Florida FCAT and Algebra I EOC 2012-13 Results

August 2013

Presentation Overview

- Summarize FCAT and Algebra EOC value-added model results from the 2012-2013 school year

  - Describe a key difference between current and prior year teacher-level results

- Are the input data accurate and sensible?

  - Examine the descriptive statistics

- Does the model behave as expected?

  - Examine R-squared to determine model fit

  - Examine the variance components

  - Precision and distribution of the value-added scores

- Do the results suggest relationships between value-added scores and classroom characteristics?

  - Impact data based on correlations between value-added scores and class characteristics

Model Background

Florida's Value-Added Models

- After exploring eight different types of value-added models, the SGIC recommended a model from the class of *covariate adjustment models*

- These models begin by establishing an expected growth for each student, which is based on growth of similar students in the same grade during the same year

- To isolate the impact of the teacher on student learning, the model developed by the SGIC and approved by the Education Commissioner accounts for the characteristics of the student and the classroom

FCAT Model Covariates

- Up to two prior test scores
- Fourteen students with disabilities (SWD) status indicators
- Gifted status
- Four English Language Learner (ELL) status indicators (time as ELL)
- Attendance (percent of days present)
- Mobility (number of transitions)
- Difference from modal age in grade
- Number of subject-relevant courses
- Class size
- Homogeneity of entering test scores in the class

Algebra I EOC Model Covariates

- Up to two prior FCAT 2.0 math scores

- English Language Learner (ELL) status (time as ELL)

- Students with Disabilities (SWD) status

- Gifted status

- Difference from modal age in grade

- Mobility (number of transitions)

- Attendance

- Class size

- Homogeneity of entering test scores in the class

- **Percent gifted in class (not in FCAT models)**

- **Percent at modal grade (not in FCAT models)**

- **Mean prior test score in class (not in FCAT models)**

Understanding Value-Added
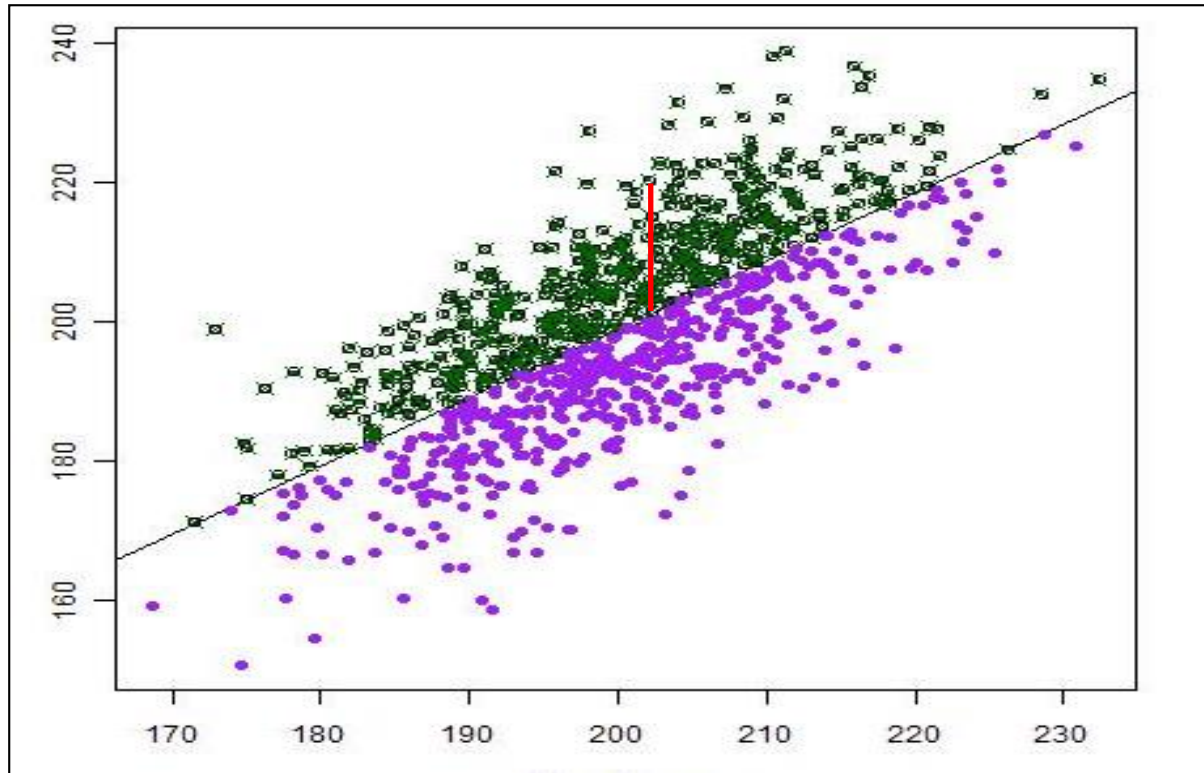
Value-Added Results

- A teacher's value-added score reflects the average amount of learning growth of the teacher's students above or below the expected growth of similar students in the state, using covariates accounted for in the model
  - A score of zero indicates that students performed no better or worse than expected, based on factors controlled for in the model
  - A positive score indicates that students performed better than expected
  - A negative score indicates that students performed worse than expected

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Value-Added Results

- The value-added estimate of a teacher's impact on student learning contains some uncertainty

- The standard error is a statistical term that describes that uncertainty

- Using a standard error to construct a confidence interval around a score (like +/- 3 points in an opinion poll) is a good statistical practice that can increase the accuracy of classification decisions

Value-Added Results Reported

- FCAT model produces results for teachers of grades 4-10 reading and 4-8 mathematics

- Algebra EOC model produces results for teachers of grade 9 only in 2012-13

- FCAT results for teachers are reported as one, two, and three-year averages

- Algebra EOC results are reported as single-year scores

Aggregation

- Teachers with multiple years of VAM scores have an aggregated VAM score

- Aggregated scores are an average of single-year scores, which are weighted by the number of students linked to the teacher that year

- Aggregating over time is a way to improve the reliability of the VAM score

- New teachers have only a single year VAM score; these scores will typically be less reliable than those based on multiple years of data

Input Data

Students Included in the Models

- Students are included if the FCAT models if they have at least one prior score within the previous two years.

- Students are included in the Algebra I model if they have at least one FCAT 2.0 math score available as a predictor variable

- Algebra I model was recommended and approved for grade 9 students only

- Unlike with the FCAT model, teacher value-added scores from the Algebra I model do not include a school component
  - More than a third of schools have only one or two Algebra I teachers

Number of Students

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Reading	173,403	176,016	178,718	177,691	178,601	169,253	166,899
Math	173,093	175,353	178,539	172,262	154,409		
Algebra					(53,673)	99,717	

Average Growth 2011-12 to 2012-13, by Subject and Grade

	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Reading	9.8	7.4	4.8	6.6	6.2	2.9	5.0
Math	12.6	6.1	4.6	9.2	6.9		

Distribution of 2012-2013 FCAT 2.0 Reading Scores by Grade—All Students

Reading Scores

2012-13 FCAT 2.0 Reading Score
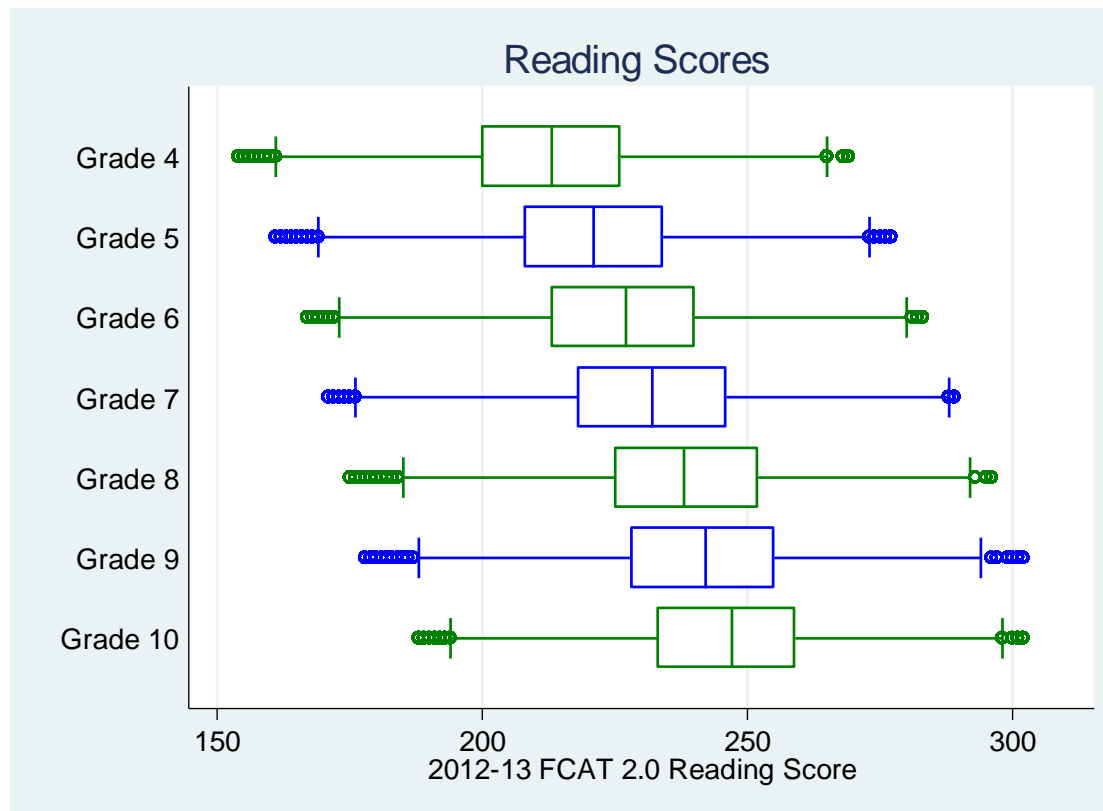
Distribution of 2012-2013 FCAT 2.0 Reading Scores by Grade—SWDs

SWD Only

2012-13 FCAT 2.0 Reading Score

Distribution of 2012-2013 FCAT 2.0 Reading Scores by Grade—ELLs

ELL Only

2012-13 FCAT 2.0 Reading Score

Distribution of 2012-2013 FCAT 2.0 Reading Scores by Grade—Gifted Students

Distribution of 2012-2013 FCAT 2.0 Math Scores by Grade—All Students
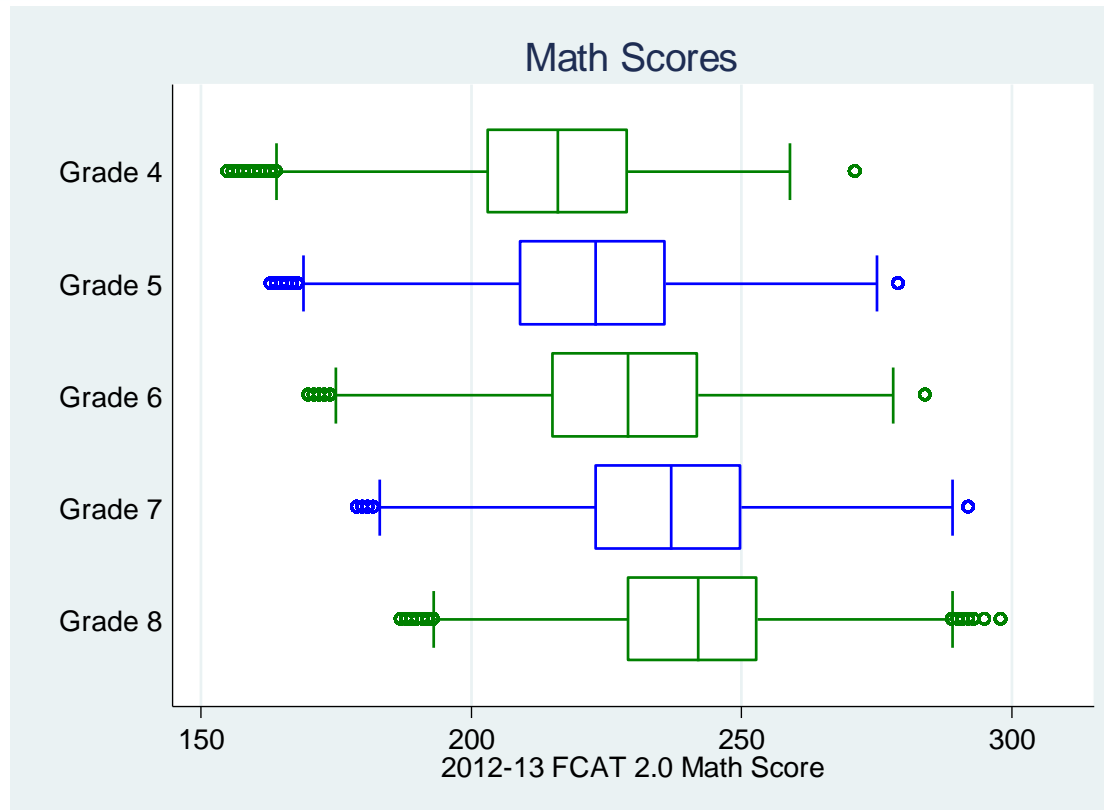
Math Scores

