NYU | STEINHARDT

AMNH RGGS MAT Earth Science Residency Program

Year 8 Report

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Executive Summary

The American Museum of Natural History's RGGS Earth Science Residency Program (hereafter, AMNH RGGS) continues to address a critical shortage of Earth Science teachers in grades 7-12 in high-need schools. Researchers from NYU's Steinhardt School of Culture, Education, and Human Development have been working with the program since its inception to provide quantitative analyses on important program outcomes. The main research question we answer is: How do students of AMNH RGGS graduates perform on the Earth Science Regents exam compared to similar students taught by other teachers?

The year 8 report re-analyzes data on the first six cohorts of AMNH RGGS using a comparison sample matched to AMNH RGGS students using student, teacher, and school characteristics. This analysis examines heterogeneity in student outcomes by poverty, race/ethnicity, student with disability and English language learner status. The outcomes in this report are all based on the Earth Science Regents from 2014-2019, including z-scores, passing at 65 and 85 or higher.

We find that:

- **AMNH RGGS teachers continue to teach students who are disadvantaged**. In 2020-21, almost 80% of students were eligible for free and reduced-price lunch, 20% were students with disabilities, 52% were Latino and 24% were Black.
- **Poor, Black, Latino, and English language learner students taught by AMNH RGGS teachers score higher on the Earth Science Regents compared to similar students in the matched comparison group.** AMNH RGGS students begin to outperform other students beginning in 2017, scoring between .05 and .18 standard deviations higher than those in the comparison group.
- **English language learners and students with disabilities are more likely to pass at 65 or higher than similar students**. Students with disabilities are 7 to 8 percentage points more likely to

score higher compared to similar students not taught by RGGS graduates. ELLs taught by RGGS graduates are between 8 and 17 pp more likely to score 65 or above compared to ELL students not taught by RGGS graduates.

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I. Introduction

The American Museum of Natural History's RGGS Earth Science Residency Program (AMNH RGGS) addresses a critical shortage of Earth Science teachers in grades 7-12 in high need schools with diverse student populations. Researchers from NYU's Steinhardt School of Culture, Education, and Human Development have been working with program staff since 2013 to provide quantitative analyses on important program outcomes to answer the question of whether students of AMNH RGGS teachers do better than similar students of other teachers on the Earth Science Regents exam.

The year 8 report differs from previous reports because of the lack of test scores due to the to the ongoing COVID-19 pandemic. Using the analytic sample from Year 7, this report examines heterogeneity among student subgroups taught by AMNH RGGS graduates in Cohorts 1-6.

Findings from the Year 8 analysis shows that AMNH RGGS teachers continue to teach students who are disadvantaged. In 2020-21, almost 80% of students were eligible for free and reduced-price lunch, 20% were students with disabilities, 52% were Latino and 24% were Black. Unfortunately, we cannot report on science performance in 2020-21 since there are no 8th Intermediate Level Science (ILS) test scores to analyze. We hope to have new test score data for both the ILS and the Earth Science Regents from the 2022-23 school year.

Subgroup result show that students who are poor, Black, Latino, and Ells taught by AMNH RGGS graduates outperform similar students taught by other teachers beginning in the fourth year (2017-18) of the program.

This report is organized as follows: Section II describes our data and Section III presents the methodology. The findings are in Section IV and the conclusions are in Section V. The appendices are in Section VI.

II. Data

As in prior years, we use detailed student- and teacher-level data provided by the NYC Department of Education (NYCDOE) to conduct these analyses. These data include student-teacher linkage files for grades 6-12 for school years 2013-14 through 2020-21, student-level demographic and educational files, and data on all teachers working in NYCDOE schools. AMNH RGGS staff provided a list of schools by cohort and year where AMNH RGGS teachers for Cohorts 1 through 8. Each AMNH RGGS graduate is matched to a scrambled teacher ID based on assigned school, licensure field, teaching assignment field, number of years teaching at the DOE, and appointment date that are in the personnel file. Students are matched to teachers using the student-linkage files.

The student level files include socio-demographic characteristics (gender and race/ethnicity), educational needs (special education and English language learner (ELL) status and eligibility for free/reduced price lunch), and school, grade, and standardized test scores (statewide English language arts, math, and science exams in grades 3-8 and New York State Regents exams).[1] All of the data above have a unique person and school identifier that allows us to track individual students and teachers across schools and over time.[2]

In our matching process for graduates in cohorts 1-6 we also used data from the *New York State School Report Cards (SRC)*, which contain school-level data on enrollment and demographic characteristics of students at each school.

Students were matched to their Earth Science or General Science teacher using the student-teacher linkage file to identify students with and without an AMNH RGGS teacher within and across schools in each year. The sample for descriptive statistics includes all students in grades 6-12 who are

[1] Data on the 8th grade Intermediate Level Science exam and science Regents exams are only available through 2018-19 (Cohorts 1-6).
[2] All student and teacher files are de-identified and are matched using scrambled identification number.

taught by an AMNH RGGS teacher through 2020-21 (Cohorts 1-8). The analytic sample for the regression analysis includes students in grades 8 through 12 in the 2013-14 through 2018-19 school years (Cohorts 1-6).

Table II-1 describes the AMNH RGGS schools compared to NYC public schools as a whole. In general, AMNH RGGS teachers are teaching in schools that have higher percentages of students who are poor or Latino. AMNH RGGS schools also have lower percentages of students who are White and Asian, compared to students in other city schools. This set of schools is similar to schools AMNH RGGS graduates were teaching in during the 2019-20 school year except for a slightly higher percentage of students who are Ells in 2020-21 school year.

Table II-1. Demographic and Educational Characteristics of AMNH RGGS Schools Compared to All NYC Schools 2020 and 2021

	2019-20		2020-21	
	RGGS	**NYC**	**RGGS**	**NYC***
% Poor	81.5	77.5	79.9	76.3
% Black	28.5	30.7	29.4	30.0
% Latino	52.9	43.5	51.8	43.7
% Asian	7.8	11.5	8.0	11.7
% White	7.5	11.7	8.0	11.6
% Multi/Other	1.2	1.5	1.7	2.4
% Female	51.0	48.9	49.6	48.9
% Students with disabilities	22.4	22.4	21.8	21.1
% English language learners	11.2	13.6	13.1	13.9
N Schools	56	1814	65	1817
N AMNH RGGS Teachers	64		77	

Source: NYC Open Data
*Excludes schools in District 75

III. Methodology

Our methodology remains the same as in previous years. Our analysis focuses on students of AMNH RGGS teachers matched to a comparison group of students based on student, teacher, and school characteristics. Students were linked to their Earth Science or General Science teacher, and then matched to their Earth Science Regents test scores, and then to additional files, which contain socio-demographic and educational data, and performance on the 8th grade Intermediate Level Science (ILS) exam. This file was then matched to the file containing teacher characteristics and finally, to the *SRC* school-level data.

Our matching process relied on nearest neighbor (NN) and entropy balancing to create a comparison group with the same observable characteristics as the treatment group. These techniques enable us to use observational data to replicate a randomized experiment to obtain "balance on covariates" between treatment and comparison groups. [3,4] Nearest neighbor matching with replacement matches control individuals to the treated group and discards controls not selected. This method is useful for when there are a small number of covariates and they are normally distributed, as is our data. Using *with replacement* allows comparison group members to be used more than once and helps to control for the order of the observations. We use five as the number of matches since multiple controls helps to decrease the variance between observations. Along with nearest neighbor matching, entropy balance further reweights the observations to further balance the covariates and drops the observations furthest away in the covariate distribution. We use the Stata procedure *kmatch* to do the matching.[5] We use an exact match of students on year, eligibility for free and reduced lunch,

[3] Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Stat Sci*, 25(1): 1-21.
[4] Hainmueller, J. (2012). Entropy Balancing for Causal Effects: A multivariate Reweighting Method to Produce Balanced Samples in Observational Studies. *Political Analysis*, 20:25-46.
[5] Jann, B. (2017). "KMATCH: Stata module for multivariate-distance and propensity-score matching, including entropy balancing, inverse probability weighting, (coarsened) exact matching, and regression adjustment," Statistical Software Components S458346, Boston College Department of Economics, revised 19 Sep 2020.

race/ethnicity, female, English language learner and disability status, and grade. We then do a nearest neighbor match on prior performance on the 8th grade ILS exam using z-scores, teacher characteristics using license subject, assignment subject, and years at the NYCDOE, and school characteristics including borough where school is located, total enrollment, and percent of students who are Black, Latino, Asian, White, and multiracial, and percent who are economically disadvantaged.

We identified 232,441 students (5.1% AMNH RGGS, 94.9% non-AMNH RGGS) who took the Earth Science Regents between 2013-14 and 2018-19 and could be matched to their Earth Science teacher. Only those students with complete data were used to match the treatment and comparison group (n=141,903); our final analytic sample is 20,825 students (AMNH RGGS = 42.8%, non-AMNH RGGS = 57.2%). For this year's analysis we re-matched students in our sample to students of the same race/ethnicity, poverty status, etc. to create a panel with the correct weighting for each subgroup.

Further analysis shows that the treatment and comparison groups for some subgroups are balanced at baseline while not for others (see Appendix Figure A1, A-F). The graphs show the results only for those variables that have not been set to an exact match. For this, we want to see a standard mean difference of 0 and a variance ratio close to one. The variance ratio is computed by dividing the variance of group one by the variance of group two. If this ratio is close to one the conclusion drawn is that the variance of each group is the same. If the ratio is far from one the conclusion drawn is that the variances are not the same. The blue dots are the results for the raw data while the red dots are those for matched sample.

The charts show the results of the matches for past performance on the Intermediate Level Science exam in 8th grade, as measured by the z-score; teacher characteristics including number of years at DOE, assignment and license; and school characteristics of borough, total enrollment and percent of economically disadvantaged, Black, Hispanic, Asian, and White students.

