.033	0.017	0.026
2022 Indicator	-0.719	0.031	-0.630	0.035
2022 cl. avg. Indicator	-0.530	0.076	-0.335	0.062
Econ. Disadv.	-0.054	0.012	-0.050	0.009
Eng. Learners	0.000	0.023	0.053	0.016
Students with Disabilities	-0.109	0.017	-0.103	0.011
Asian	0.058	0.038	0.032	0.029
Black	0.004	0.013	0.010	0.009
Hispanic	0.023	0.019	0.032	0.014
Native American	0.061	0.059	-0.018	0.038
Female	-0.027	0.011	0.000	0.007
Econ. Disadv. cl. avg.	-0.043	0.061	-0.181	0.040
Eng. Learners cl. avg.	0.240	0.127	0.280	0.074
Students with Disabilities cl. avg.	-0.043	0.064	-0.009	0.038
Asian cl. avg.	0.552	0.283	0.340	0.158
Black cl. avg.	0.171	0.050	0.205	0.032
Hispanic cl. avg.	0.203	0.104	0.182	0.065
Native American cl. avg.	0.546	0.374	0.277	0.192
Female cl. avg.	0.000	0.059	-0.056	0.037

Table 17. Coefficient Estimates in Double-Lag Model, 2024-25 EOCEP ELA

	Fall		Spring	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Grade 08 Math Pretest	0.047	0.018	0.036	0.015
2024 Grade 08 ELA Pretest	0.330	0.018	0.313	0.016
2024 Grade 08 cl. avg. Math Pretest	-0.067	0.032	0.024	0.030
2024 Grade 08 cl. avg. ELA Pretest	0.027	0.036	-0.009	0.032
2023 Grade 08 Math Pretest	0.066	0.015	0.101	0.014
2023 Grade 08 ELA Pretest	0.427	0.017	0.411	0.015
2023 Grade 08 cl. avg. Math Pretest	0.046	0.020	0.032	0.017
2023 Grade 08 cl. avg. ELA Pretest	-0.005	0.023	-0.026	0.018
2022 Grade 08 Math Pretest	0.064	0.036	0.042	0.064
2022 Grade 08 ELA Pretest	0.564	0.033	0.657	0.058
2022 Grade 08 cl. avg. Math Pretest	0.070	0.044	0.209	0.050
2022 Grade 08 cl. avg. ELA Pretest	-0.119	0.046	-0.326	0.049
2023 Grade 07 Math Pretest	0.020	0.018	0.043	0.016
2023 Grade 07 ELA Pretest	0.221	0.018	0.184	0.016
2022 Grade 07 Math Pretest	-0.043	0.018	-0.053	0.016
2022 Grade 07 ELA Pretest	0.265	0.019	0.270	0.017
2023 Indicator	-0.940	0.011	-0.885	0.009
2023 cl. avg. Indicator	-0.068	0.018	-0.064	0.016
2022 Indicator	-1.387	0.020	-1.463	0.025
2022 cl. avg. Indicator	-0.279	0.040	-0.229	0.039
Econ. Disadv.	-0.038	0.008	-0.028	0.007
Eng. Learners	-0.043	0.018	-0.036	0.016
Students with Disabilities	-0.101	0.013	-0.106	0.011
Asian	-0.007	0.022	0.024	0.018
Black	-0.060	0.009	-0.035	0.008
Hispanic	0.021	0.012	0.033	0.011
Native American	-0.012	0.039	0.004	0.035
Female	0.001	0.007	-0.010	0.006
Econ. Disadv. cl. avg.	-0.166	0.031	-0.077	0.025
Eng. Learners cl. avg.	0.073	0.076	-0.013	0.057
Students with Disabilities cl. avg.	-0.060	0.036	-0.191	0.028
Asian cl. avg.	0.268	0.104	0.189	0.093
Black cl. avg.	0.091	0.024	0.072	0.020
Hispanic cl. avg.	0.142	0.054	0.182	0.042
Native American cl. avg.	0.159	0.166	0.129	0.145
Female cl. avg.	0.017	0.030	0.014	0.024