Distribution of 2012-2013 FCAT 2.0 Math Scores by Grade—SWDs
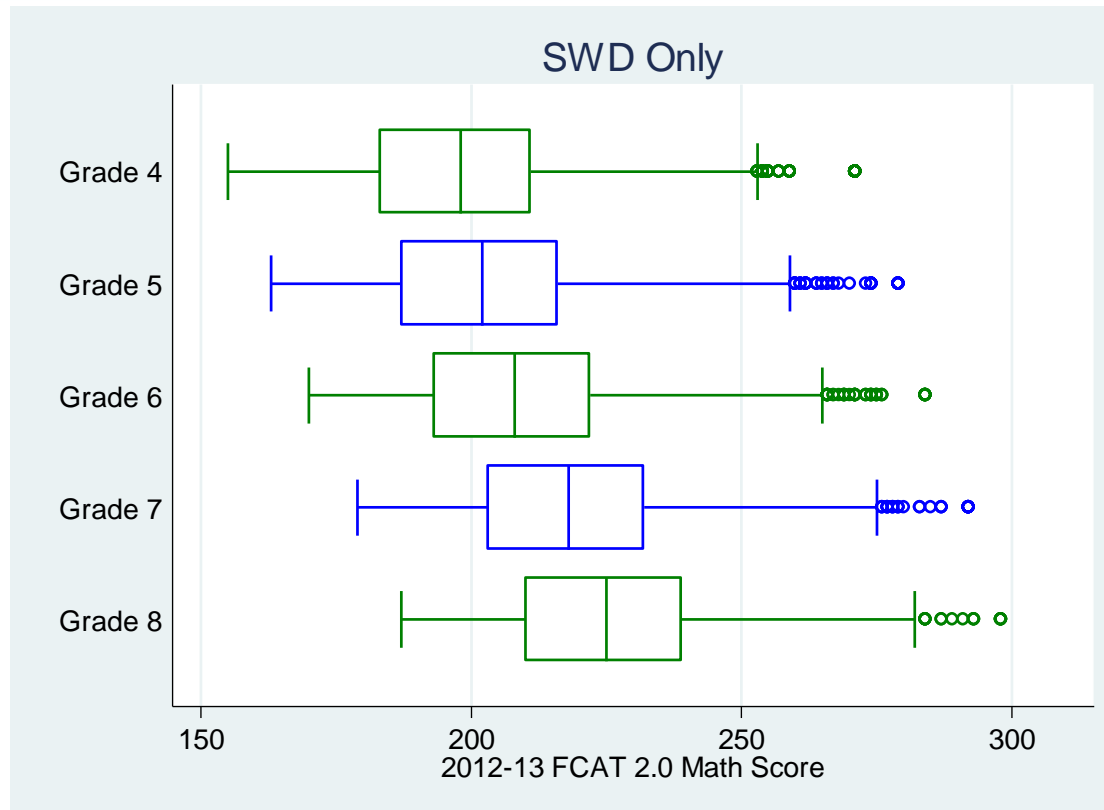
Distribution of 2012-2013 FCAT 2.0 Math Scores by Grade—ELLs

Distribution of 2012-2013 FCAT 2.0 Reading Scores by Grade—Gifted Students

Gifted Only

2012-13 FCAT 2.0 Math Score

Grade 9
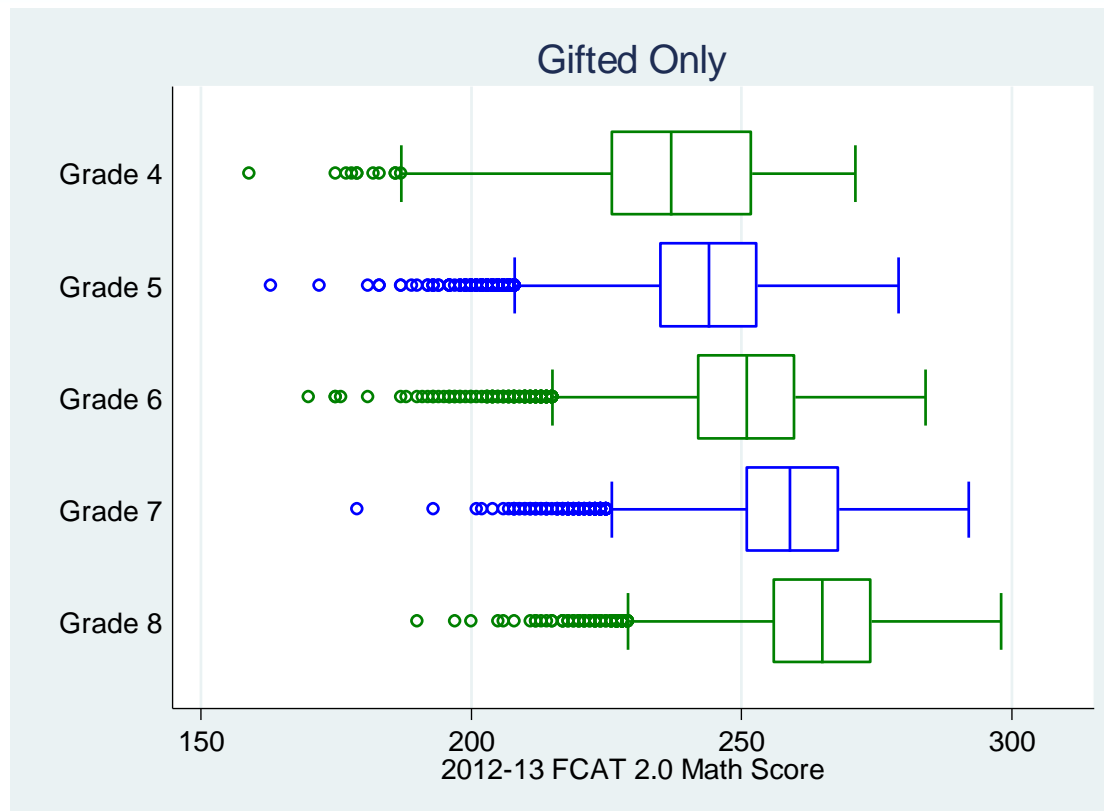
2012-13 Algebra I EOC
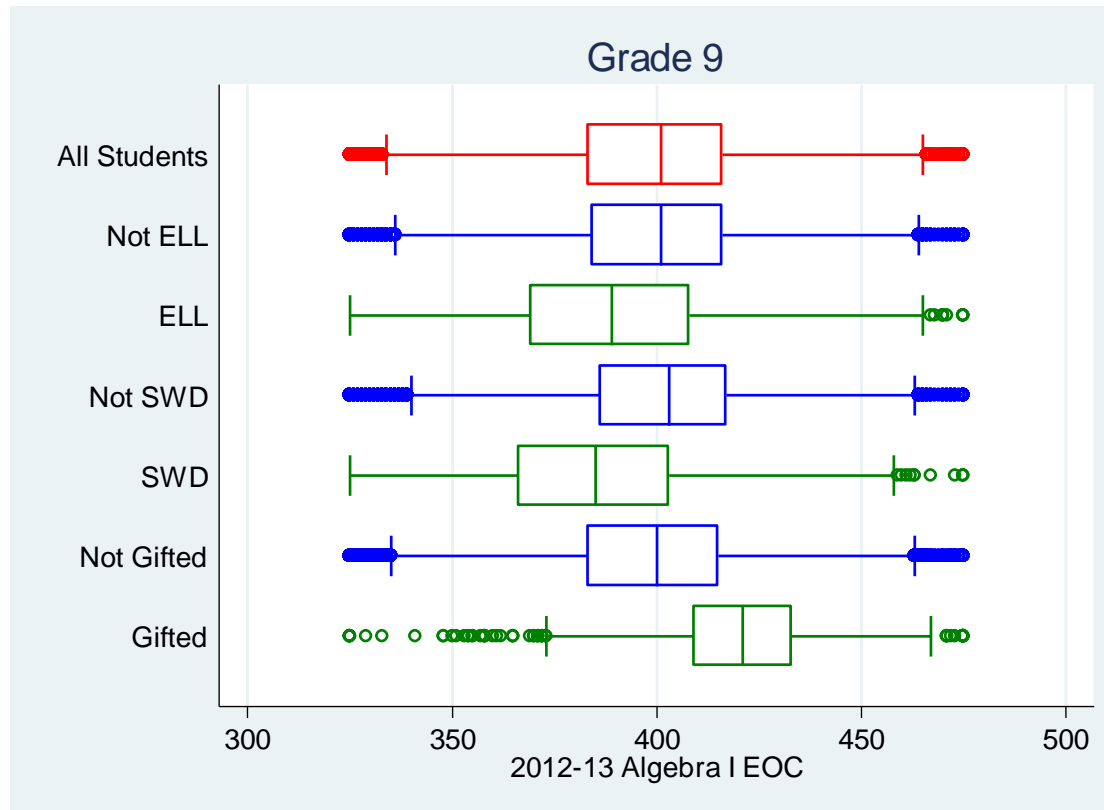
Model Fit and Results