The results for each subgroup are consistent across each year. However, given the segregation of New York City schools by race/ethnicity and the focus of the AMNH RGGS program of working in high-needs schools, some subgroups have higher success in creating a well-matched comparison group than other subgroups. The best matches are for the poor, Latino, Asian, and Ell subgroups. The treatment and comparison groups for Black students are well matched on past performance and teacher characteristics, and many of the school level variables. However, high variance ratios are found on total enrollment and percent of economically disadvantaged students at the schools they attend. More problematic for the analysis are the variance ratios for White students and students with disabilities, which are primarily above one. These matching results have implications for the precision of our estimates.

As in past years, our primary outcome of interest is the Earth Science Regents exam. We use both the standardized z-score (mean of 0 and standard deviation of 1) and the probability of passing at 65 or above and 85 or above; 65 is the passing threshold on the Regents exam while 85 indicates a high pass.

After matching, we estimate the relationship between achievement and having an AMNH RGGS graduate as an Earth Science teacher for each subgroup using the following model:

$$Y_{ijt} = \beta_0 + \beta_1 RGGS_j + \beta_2 (RGGS*year)_{ijt} + \beta_3 ST_{it} + \gamma_t + \varepsilon_{ijt} \quad (1)$$

In this model, Y is the outcome of interest (either passing at 65 or above or 85 or above level, or the z-score for the Earth Science Regents) for student i taught by teacher j in year t. *RGGS* is an indicator variable and takes a value of 1 if student i is taught by *RGGS* teacher j and 0 if they are taught by another teacher. *RGGS*year* is an interaction term that indicates whether the student had an AMNH RGGS teacher in a particular year (2014 through 2019). *ST* is a set of student characteristics that includes the socio-demographic characteristics, educational needs, and grade indicators described in the data section above. Year effects are indicated by γ and ε indicates the remaining variation due to unobservable or uncontrolled for factors. Robust standard errors clustered by teacher are used and all analyses are

weighted using the entropy balance weights. This means that we run the same model on the three outcome variables eight times.

In this model, β_1 indicates the impact of being taught by an AMNH RGGS teacher on student achievement for a specific subgroup and β_2 represents the impact of being taught by an AMNH RGGS teacher in a particular year, compared to the first year of the program, again for the specific subgroup. We also conducted a joint F test to examine whether $\beta_1 + \beta_2$ are jointly significant and different from zero in each year to examine differences across years.

We use an ordinary least squares regression (OLS) for models in which the z-scores in the Earth Science Regents is the outcome of interest (Y); linear probability model (LPM) are used for models in which passing (either at 65 or higher or 85 or higher).

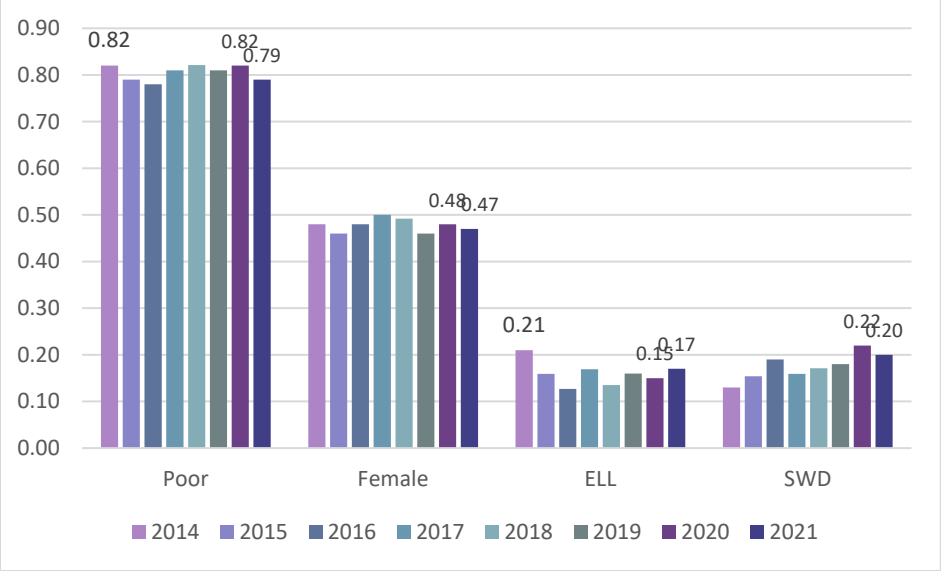
IV. Findings

In Section A we present descriptive analyses on the characteristics of students with AMNH RGGS teachers by year. We focus on describing variation in demographic characteristics and educational needs among students taught by an AMNH RGGS teacher across time and in Section B we present the results of our regression analysis.

A. Descriptive Statistics: Students of AMNH RGGS Teachers

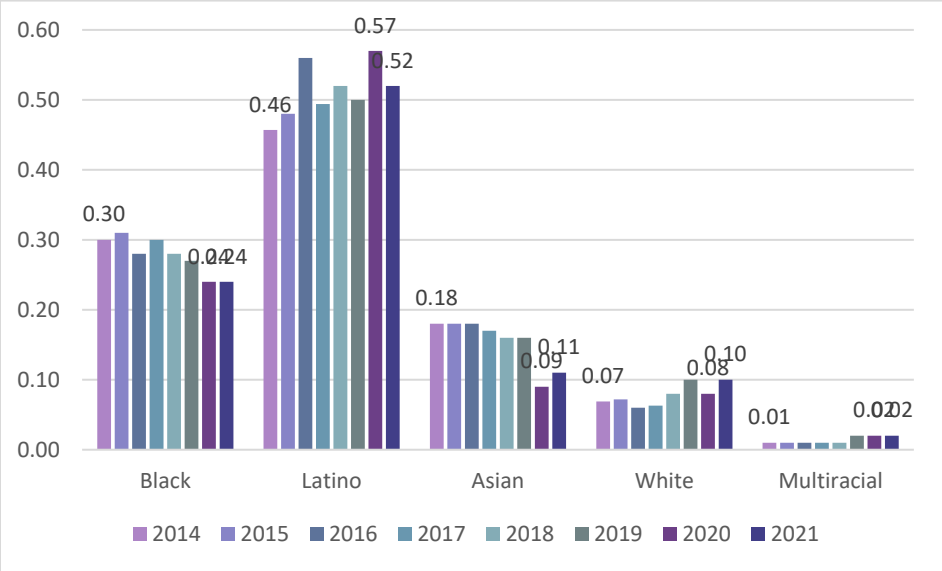
Figure IV-1 displays the share of AMNH RGGS students with certain demographic and educational characteristics over time. As you can see, there has been little change in the characteristics of students taught by AMNH RGGS teachers over time. The share of students who are poor decreased to .79 from .82 (3.7% decrease); the share of students who are ELLs increased to .17 from .15 (11.7% increase), and the share of students with disabilities decreased to .20 from .22 over last year (9.1% decrease).

Figure IV-1. Share of AMNH RGGS Students by Poverty, Gender, and Educational Characteristics by Year



As shown in Figure IV-2, between the 2020 and 2021 school years, we see a decrease in the share of students who are Latino and small increases in the share of students who are Asian or White. The percentage of Latino students decreased by 8.7% while the percentage of Asian and White students increased by 22% and 25%, respectively.

Figure IV-2. Share of AMNH RGGS Students by Ethnicity and Year



B. Regression Analyses

In this section, we present the regression analyses on the impact of having an AMNH RGGS teacher on Earth Science Regents outcomes to explore heterogeneity in the effects based on student characteristics. Tables IV-1 summarizes the data used for the regression analyses, presented in Tables IV-3 to IV-5.

Table IV-1. Summary of Regression Analyses – Pooled Cohort samples

	Z-score	Pass 65 +	Pass 85+
Cohorts	1-6	1-6	1-6
# years student data	6	6	6
Includes Student Characteristics	Yes	Yes	Yes
Includes Prior Performance	Yes	Yes	Yes
Includes Year Effects	Yes	Yes	Yes

Because of small sample sizes, we cannot analyze subgroup results by cohort and only present results for the pooled sample.

We show the results comparing the treatment and control group in Figures IV-3 to IV-5 (see Appendices for regression tables). As mentioned previously, this analysis compares students of AMNH RGGS teachers to similar students not taught by an AMNH RGGS teacher and who match on student, teacher, and school observable characteristics. The regressions are run on specific subgroups and include all the covariates included in previous regressions.