Table 18. Coefficient Estimates in Single-Lag Model, 2024-25 EOCEP ELA

	Fall		Spring	
Variable	**Coeff.**	**SE**	**Coeff.**	**SE**
2024 Grade 08 Math Pretest	0.090	0.011	0.092	0.010
2024 Grade 08 ELA Pretest	0.489	0.011	0.450	0.010
2024 Grade 08 cl. avg. Math Pretest	-0.066	0.032	0.022	0.031
2024 Grade 08 cl. avg. ELA Pretest	0.046	0.037	0.011	0.032
2023 Grade 08 Math Pretest	0.064	0.008	0.087	0.007
2023 Grade 08 ELA Pretest	0.630	0.008	0.619	0.007
2023 Grade 08 cl. avg. Math Pretest	0.068	0.020	0.069	0.017
2023 Grade 08 cl. avg. ELA Pretest	-0.020	0.022	-0.056	0.018
2022 Grade 08 Math Pretest	0.080	0.039	0.121	0.080
2022 Grade 08 ELA Pretest	0.550	0.036	0.598	0.069
2022 Grade 08 cl. avg. Math Pretest	0.047	0.046	0.151	0.053
2022 Grade 08 cl. avg. ELA Pretest	-0.115	0.049	-0.290	0.052
2023 Indicator	-0.927	0.011	-0.876	0.009
2023 cl. avg. Indicator	-0.072	0.018	-0.060	0.016
2022 Indicator	-1.386	0.021	-1.469	0.028
2022 cl. avg. Indicator	-0.260	0.042	-0.224	0.041
Econ. Disadv.	-0.039	0.008	-0.036	0.007
Eng. Learners	-0.075	0.017	-0.069	0.015
Students with Disabilities	-0.103	0.013	-0.112	0.011
Asian	-0.005	0.022	0.024	0.018
Black	-0.071	0.009	-0.051	0.008
Hispanic	0.012	0.013	0.030	0.011
Native American	-0.008	0.039	-0.020	0.035
Female	0.005	0.007	-0.004	0.006
Econ. Disadv. cl. avg.	-0.183	0.030	-0.099	0.025
Eng. Learners cl. avg.	0.073	0.073	-0.033	0.055
Students with Disabilities cl. avg.	-0.087	0.036	-0.194	0.028
Asian cl. avg.	0.257	0.106	0.185	0.090
Black cl. avg.	0.075	0.024	0.076	0.020
Hispanic cl. avg.	0.123	0.054	0.188	0.041
Native American cl. avg.	0.194	0.168	0.151	0.141
Female cl. avg.	0.039	0.031	0.035	0.024

Table 19. Variance and Reliability of HS Math Value-Added

	Fall	Spring
Variance of estimates ($Var[\hat{\alpha}_{jt}]$)	0.114	0.090
Noise variance ($Mean[\hat{\sigma}_{jt}^2]$)	0.013	0.010
Estimated variance ($\hat{\omega}^2$)	0.100	0.080
Estimated standard deviation ($\hat{\omega}$)	0.317	0.283
Reliability ($\hat{\omega}^2$ / $Var[\hat{\alpha}_{jt}]$)	0.883	0.891
Number of teachers	1090	1568

Table 20. Variance and Reliability of HS ELA Value-Added

	Fall	Spring
Variance of estimates ($Var[\hat{\alpha}_{jt}]$)	0.018	0.023
Noise variance ($Mean[\hat{\sigma}_{jt}^2]$)	0.008	0.008
Estimated variance ($\hat{\omega}^2$)	0.010	0.015
Estimated standard deviation ($\hat{\omega}$)	0.102	0.123
Reliability ($\hat{\omega}^2$ / $Var[\hat{\alpha}_{jt}]$)	0.572	0.647
Number of teachers	1142	1651

Table 21. Correlations between Student Demographics and HS Math and ELA Value-Added

Characteristic	Math	ELA
Economic Disadvantage	0.00	-0.04
English Learner	0.04	0.06
Disability	0.03	0.07
Asian	0.03	0.04
Black	0.02	-0.01
Hispanic	0.03	0.06
Native American	0.02	0.01
White	-0.04	-0.02
Female	-0.02	0.00

Table 22. Correlations between Prior Attainment and HS Value-Added

Subject	Prior Year	
Math	2024	-0.03
	2023	0.07
	2022	0.03
ELA	2024	-0.05
	2023	0.03
	2022	-0.07

Table 23. Correlations in Value-Added between Subjects

	Correlation
2025 HS Math/ELA	0.44