R-Squared Measures How Well Model Fits the Data

2013 Reading Variance Components
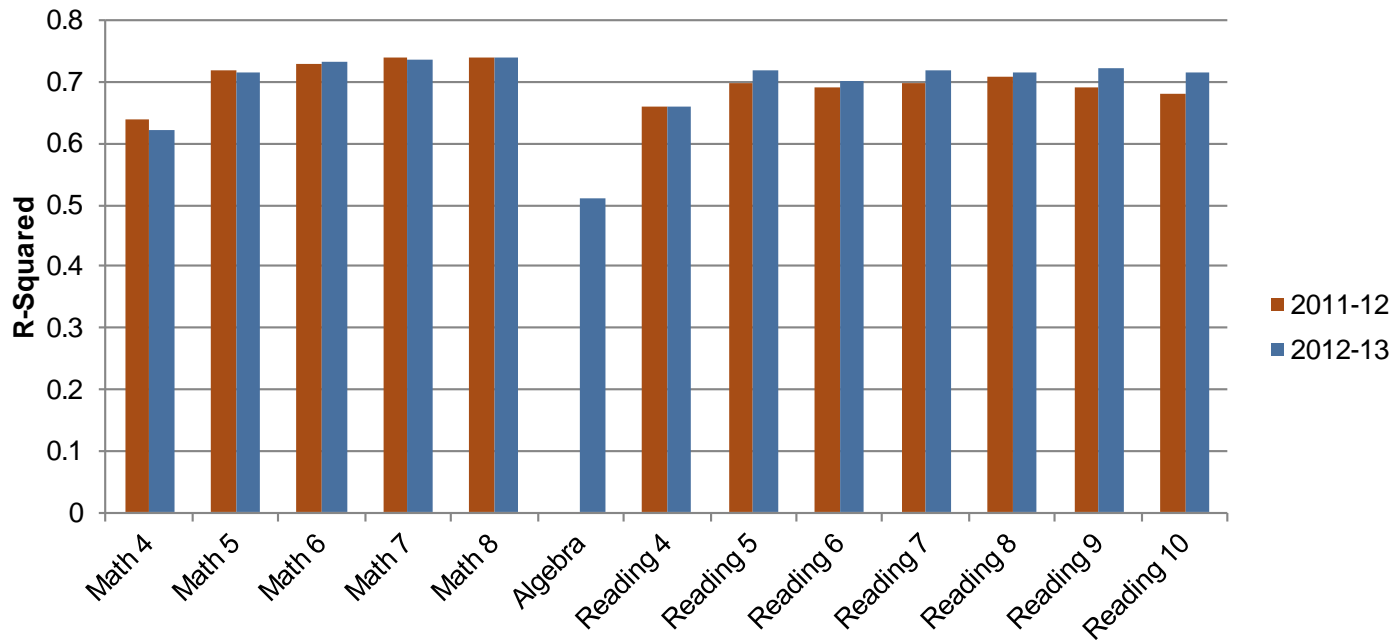
Reading Variance Components

2013 Math Variance Components
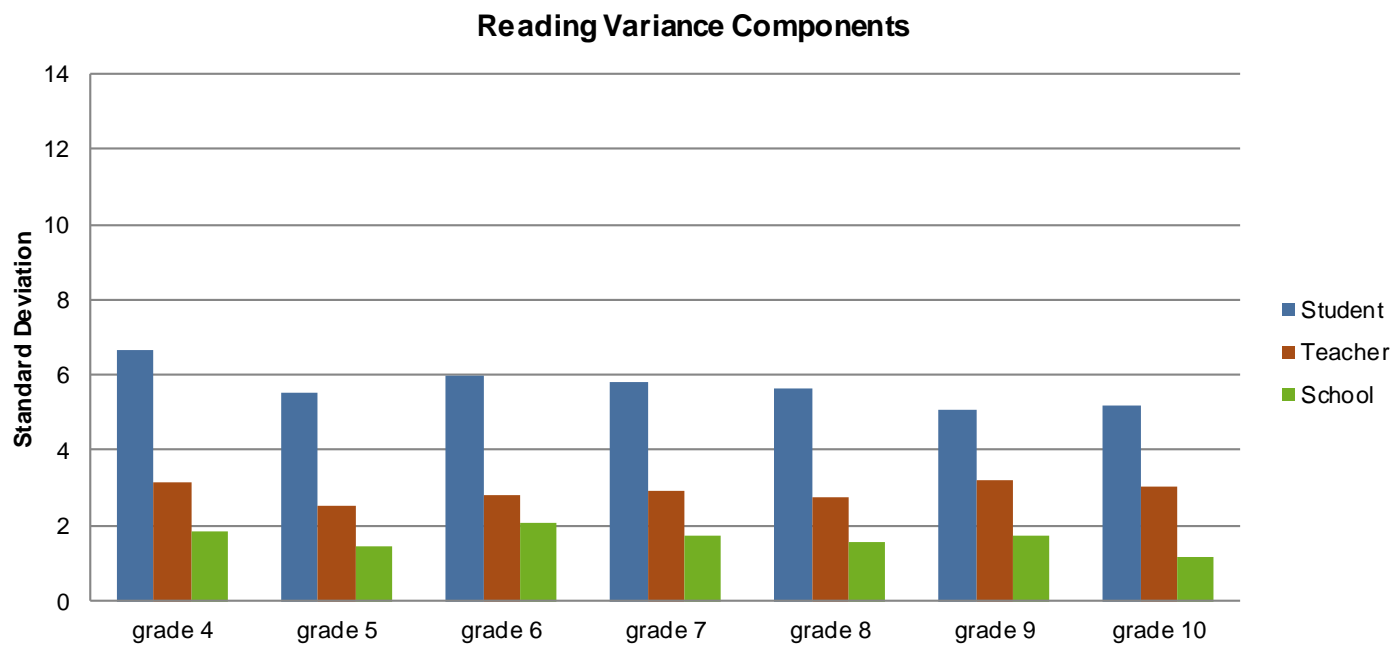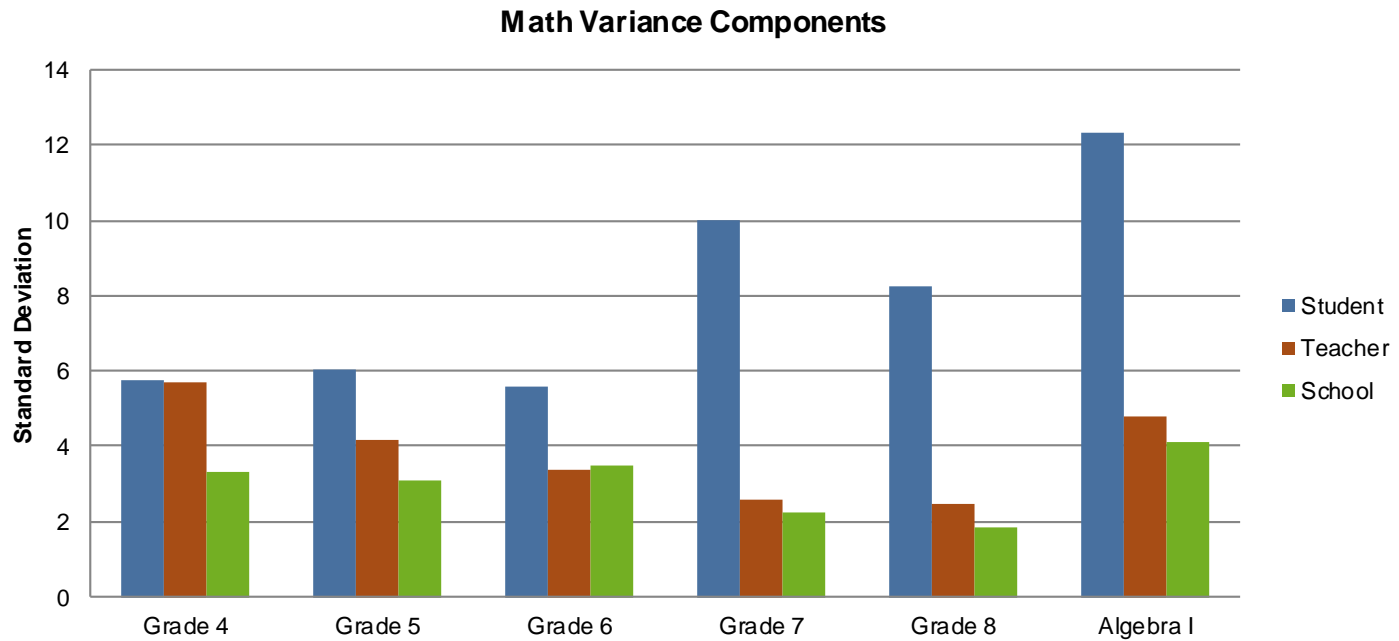
Math Variance Components