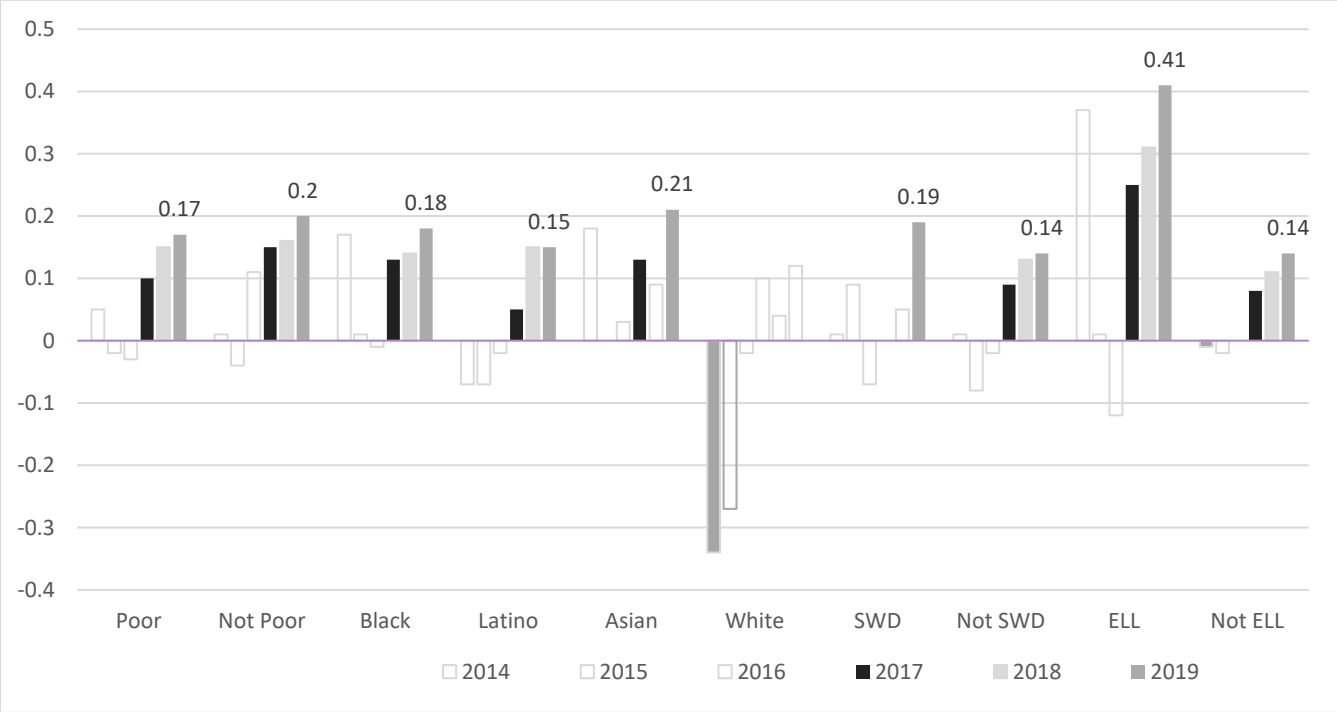
i. Earth Science Regents

The results in Figure IV-3 show that, in general, poor students, Black and Latino students, and English language learners, score, on average, statistically higher than similar students in the comparison group since 2017. Poor students taught be AMNH RGGS graduates score between 0.10 and .17sd higher compared to other poor students in the comparison group in 2017, 2018, and 2019. Non-poor students score between .15 and .20sd higher compared to other non-poor students in the comparison group in those same years.

Black and Latino students taught by RGGS graduates also score higher compared to other Black and Latino not taught by RGGS graduates. The coefficient on MAT for Black students is positive and significant (β=0.17, $p< 0.01$). Between 2017 and 2019, Black students score between .13 and 0.18sd. The joint F tests show that Latino students score between 0.05 to 0.15sd higher compared in other Latino students not taught by RGGS graduates. The coefficients on MAT are statistically significant overall for White (β=-0.34, $p< 0.05$) and Asian students (β=0.1, $p< 0.05$), although most of the joint F tests results are negative. Therefore, there is no consistent story we can tell for these student subgroups.

Finally, we see statistically significant positive impacts on the Earth Science z-score for students who are English language learners (β=0.37, $p< 0.001$). Between 2017 and 2019, ELLs score between 0.25 to 0.41sd higher compared to ELL students not taught by RGGS graduates. There are no statistically significant findings for students with disabilities.

Figure IV-3. Earth Science Z-Score by Student Subgroup, 2014-2019



Note: Non-shaded areas indicate the results are not statistically significant. All show statistical significance at $p < .05$ or lower

ii. Passing at 65 or higher

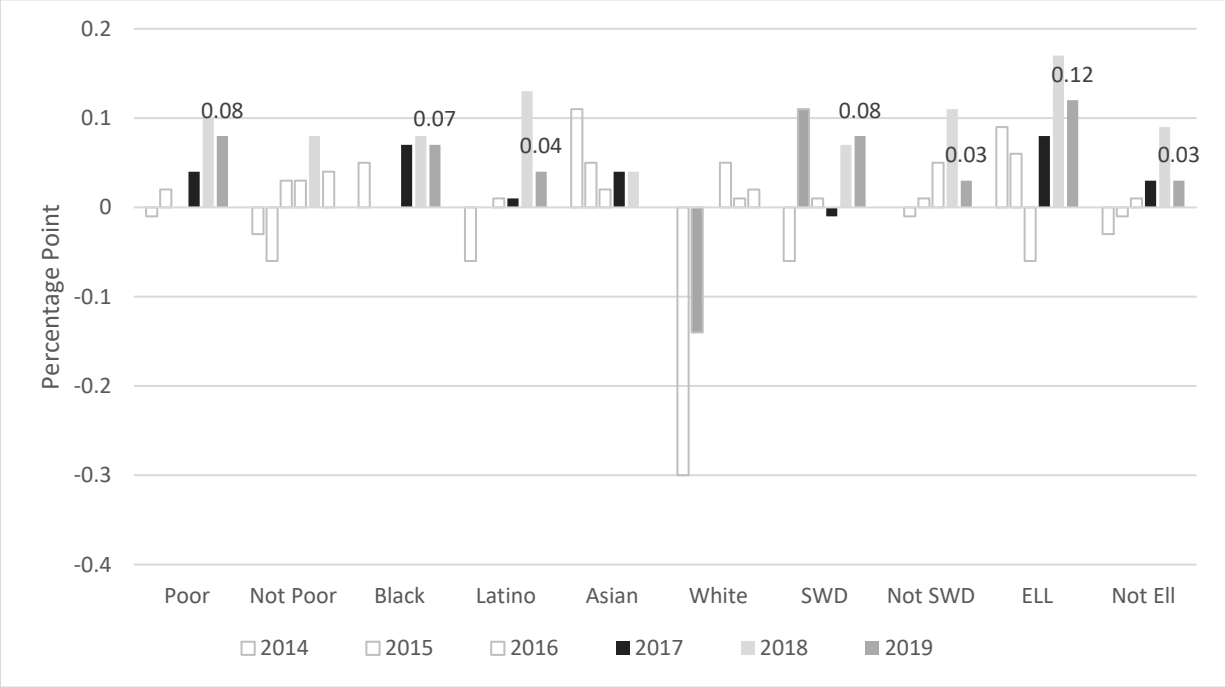
The results in Figure IV-4 are for passing the Earth Science regents at 65 or higher and show similar results to those for z-scores. Since 2017, poor students, Black and Latino students, and students with disabilities and English language learners, are, on average, more likely than similar students in the comparison group to pass the regents at 65 or higher. Poor students taught be RGGS graduates are between 3 and 7 pp more likely to score above 65 or higher compared to other poor students in the comparison group in 2017, 2018, and 2019, while we only see significant differences for non-poor students taught by RGGS graduates compared to other non-poor students in 2018.

Black and Latino students taught by RGGS graduates also score higher compared to similar students not taught by RGGS graduates. For example, between 2017 and 2019, Black students are 7 to 8

pp more likely to score 65 or higher than comparison students. While the coefficient on RGGS is negative and statistically significant for Latino students (β= -0.06, $p < 0.01$), they are between 1 and 13 pp more likely to score 65 or higher compared in similar students not taught by RGGS graduates in 2018 and 2019. Overall, Asian students taught by RGGS graduates are 11 pp more likely to pass at 65 or higher while White students are 30 pp less likely to pass. However, when we look at White students by year, while the coefficients are positive and statistically significant, indicating that White students taught by RGGS graduates are between 3 and 5 pp higher than non-RGGS White students, these results are not statistically significant.

Finally, we see statistically significant positive impacts on scoring 65 or higher for students with disabilities and English language learners. In 2015, 2017, and 2018, students with disabilities are 7 to 8 pp more likely to score higher compared to similar students not taught by RGGS graduates. ELLs taught by RGGS graduates are between 8 and 17 pp more likely to score 65 or above compared ELL students not taught by RGGS graduates.

Figure IV-4. Passing at 65 or higher by subgroup, 2014-19



Note: Non-shaded areas indicate the results are not statistically significant. All show statistical significance at p < .05 or lower

iii. Passing at 85 or higher

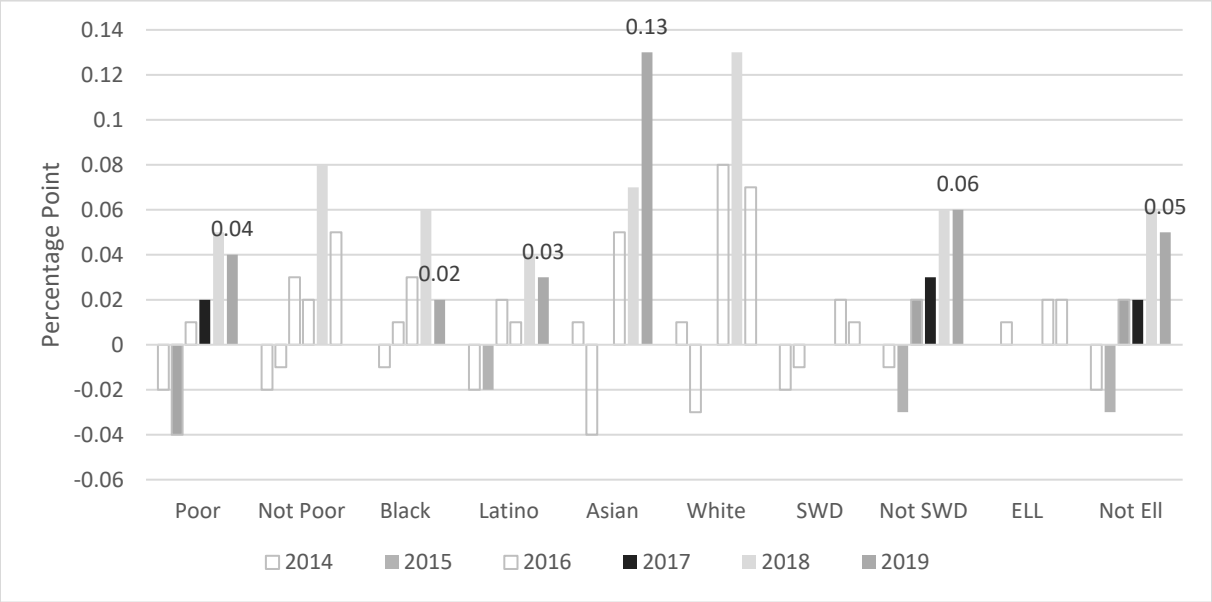
Figure IV-5 shows the results for scoring at 85 or higher for each of the subgroups. None of the coefficients on RGGS are statistically significant and few of the RGGS*year are also statistically significant. Poor students, Black and Latino students, are, on average, more likely than similar students in the comparison group to pass the regents at 85 or higher. Poor students taught be RGGS graduates are between 2 and 5 pp more likely to score at 85 or higher compared to other poor students in the comparison group in 2015, 2017, 2018, and 2019, while the differences between non-poor students taught by RGGS graduates compared to other non-poor students is statistically significant in 2018 and 2019 with non-poor RGGS students 5 to 8 pp more likely to pass at 85 or higher.