2013 Distribution of Teachers Math VAM Scores by Grade
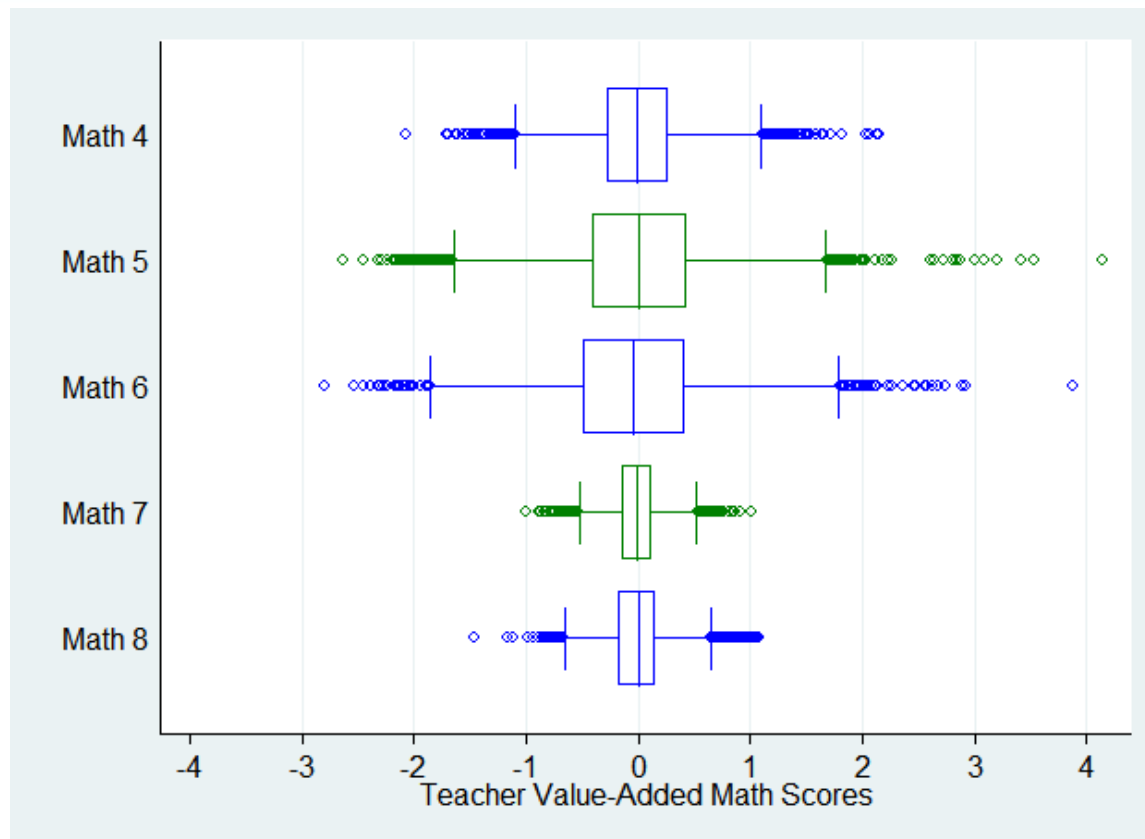
2012 Distribution of Teachers Math VAM Scores by Grade
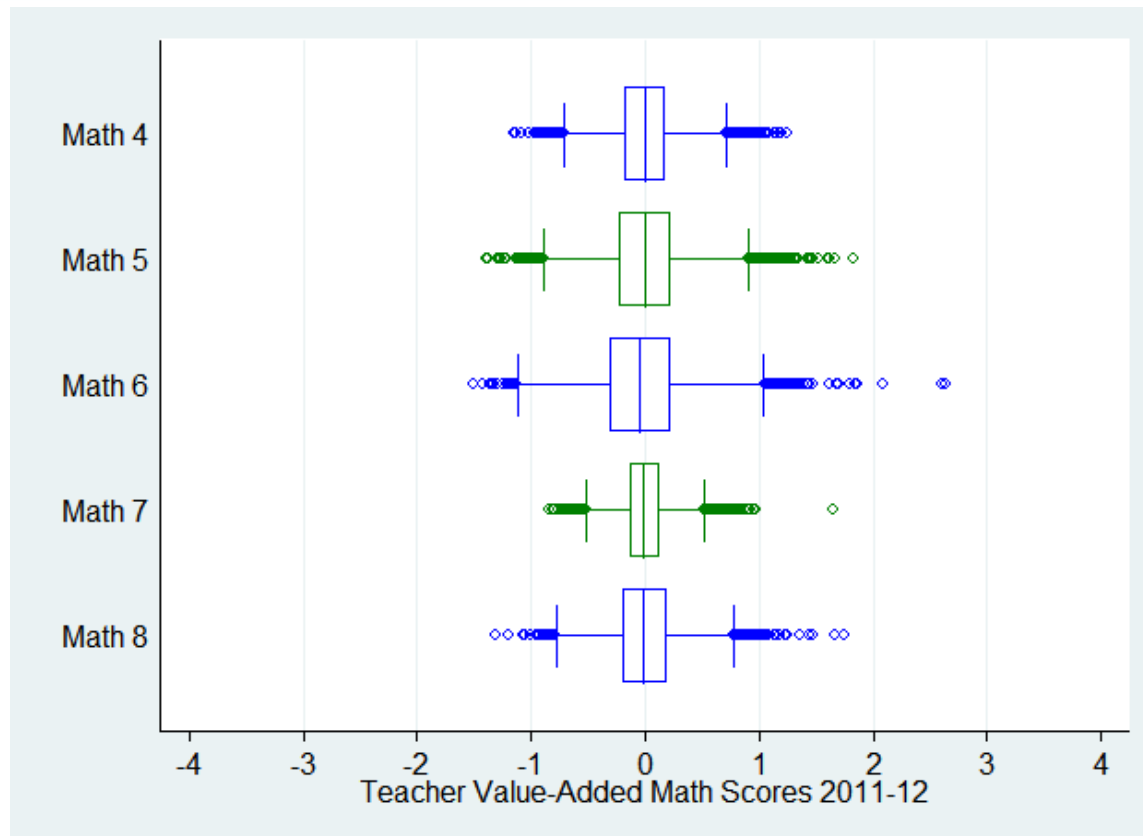
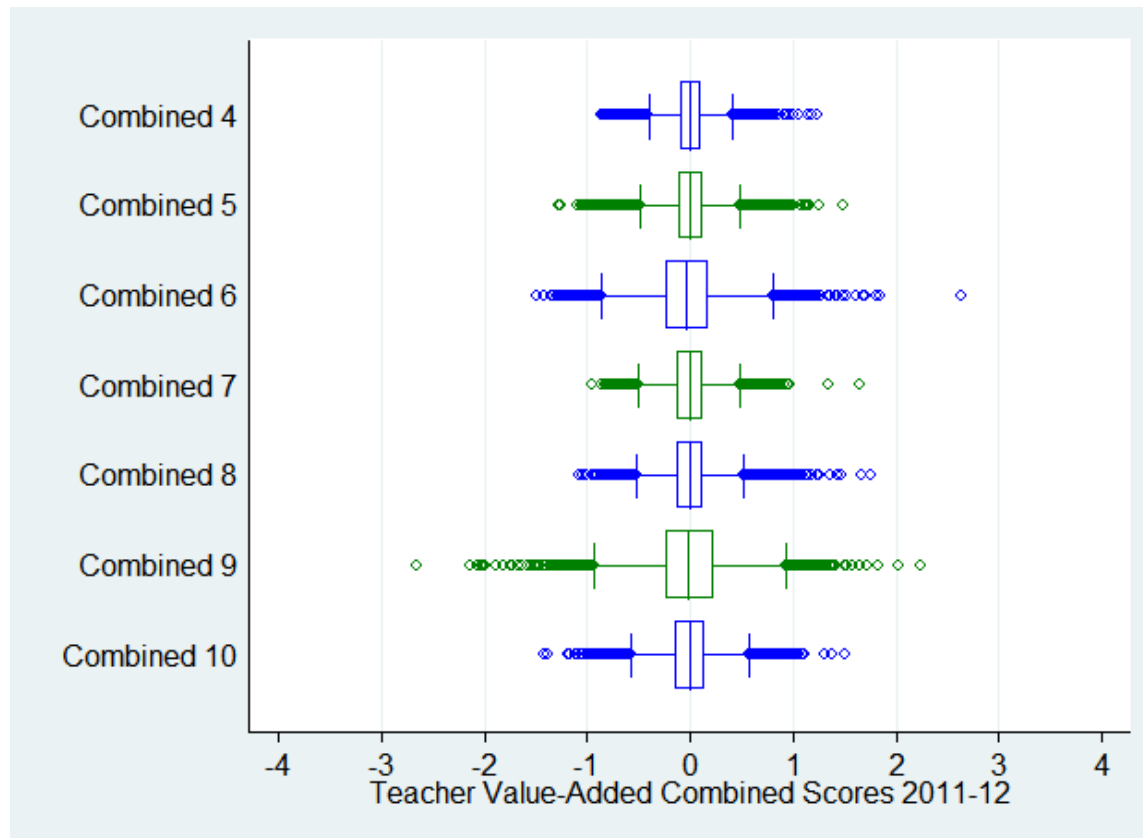# 2013 Distribution of Teachers Reading VAM Scores by Grade
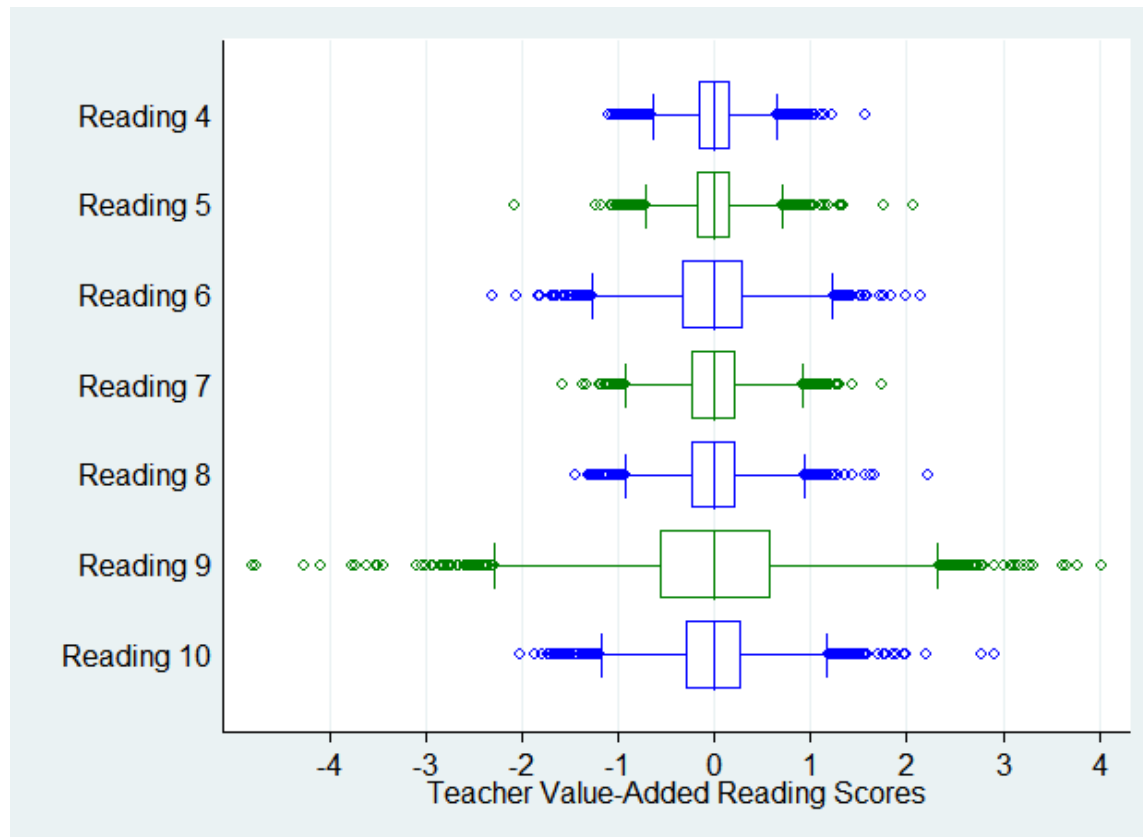
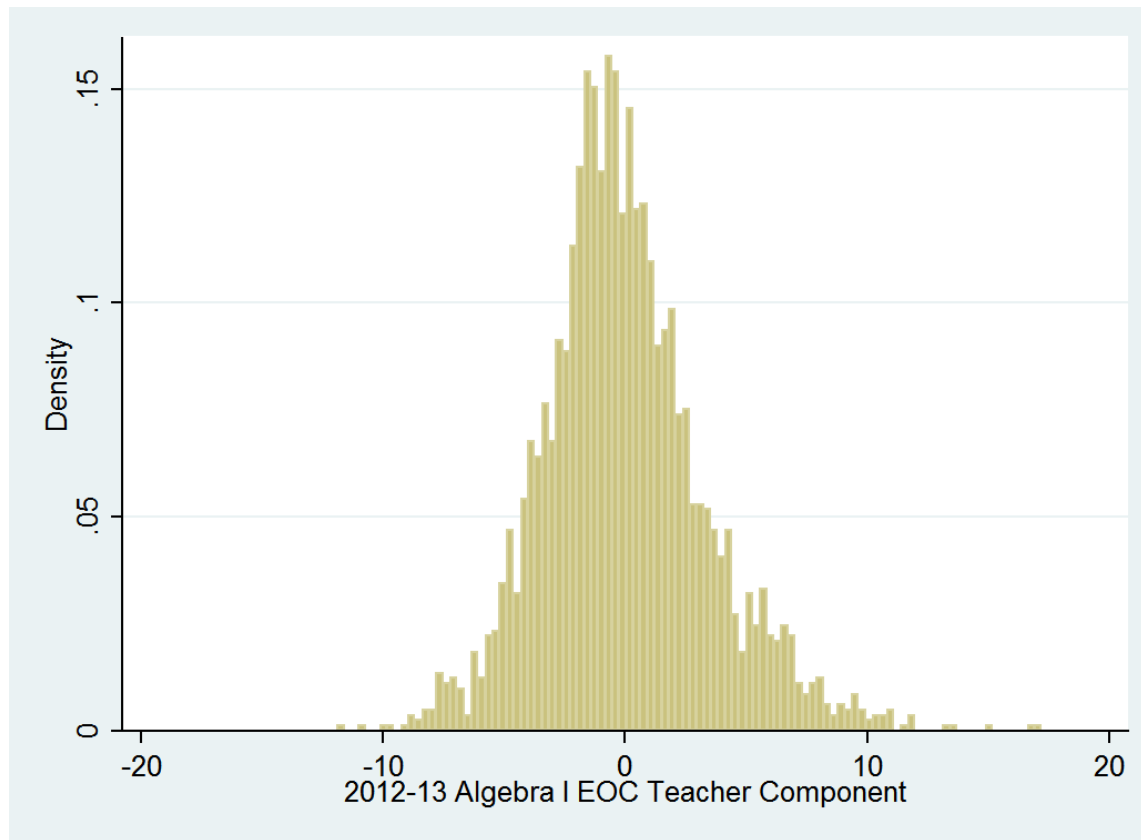# 2012 Distribution of Teachers Reading VAM Scores by Grade
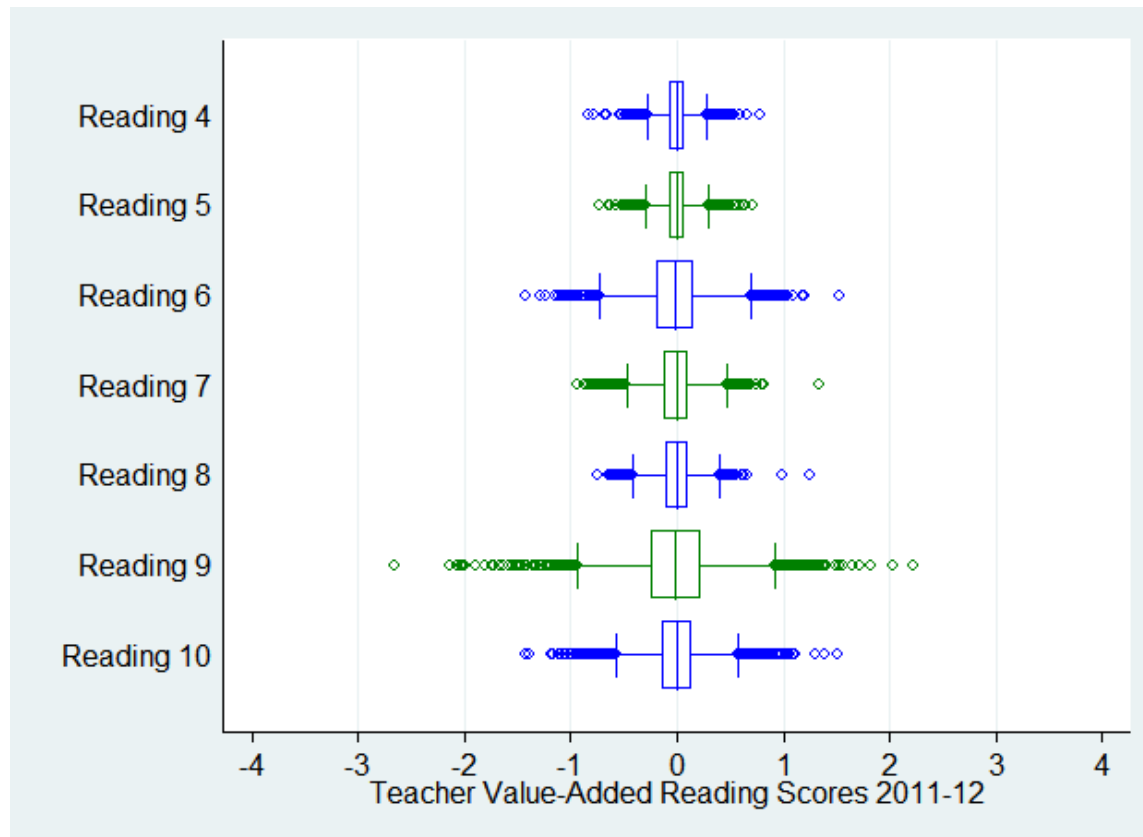
2013 Distribution of Teachers Combined VAM Scores by Grade
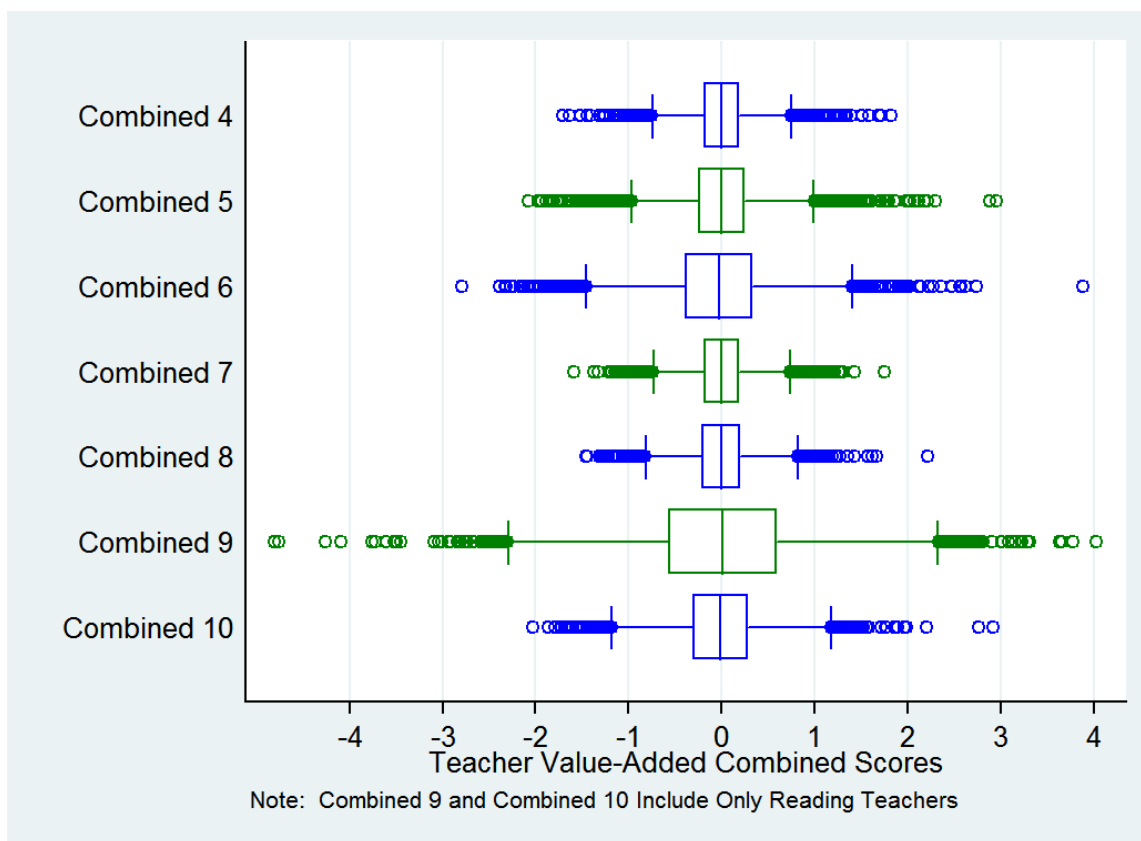
2012 Distribution of Teachers Combined VAM Scores by Grade