Black and Latino students taught by RGGS graduates also score higher compared to similar students not taught by RGGS graduates. In 2017 and 2018 Black students are 3 to 6 pp more likely to score at 85 or higher than comparison students while Latino students are between 1 and 4 pp more

likely to score at 85 or higher compared in 2018 and 2019. Overall, Asian students taught by RGGS graduates are more likely to pass at 85 or higher in 2018 and 2019 while White students are only more likely to pass in 2018.

Finally, we see no impacts on scoring 85 or higher for students with disabilities or English language learners in any of the years.

Figure IV-5. Passing at 85 or higher by subgroup, 2014-19



Note: Non-shaded areas indicate the results are not statistically significant. All show statistical significance at $p < .05$ or lower

V. Conclusion

This report presents the results from the analysis of AMNH's RGGS Earth Science Residency Program using data previously analyzed. For this report we conduct descriptive analysis on students in Cohorts 1-8 and subgroup analysis on Earth Science outcomes for students in Cohorts 1-6. We again use data obtained from the NYCDOE to examine the impact of AMNH RGGS on student performance on the statewide Earth Science Regents exam using a comparison group of students who are matched to AMNH

RGGS students by student characteristics, teacher characteristics, and characteristics of the schools they attend.

The results show that AMNH RGGS is successfully improving test scores among poor, Black, Latino, and English language learner students, particularly beginning in the fourth year of the program. students performing higher on the Earth Science Regents exam than their matched counterparts. Overall, these students perform between scoring between .05 and .18 standard deviations higher than those in the comparison group. These groups are also more likely to pass at 65 or higher compared to their counterparts.

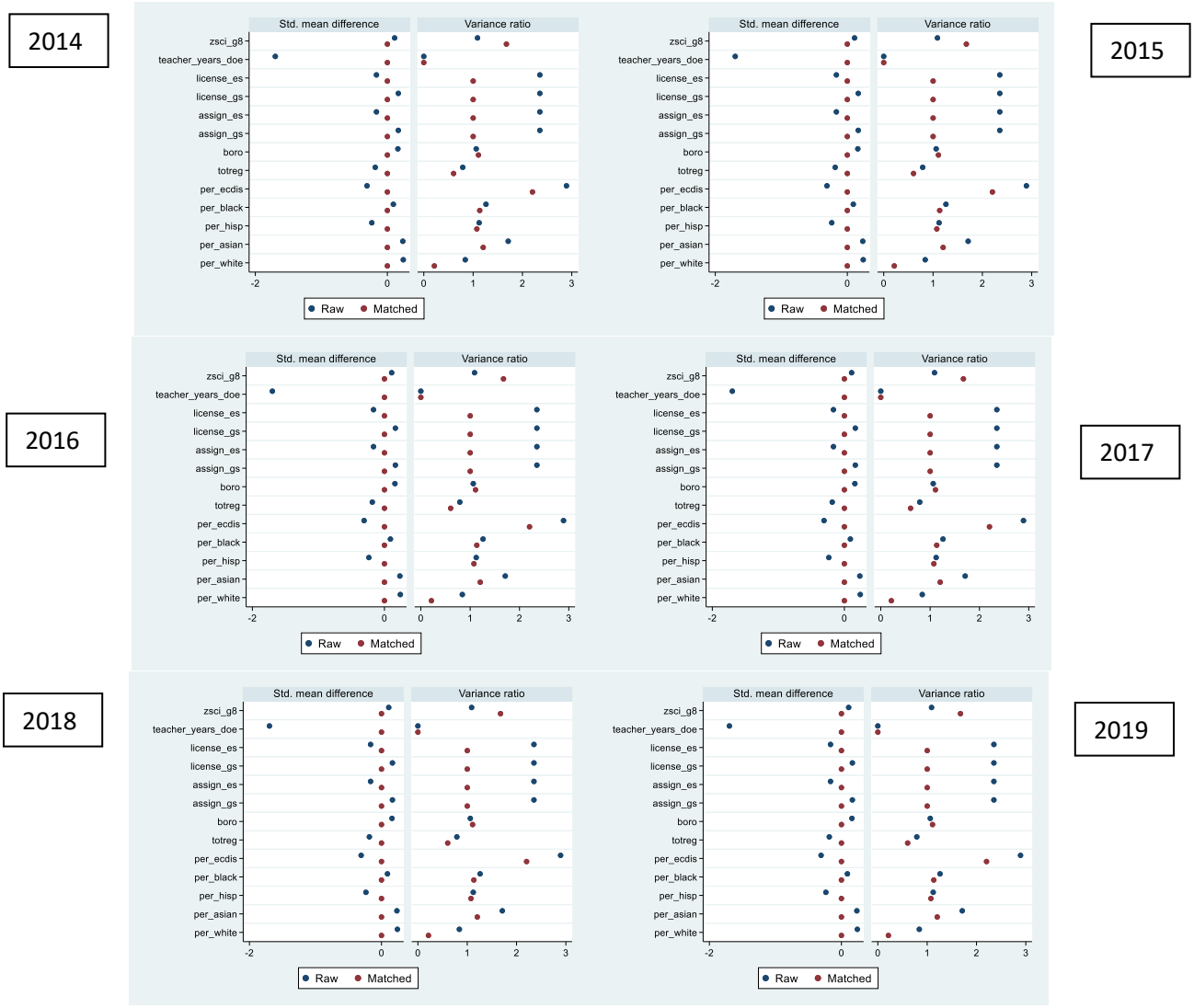
While we successfully matched most of these subgroups by AMNH RGGS and non-AMNH RGGS teachers, there are some subgroups where the comparison group differs from AMNH RGGS group on several teacher and school characteristics. In particular, the comparison group for White students and students with disabilities are the most problematic. This is not surprising for White students, given that AMNH RGGS specifically aims for graduates to teach in schools with high percentages of Black and Latino students and the population of White students across these schools is relatively small. This may be similar for students with disabilities. Therefore, the estimates for White and students with disabilities may provide incorrect estimates. Finally, some of the subgroups (for example, White, SWD, ELL) have fewer observations than other subgroups and the sample size may also be a limitation to the findings.

While we are not able to analyze any Earth Science Regents data from the 2019-20 and 2020-21 school year because of COVID-19, we should begin to have test score data again in the 2021-22 school year and will resume our analysis of the Earth Science Regents exam.

VI. Appendices

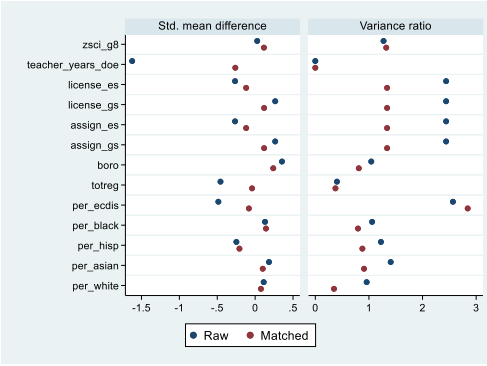
Figure VI-1. Balance Results for KMATCH for Treatment and Comparison Group by Sugbroup and Year

A. Poor Students

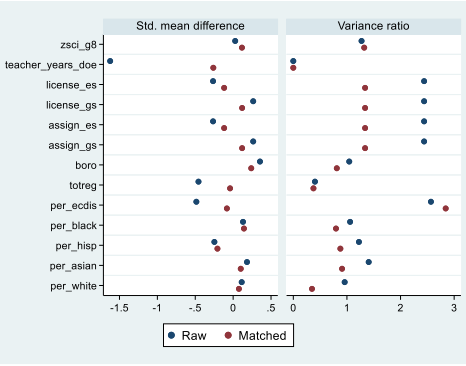


B. Non-Poor Students

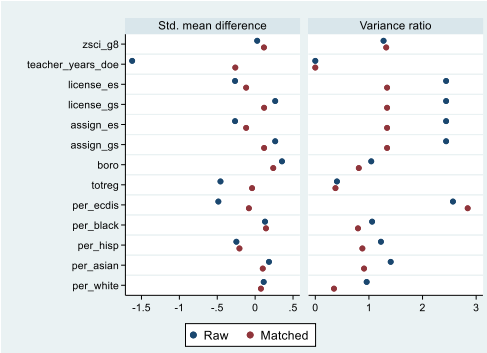
2014



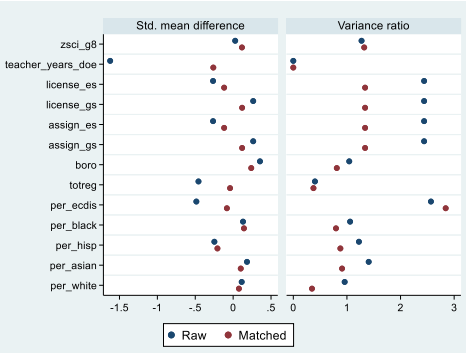
2015



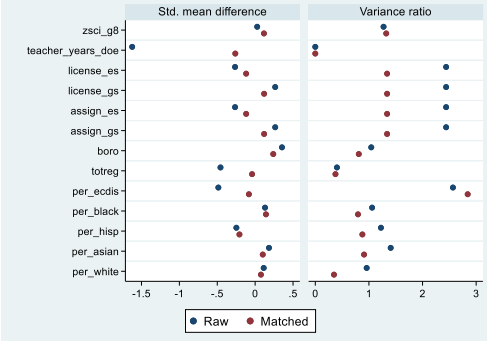
2016



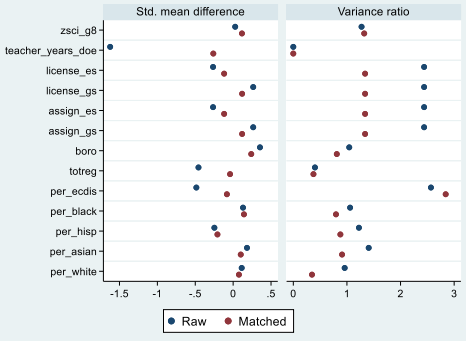
2017



2018

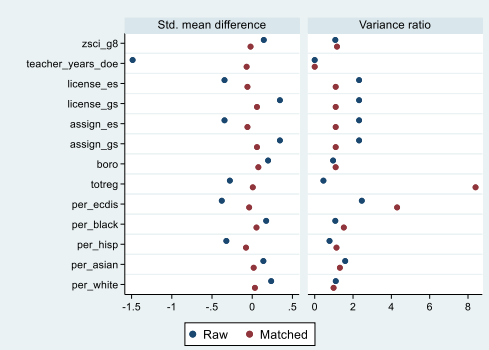


2019

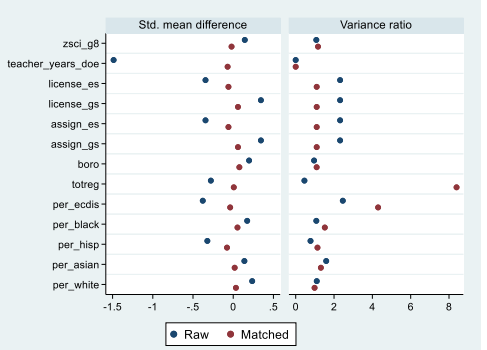


C. Black Students

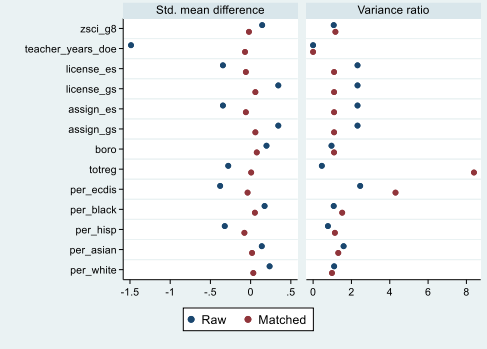
2014



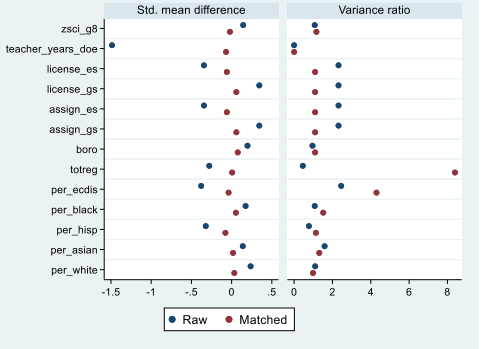
2015



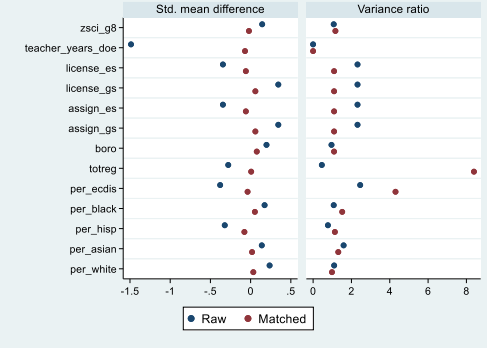
2016



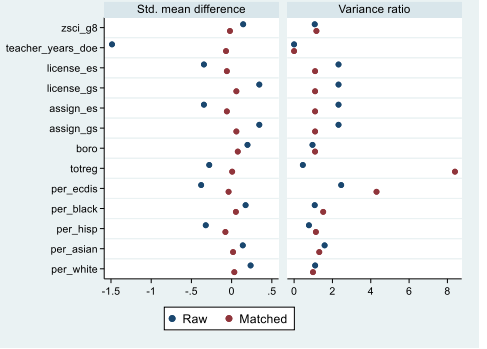
2017



2018

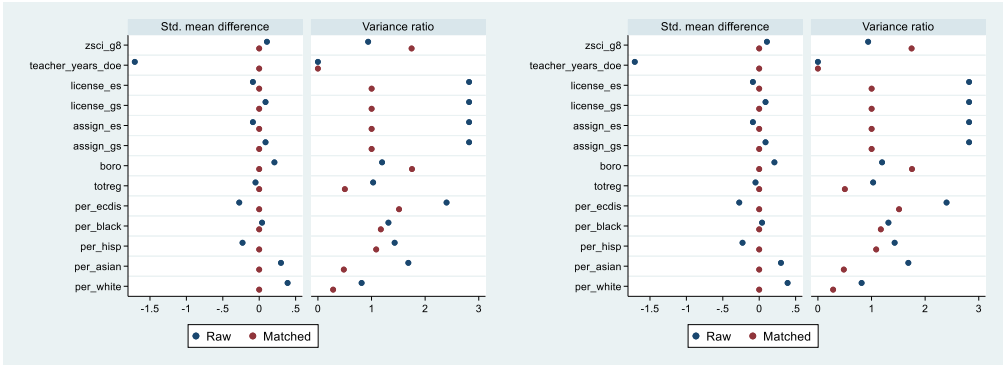


2019



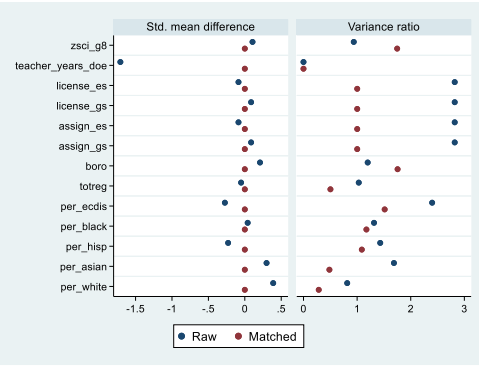
D. Latino Students

2014

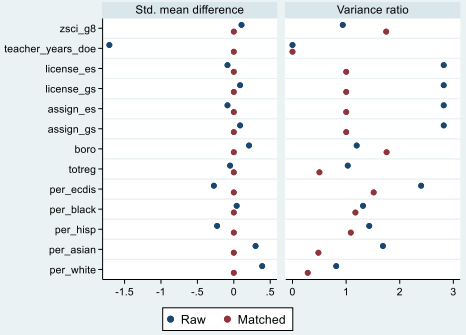


2015

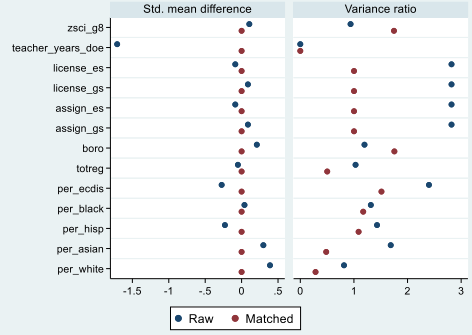
2016



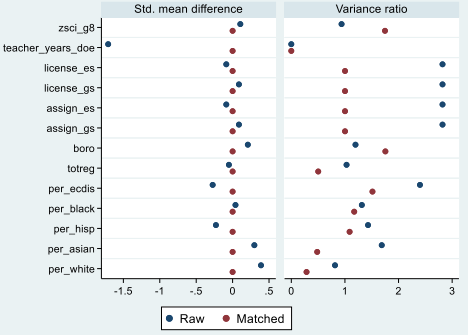
2017



2018

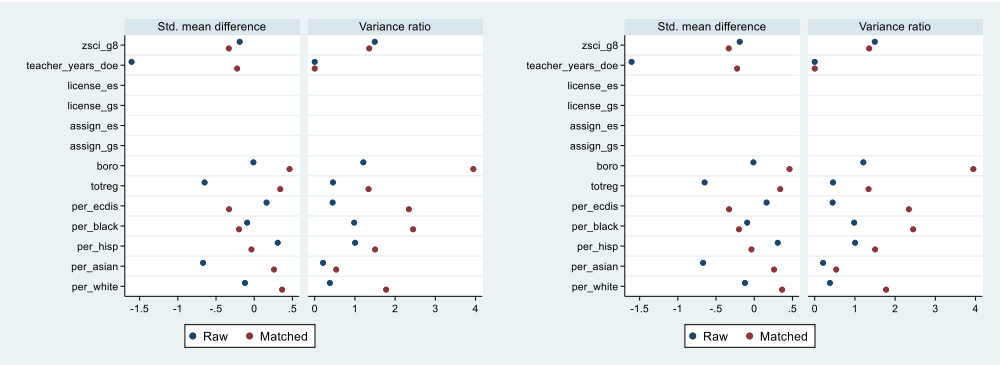


2019



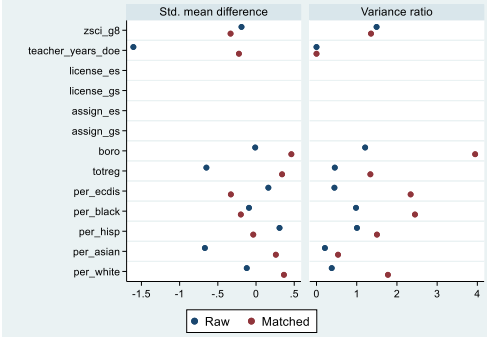
E. White Students

2014

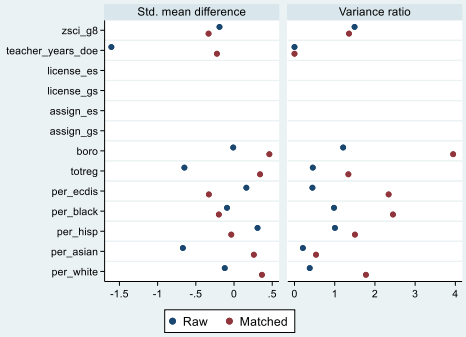


2015

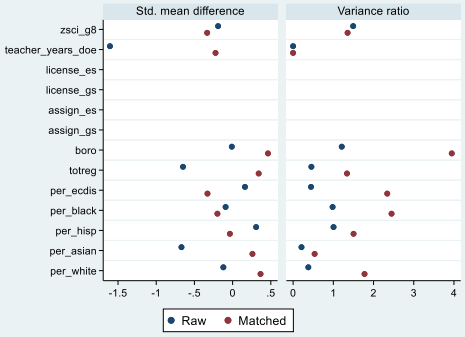
2016



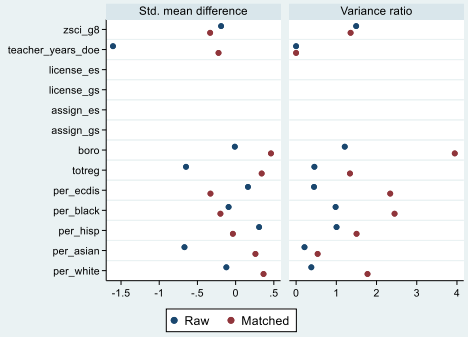
2017



2018

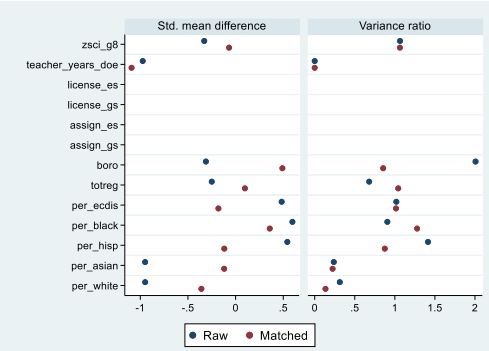


2019

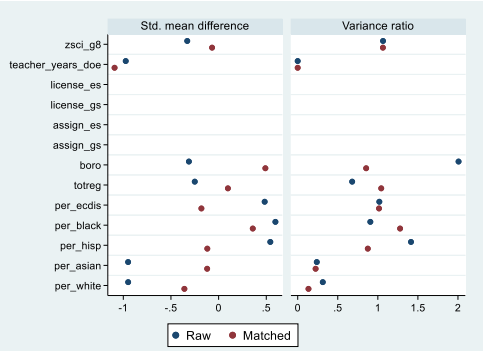


F. Asian Students

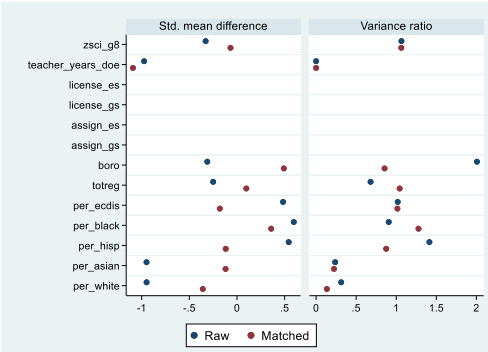
2014



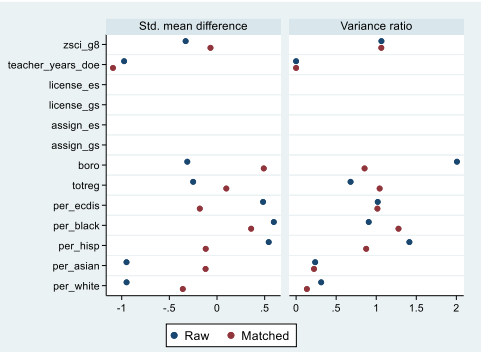
2015



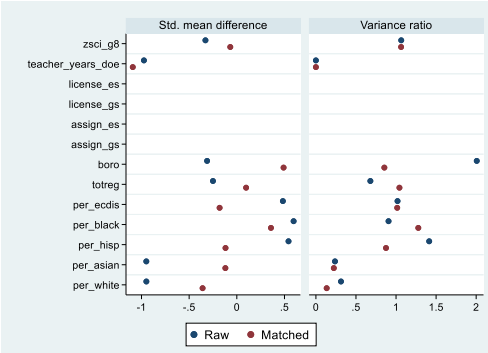
2016



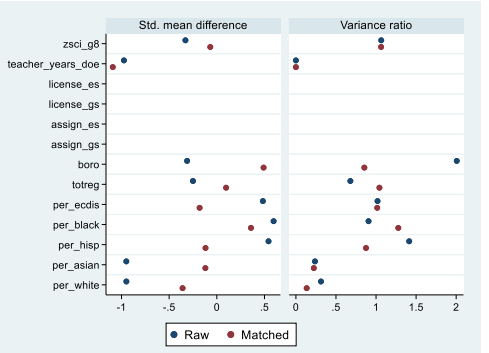
2017



2018

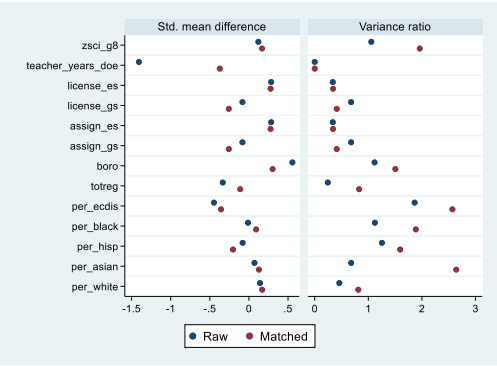


2019

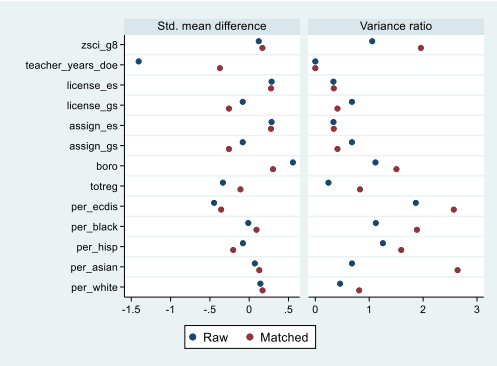


G. Students with Disabilities

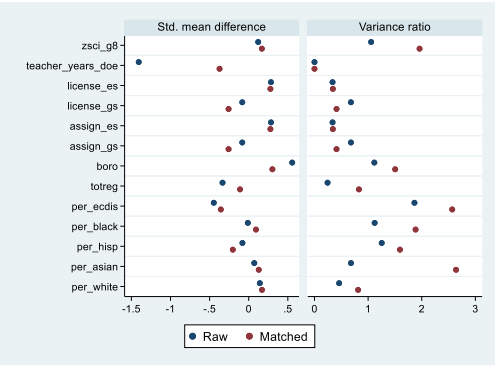
2014



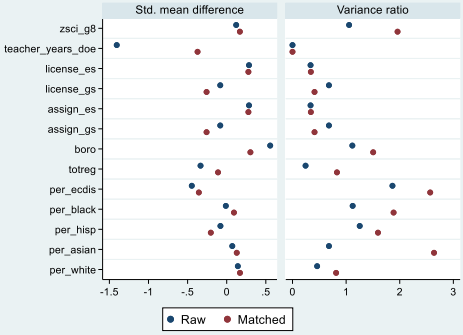
2015



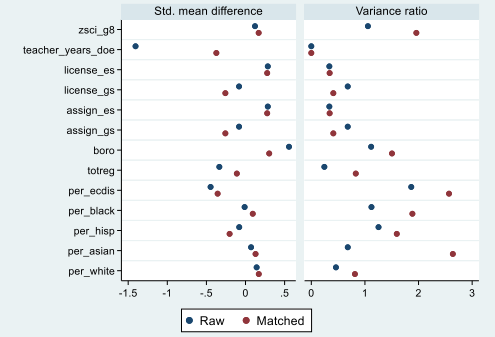
2016



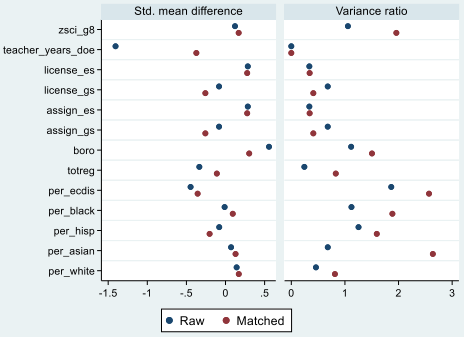
2017



2018

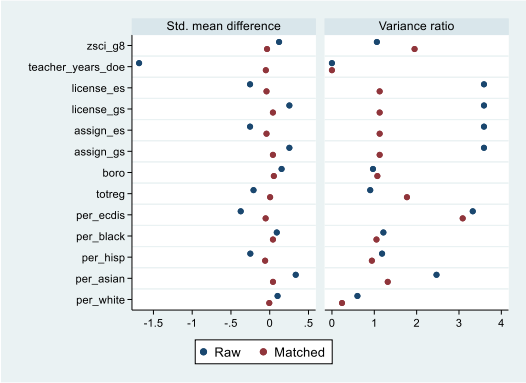


2019

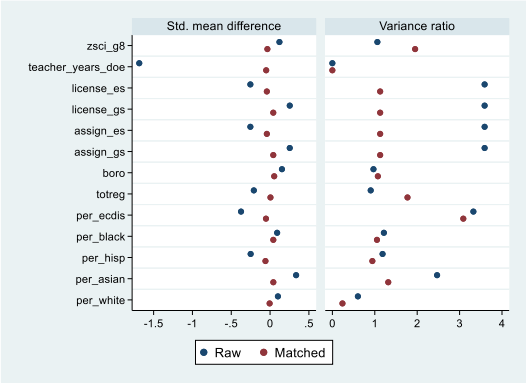


H. Students without Disabilities

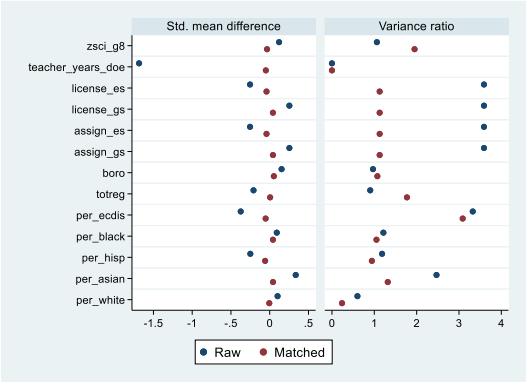
2014