Distribution of 2012-13 Algebra I Teacher Scores

Teacher VAM Score Reliability Ratios

- Reliability ratios are one measure of how well estimates distinguish among teachers on the basis of effectiveness

- Compares the average precision of the teacher scores to the overall distribution of teacher scores

- A smaller ratio implies that we are better able to distinguish among teachers on the basis of effectiveness

- 2012-13 reliability ratios smaller than 2011-12 reliability ratios in most grade/subject combinations

Teacher VAM Score Reliability Ratios, 2011-12 and 2012-13

	Reading		Math	
	2011-12	2012-13	2011-12	2012-13
Grade 4	1.34	0.84	0.73	0.51
Grade 5	1.37	0.85	0.74	0.59
Grade 6	1.18	0.88	0.77	0.63
Grade 7	1.37	0.88	0.93	0.97
Grade 8	1.37	0.87	0.84	0.96
Algebra				1.02
Grade 9	1.25	0.78		

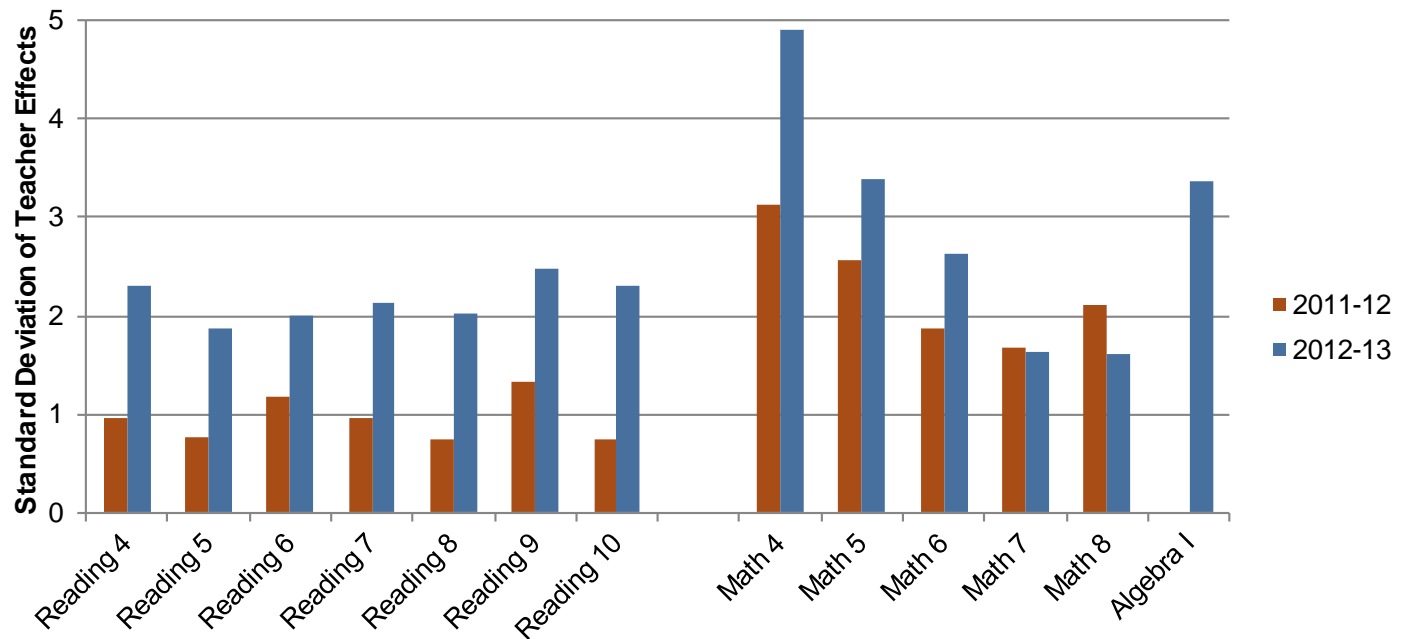# Share of Composite VAM Scores Significantly Different Than Zero (95% C.I.)
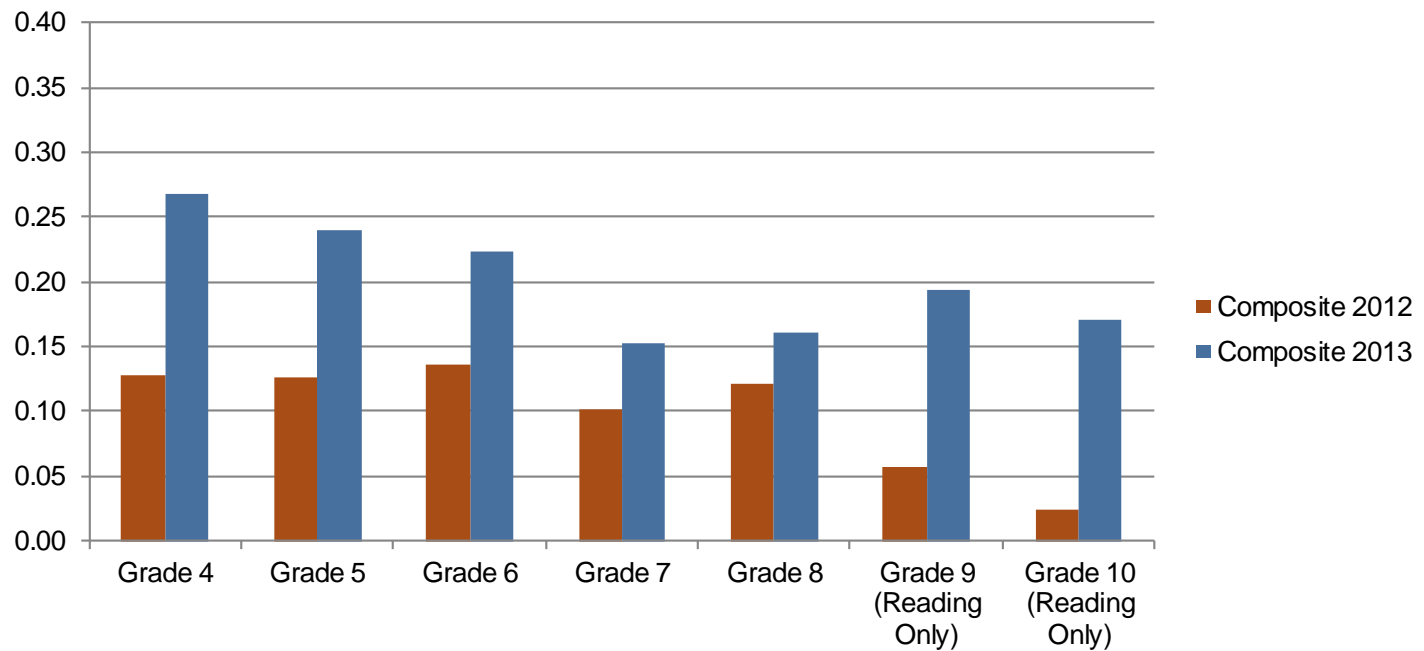
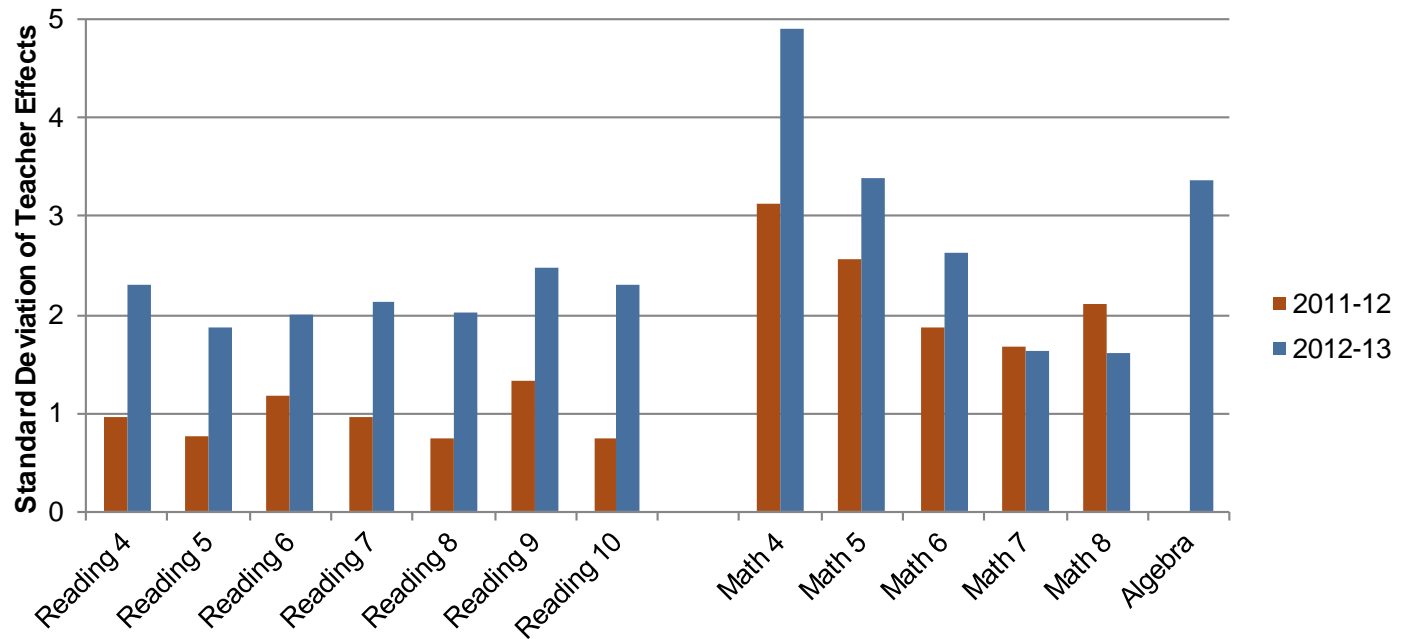# Share of Reading VAM Scores Significantly Different Than Zero (95% C.I.)
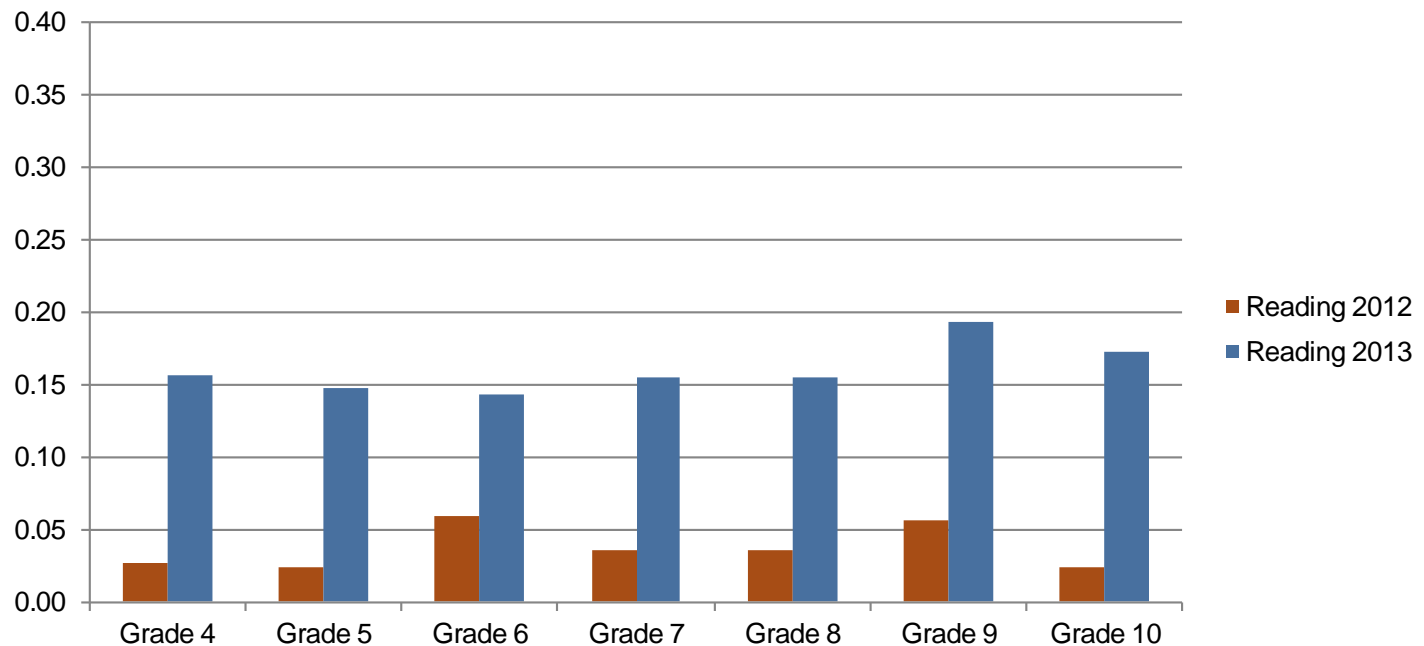
Share of Math VAM Scores Significantly Different Than Zero (95% C.I.)
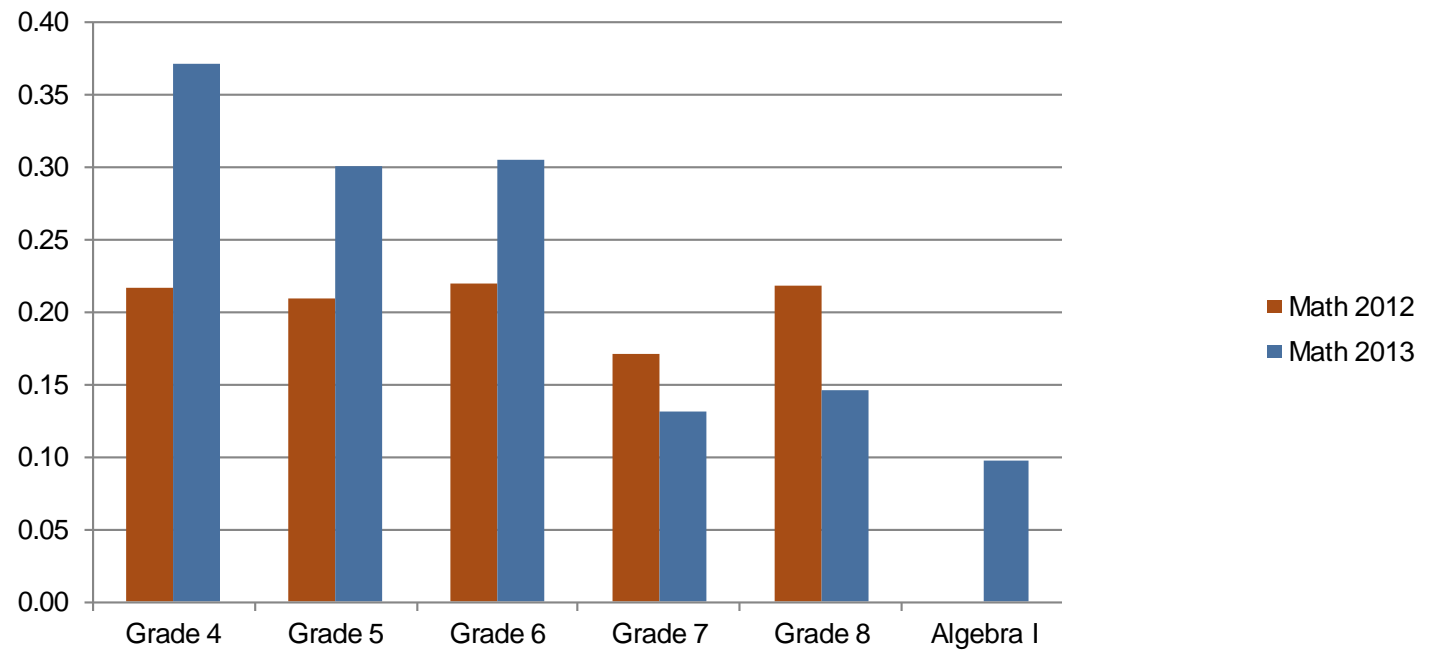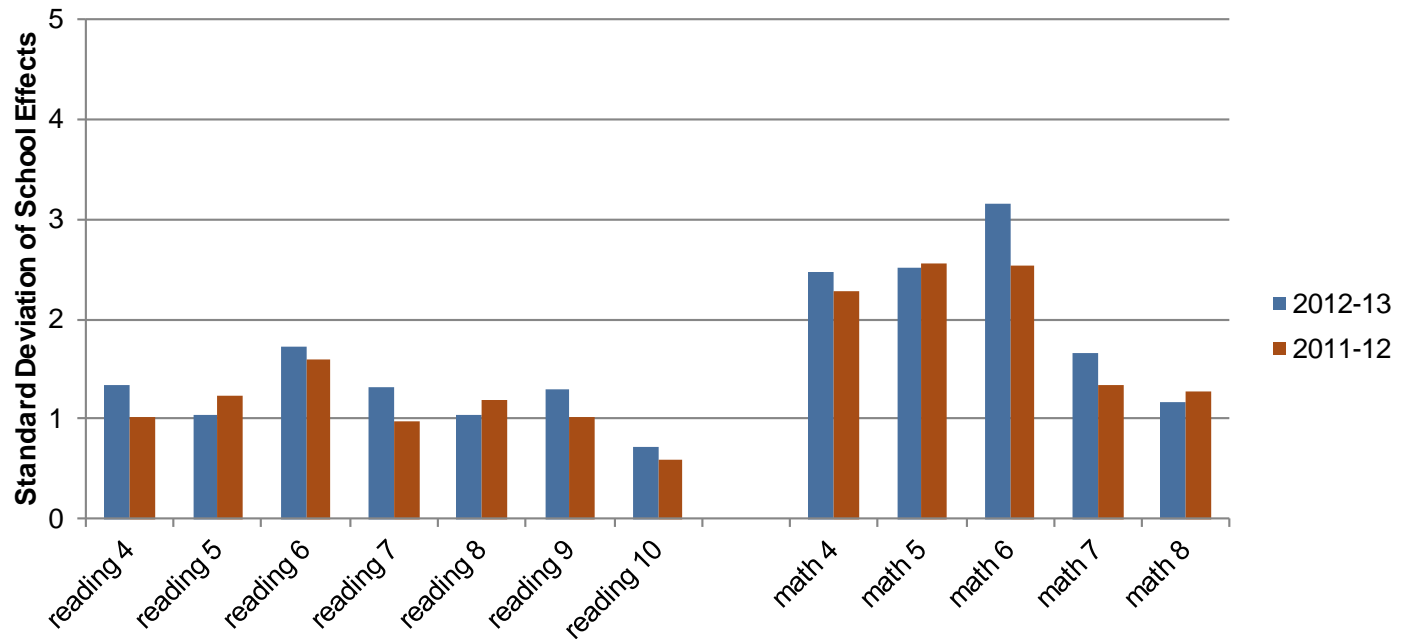
Overall, Variance of Teacher VAM Scores Increased in Most Grades