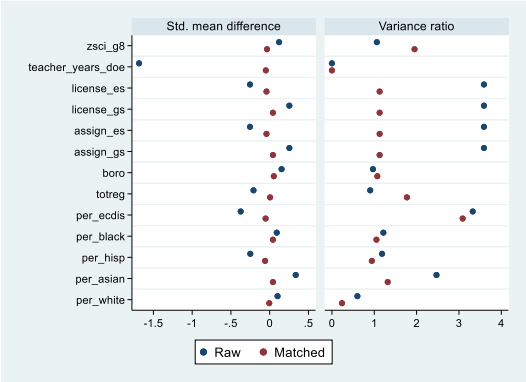
2015



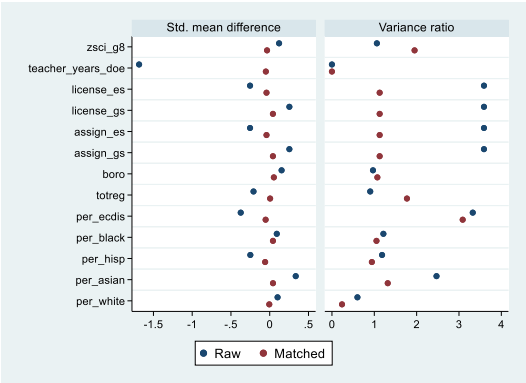
2016



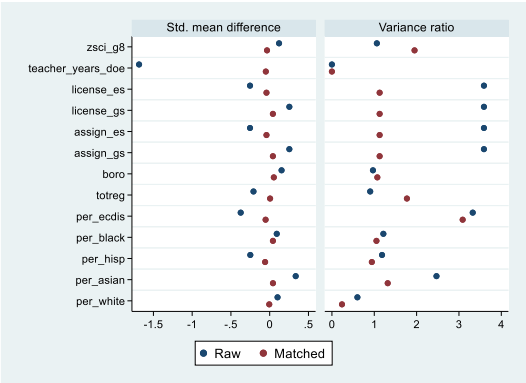
2017



2018

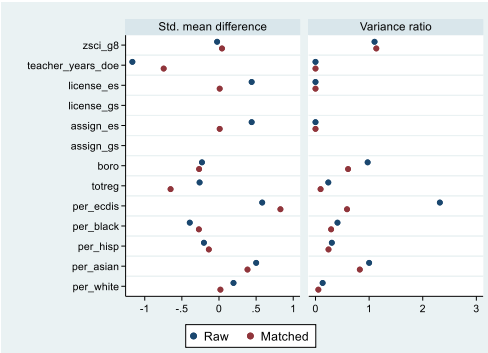


2019

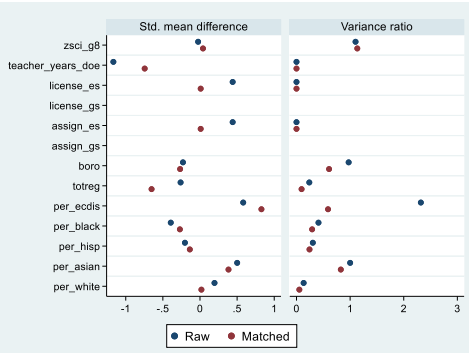


I. English Language Learners

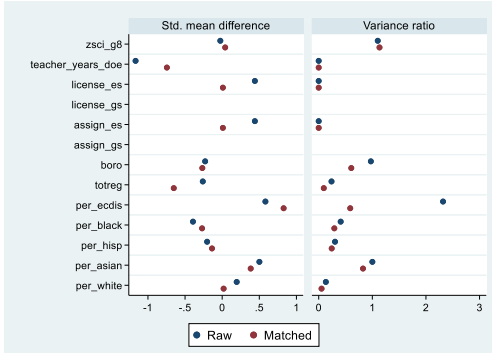
2014



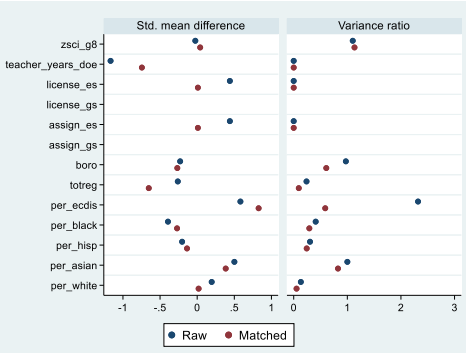
2015



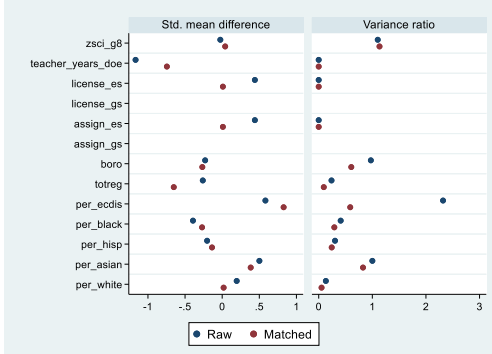
2016



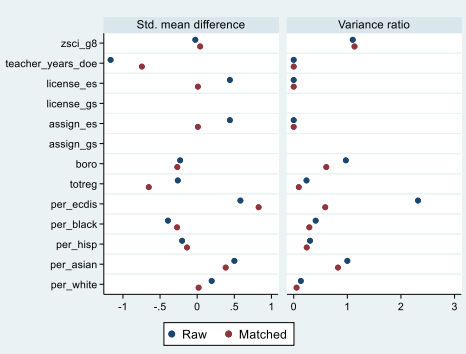
2017



2018

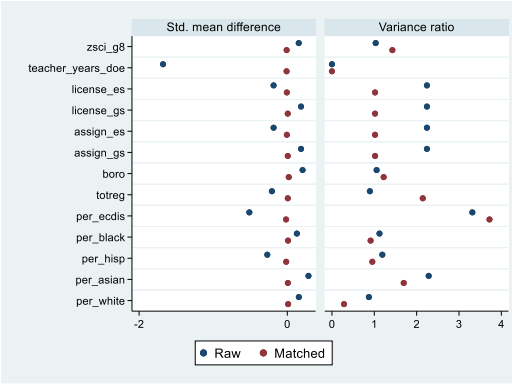


2019

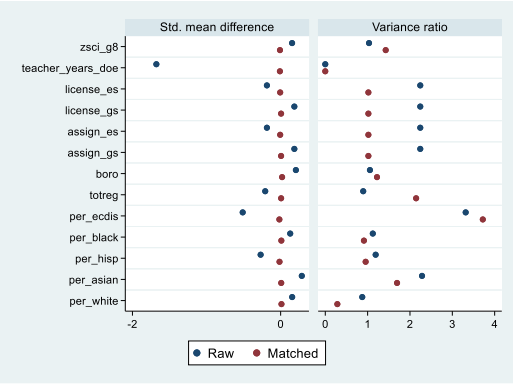


J. Non-English Language Learners

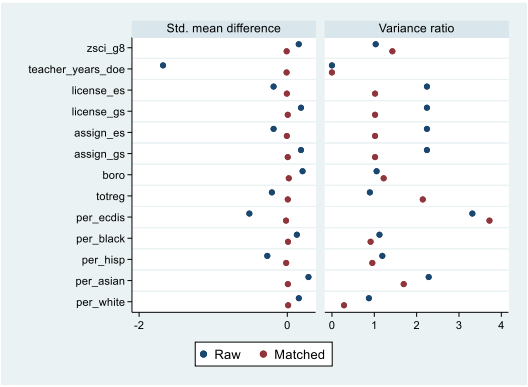
2014



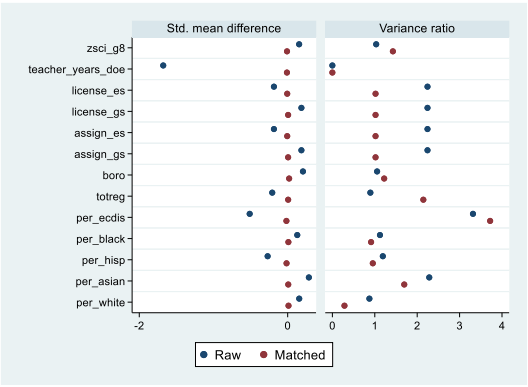
2015



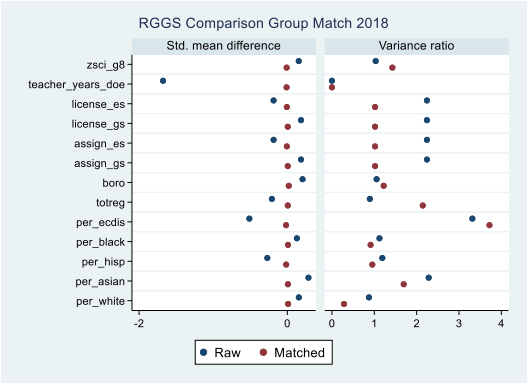
2016



2017



2018



2019

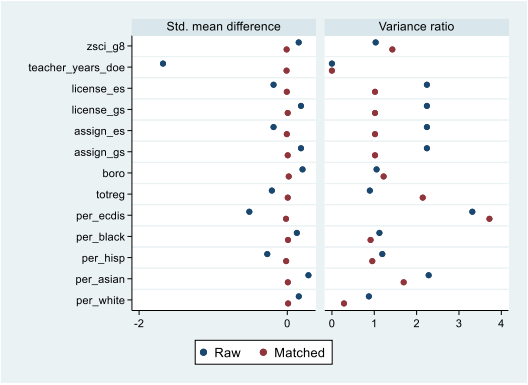


Table VI-1. Subgroup Analysis, Z-Score, Earth Science Regents 2014-2019

	(1) Poor	(2) Not Poor	(3) Black	(4) Latino	(5) Asian	(6) White	(7) SWD	(8) Not SWD	(9) Ell	(10) Not Ell
RGGS	0.05	0.01	0.17***	-0.07	0.18**	-0.34**	0.01	0.04	0.37***	
	(0.03)	(0.07)	(0.05)	(0.04)	(0.09)	(0.14)	(0.09)	(0.03)	(0.10)	
RGGS_2015	-0.07*	-0.05	-0.16***	-0.00	-0.18*	0.07	0.08	-0.09*	-0.36***	
	(0.04)	(0.08)	(0.06)	(0.05)	(0.10)	(0.17)	(0.11)	(0.04)	(0.13)	
RGGS_2016	-0.08**	0.10	-0.18***	0.05	-0.15*	0.32**	-0.08	-0.03	-0.49***	
	(0.04)	(0.07)	(0.06)	(0.05)	(0.09)	(0.15)	(0.10)	(0.04)	(0.11)	
RGGS_2017	0.05	0.14**	-0.04	0.12***	-0.05	0.44***	-0.01	0.08**	-0.12	
	(0.04)	(0.07)	(0.06)	(0.04)	(0.09)	(0.15)	(0.09)	(0.03)	(0.10)	
RGGS_2018	0.10***	0.15**	-0.03	0.22***	-0.09	0.38***	0.04	0.12***	-0.06	
	(0.04)	(0.07)	(0.06)	(0.04)	(0.09)	(0.15)	(0.10)	(0.03)	(0.10)	
RGGS_2019	0.12***	0.19***	0.01	0.22***	0.03	0.46***	0.18*	0.13***	0.04	
	(0.04)	(0.07)	(0.06)	(0.04)	(0.09)	(0.15)	(0.10)	(0.03)	(0.11)	
_cons	0.07	-0.05	-0.26***	-0.02	0.31*	0.20	0.03	-0.02	-0.43*	
	(0.09)	(0.12)	(0.08)	(0.06)	(0.16)	(0.25)	(0.15)	(0.05)	(0.23)	
N	16458	4659	6365	10770	2573	1886	3758	16566	1962	
adj. R^2	0.402	0.420	0.365	0.370	0.410	0.380	0.328	0.377	0.260	
RGGS_2015	NS	NS	NS	NS	NS	*	NS	NS	NS	
RGGS_2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	
RGGS_2017	***	**	***	*	*	NS	NS	***	**	
RGGS_2018	***	**	***	***	NS	NS	NS	***	***	
RGGS_2019	***	***	***	***	***	NS	***	***	***	

Robust standard errors clustered by teacher in parentheses
Covariates not shown are: Columns 1 and 2 Black, Latino, Asian, SWD, and ELL status; Columns 3-6 not shown are Poor, SWD, ELL; column 6 not shown Poor, Black, Latino, Asian, and ELL; and column 7 not shown are Poor, Black, Latino, Asian, and SWD
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table VI-2. Scoring 65 or higher on the Earth Science Regents, by Subgroup, 2014-2019

	(1) Poor	(2) Not Poor	(3) Black	(4) Latino	(5) Asian	(6) White	(7) SWD	(8) Not SWD	(9) Ell	(10) Not Ell
RGGS	-0.01	-0.03	0.05	-0.06**	0.11**	-0.30***	-0.06	0.00	0.09	
	(0.02)	(0.04)	(0.04)	(0.03)	(0.05)	(0.09)	(0.05)	(0.02)	(0.07)	
RGGS_2015	0.03	-0.03	-0.05	0.06*	-0.06	0.16	0.17***	-0.01	-0.03	
	(0.03)	(0.05)	(0.04)	(0.03)	(0.07)	(0.11)	(0.06)	(0.03)	(0.08)	
RGGS_2016	0.01	0.06	-0.05	0.07**	-0.09	0.30***	0.07	0.01	-0.15**	
	(0.03)	(0.05)	(0.04)	(0.03)	(0.06)	(0.10)	(0.05)	(0.03)	(0.07)	
RGGS_2017	0.05*	0.06	0.02	0.07**	-0.07	0.35***	0.05	0.05*	-0.01	
	(0.02)	(0.05)	(0.04)	(0.03)	(0.05)	(0.10)	(0.05)	(0.02)	(0.07)	
RGGS_2018	0.11***	0.11**	0.03	0.19***	-0.07	0.31***	0.13**	0.11***	0.08	
	(0.02)	(0.04)	(0.04)	(0.03)	(0.05)	(0.10)	(0.06)	(0.02)	(0.07)	
RGGS_2019	0.04*	0.07	0.02	0.10***	-0.11**	0.32***	0.14**	0.03	0.03	
	(0.02)	(0.05)	(0.04)	(0.03)	(0.05)	(0.09)	(0.05)	(0.02)	(0.07)	
_cons	0.64***	0.61***	0.48***	0.56***	0.57***	0.68***	0.62***	0.60***	0.33***	
	(0.05)	(0.07)	(0.05)	(0.04)	(0.13)	(0.14)	(0.09)	(0.04)	(0.10)	
N	16458	4659	6365	10770	2573	1886	3758	16566	1962	
adj. R^2	0.272	0.296	0.257	0.253	0.270	0.257	0.226	0.253	0.179	
RGGS_2015	NS	NS	NS	NS	NS	**	**	NS	NS	