Variance of Teacher Effects Increased in All Subjects But Middle School Math

Variance of School Effects Decreased in Some Grades, Increased in Others

Summary of Increase in Teacher Score Variance

- Variance of teacher VAM scores increased in all subject/grade combinations but grade 8 math

- Additionally, we observe that the reliability of the results has improved some over prior years

- A larger share of teacher scores are statistically different than zero

- We are better able to distinguish among teachers on the basis of effectiveness in 2012-13 than in 2011-12

# Possible Reason for Variance Increase

- Results indicate:
  - The R-squares for the models have improved some
  - The residual variance has decreased
- Both of these two factors means the model is more sensitive to differences between teachers this year than in prior years
- Because both prior scores are FCAT 2.0 in 2012-13, the model may measure learning growth more effectively

Model Impact Results

Impact Data Results

- Impact data slides show the relationship of the teacher score to various classroom characteristics

- These figures demonstrate no significant correlations between a teacher's VAM scores and the characteristics of students taught by that teacher
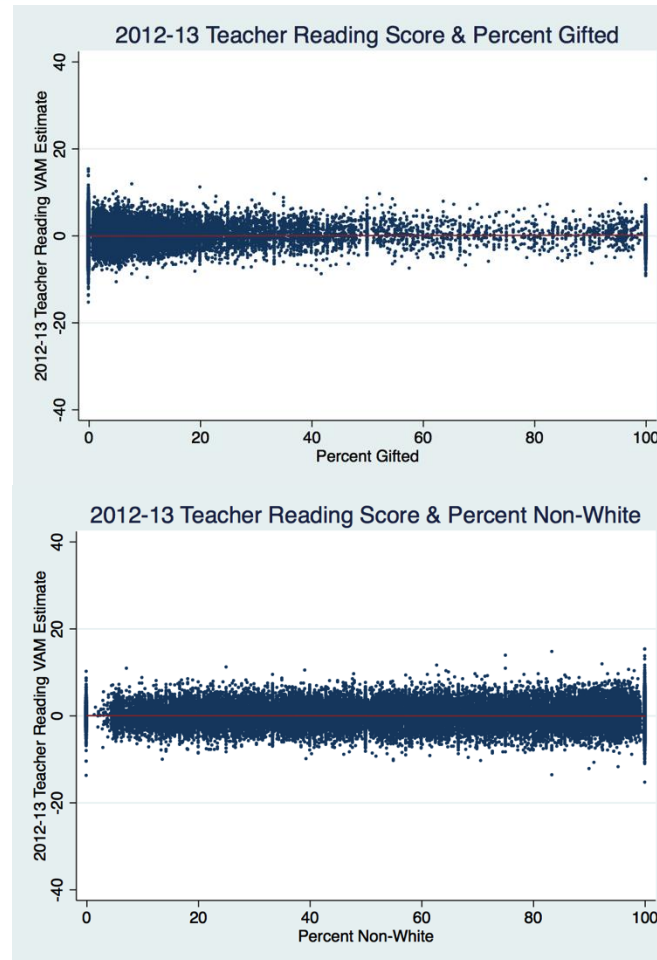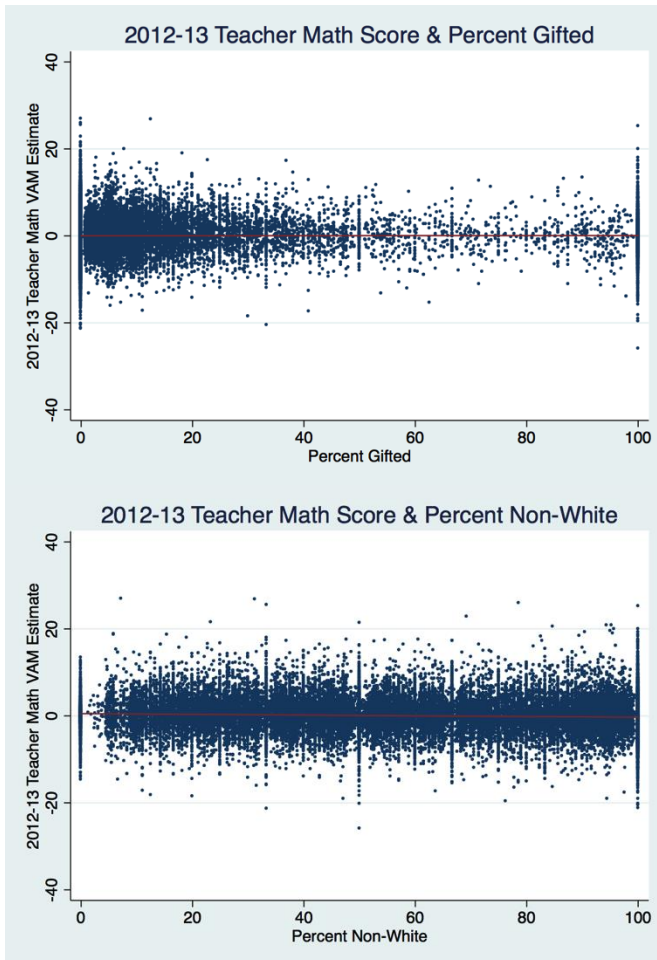
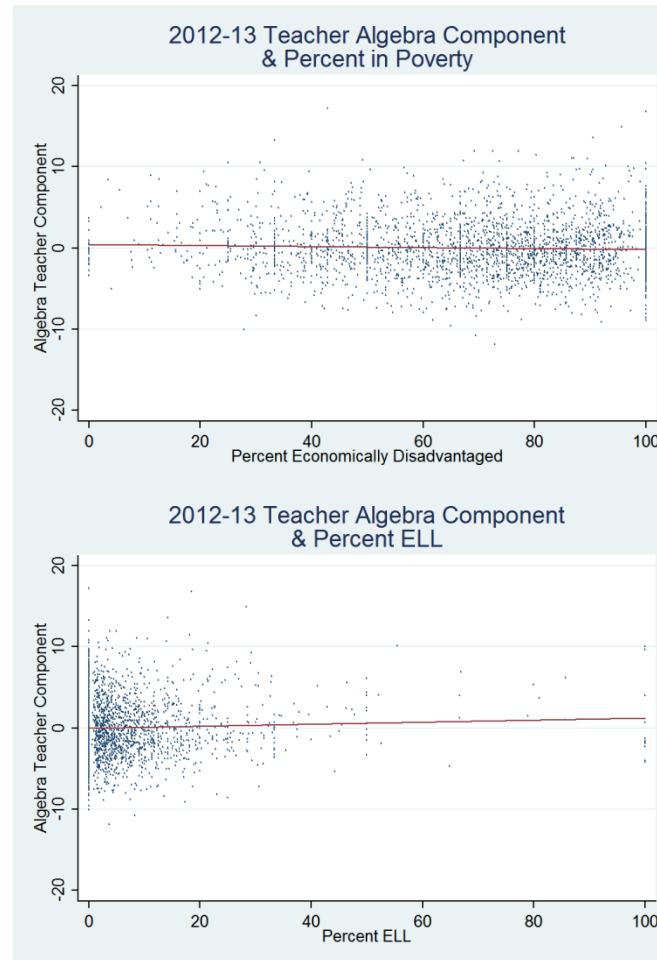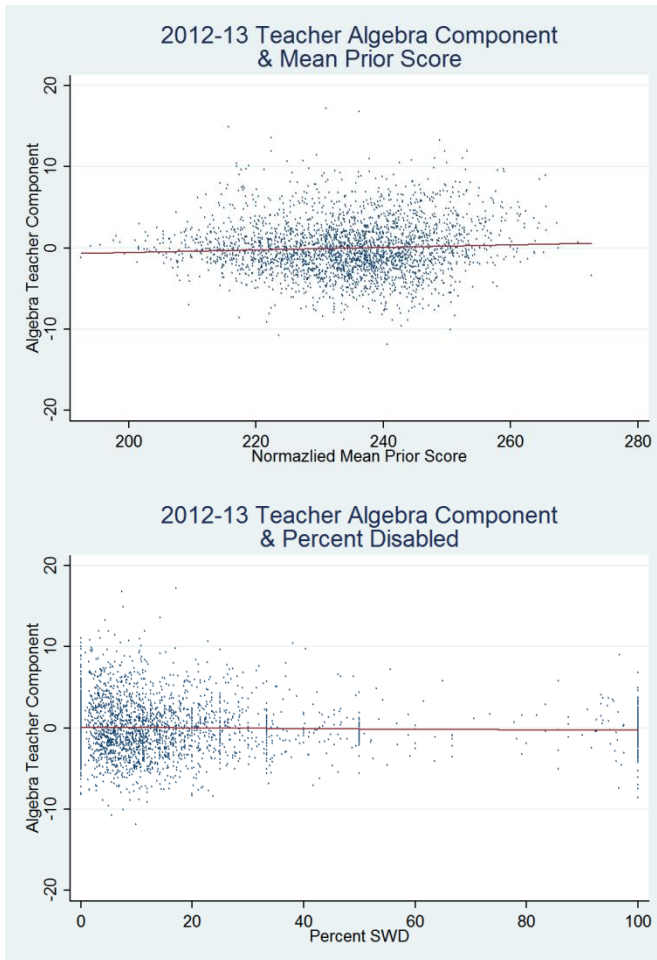# Observed Correlations with Teacher VAM Scores
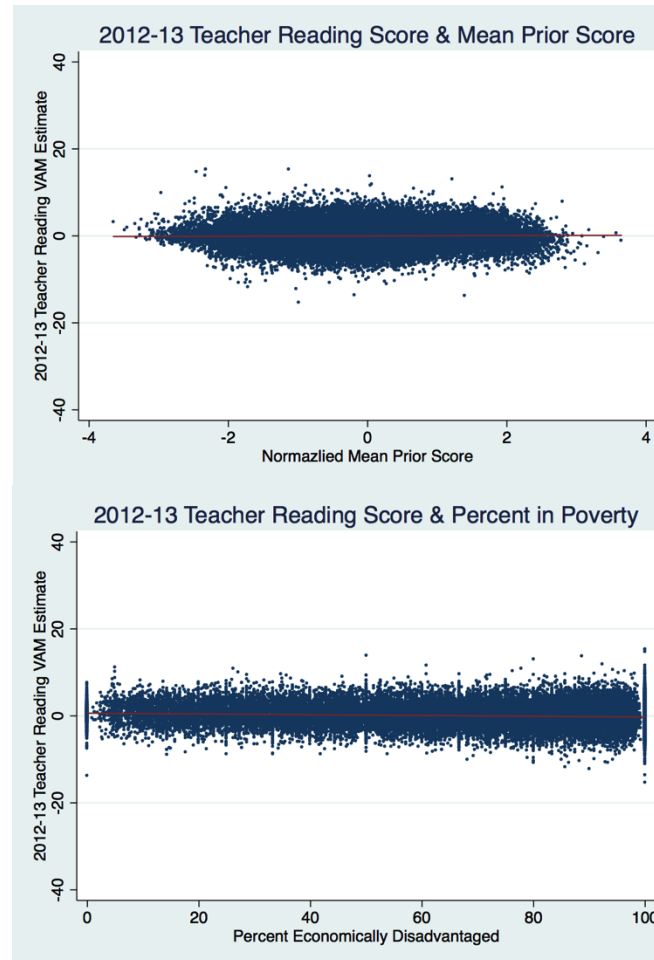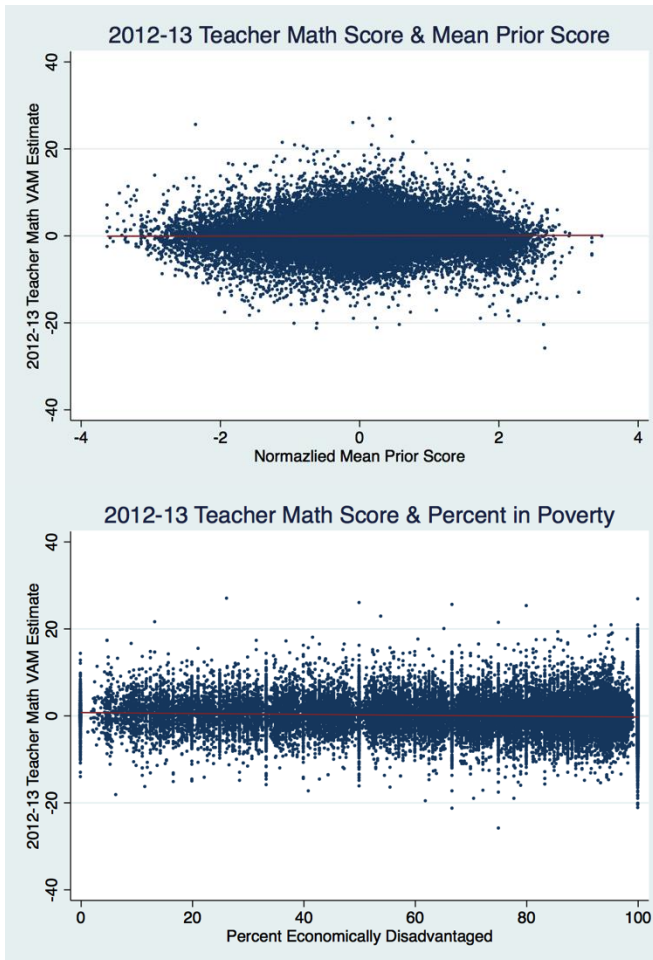
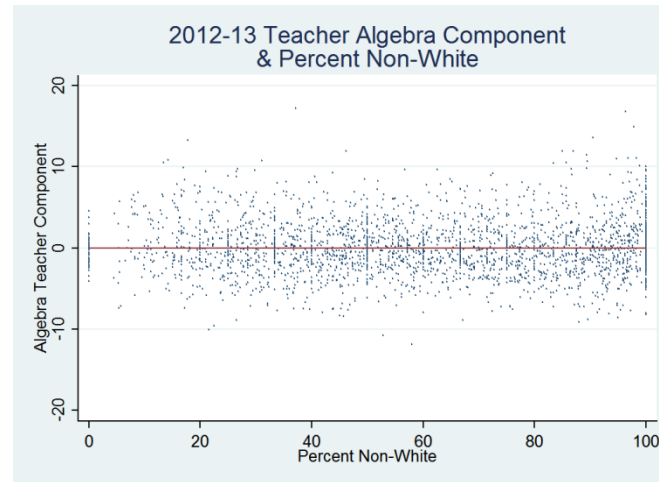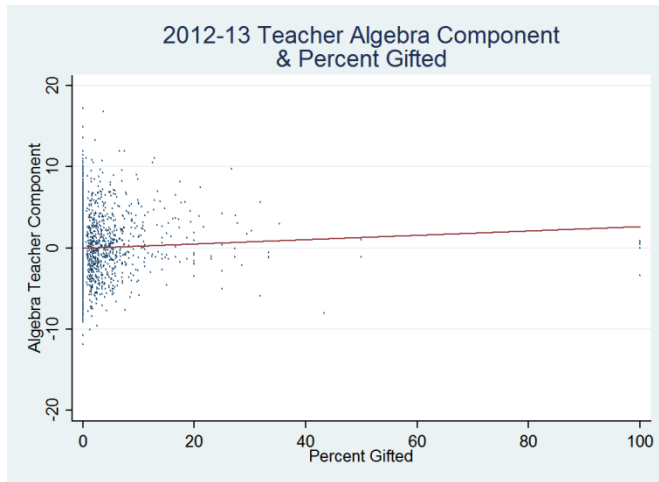# Observed Correlations with Teacher VAM Scores
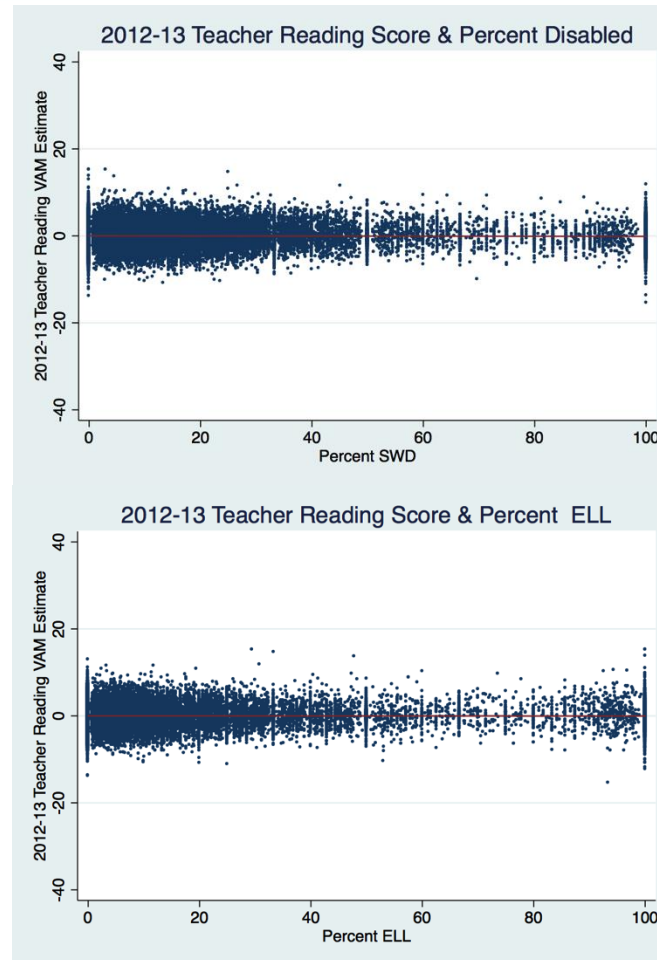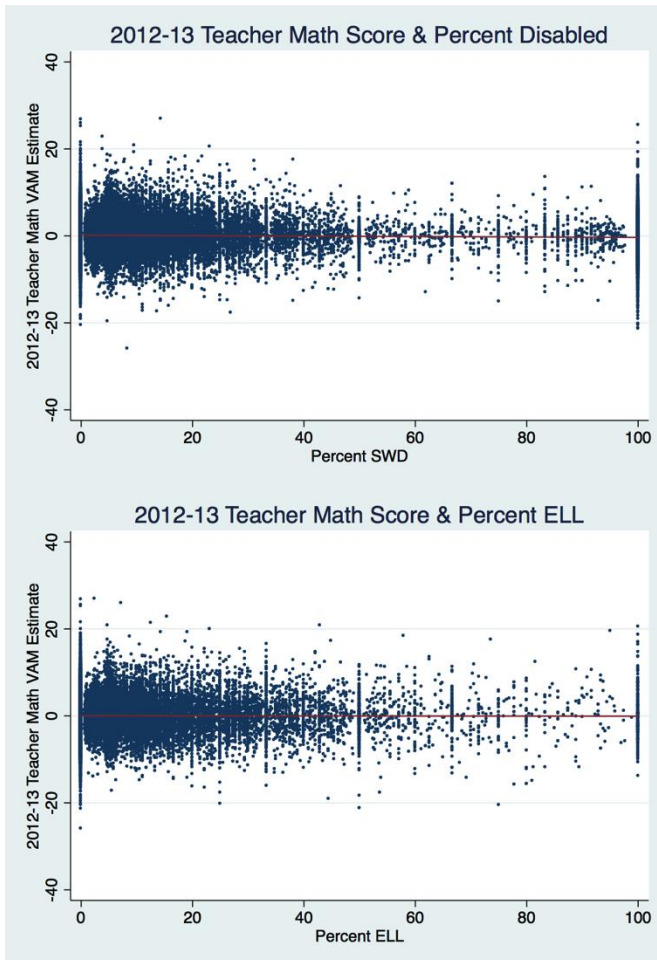
Observed Correlations with Teacher VAM Scores

Observed Correlations with Teacher Algebra Scores

Observed Correlations with Teacher Algebra Scores

Observed Correlations with Teacher VAM Scores, 2012-13

	Mean Prior	%ED	%SWD	%ELL	%Gifted	%Non-White
Math 2012	-0.07	-0.08	0.01	0.04	0.01	0.03
Math 2013	0.01	-0.07	-0.05	-0.00	0.00	-0.06
Reading 2012	-0.03	-0.08	-0.02	0.00	-0.00	-0.04
Reading 2013	0.02	-0.10	-0.02	-0.00	0.02	-0.01
Algebra 2013	0.06	-0.04	-0.03	0.04	0.05	0.00

Summary

- Models developed by the SGIC and approved by the Education Commissioner isolate the impact of the teacher on student learning by establishing an expected growth for each student

- Expected growth is based on growth of similar students in similar classrooms in the same grade during the same year

- Between 2011-12 and 2012-13 model fit (R-squared) increased in most grades and subjects

Summary

- Relative sizes of variance components are as expected, with the possible exception of grade 4 math

- Variance of teacher VAM scores increased in all subject/grade combinations but grade 8 math.

- As a result, we are better able to distinguish among teachers on the basis of effectiveness in 2012-13 than in 2011-12

- No significant correlations exist between a teacher's VAM scores and the characteristics of students taught by that teacher

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