RGGS_2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	
RGGS_2017	***	NS	**	NS	NS	NS	NS	***	**	
RGGS_2018	***	***	***	***	NS	NS	**	***	***	
RGGS_2019	***	NS	***	**	NS	NS	**	**	***	

Robust standard errors clustered by in parentheses

Covariates not shown are: Columns 1 and 2 Black, Latino, Asian, SWD, and ELL status; Columns 3-6 not shown are Poor, SWD, ELL; column 6 not shown Poor, Black, Latino, Asian, and ELL; and column 7 not shown are Poor, Black, Latino, Asian, and SWD

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table VI-3. Scoring 85 or higher on the Earth Science Regents, by Subgroup, 2014-2019

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Poor	Not Poor	Black	Latino	Asian	White	SWD	Not SWD	Ell	Not Ell
RGGS	-0.02	-0.02	-0.00	-0.02	0.01	0.01	-0.02	-0.01	0.00	
	(0.01)	(0.03)	(0.02)	(0.01)	(0.05)	(0.06)	(0.02)	(0.01)	(0.02)	
RGGS_2015	-0.02	0.01	-0.01	-0.00	-0.05	-0.04	0.01	-0.02	0.01	
	(0.01)	(0.03)	(0.02)	(0.02)	(0.06)	(0.06)	(0.02)	(0.01)	(0.03)	
RGGS_2016	0.03**	0.05	0.01	0.04**	-0.01	-0.01	0.02	0.03*	-0.00	
	(0.01)	(0.03)	(0.02)	(0.02)	(0.06)	(0.06)	(0.02)	(0.01)	(0.02)	
RGGS_2017	0.04***	0.04	0.03	0.03**	0.04	0.07	0.02	0.04**	0.00	
	(0.01)	(0.03)	(0.02)	(0.02)	(0.06)	(0.06)	(0.02)	(0.01)	(0.02)	
RGGS_2018	0.07***	0.10***	0.06***	0.06***	0.06	0.12**	0.04**	0.07***	0.02	
	(0.01)	(0.03)	(0.02)	(0.02)	(0.06)	(0.06)	(0.02)	(0.01)	(0.02)	
RGGS_2019	0.06***	0.07**	0.02	0.05***	0.12**	0.06	0.03*	0.07***	0.02	
	(0.01)	(0.03)	(0.02)	(0.02)	(0.06)	(0.06)	(0.02)	(0.01)	(0.03)	
_cons	0.06	0.16***	0.07***	0.10***	0.14	0.18*	0.13***	0.09***	0.06**	
	(0.05)	(0.04)	(0.02)	(0.02)	(0.12)	(0.10)	(0.03)	(0.02)	(0.03)	
N	16458	4659	6365	10770	2573	1886	3758	16566	1962	
adj. R^2	0.160	0.206	0.132	0.111	0.211	0.167	0.082	0.171	0.070	
RGGS_2015	***	NS	NS	**	NS	NS	NS	**	NS	
RGGS_2016	NS	NS	NS	NS	NS	NS	NS	*	NS	
RGGS_2017	***	NS	**	NS	NS	NS	NS	**	NS	
RGGS_2018	***	***	***	**	**	***	NS	***	NS	
RGGS_2019	***	**	NS	**	***	NS	NS	***	NS	