

jj_lab2

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Current Models

Model Set 1 — log models

Model 1: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio})$
Model 2: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio}) + \text{lunch_subsidy_eligibility}$
Model 3: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio}) + \text{lunch_subsidy_eligibility} + \text{average_salary}$

Model Set 2 — sqrt models

Model 4: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio})$
Model 5: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio}) + \text{lunch_subsidy_eligibility}$
Model 6: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio}) + \text{lunch_subsidy_eligibility} + \text{average_salary}$

Model Set 3 — sqrt interaction models

Model 7: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio})$
Model 8: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio}) : \text{lunch_subsidy_eligibility}$
Model 9: $\sqrt{\text{truancy_rate}} \sim \log(\text{pupil_teacher_fte_ratio}) : \text{lunch_subsidy_eligibility} + \text{average_salary}$

Model Proposal

Proposed Model Set 4 — grade-level log interaction models

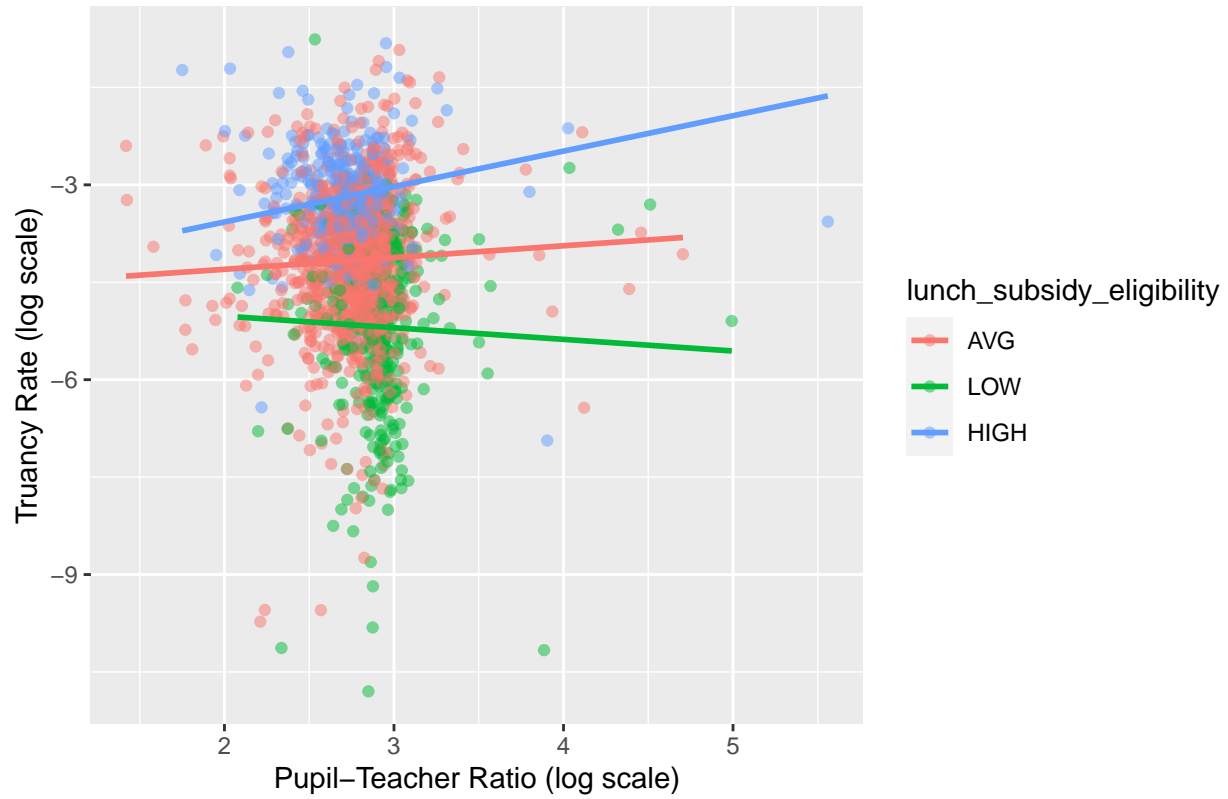
Model 10: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio}) : \text{lunch_subsidy_eligibility}$
Model 11: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio}) : \text{lunch_subsidy_eligibility} + \text{grade_level}$
Model 12: $\log(\text{truancy_rate}) \sim \log(\text{pupil_teacher_fte_ratio}) : \text{lunch_subsidy_eligibility} + \text{grade_level} +$

average_salary

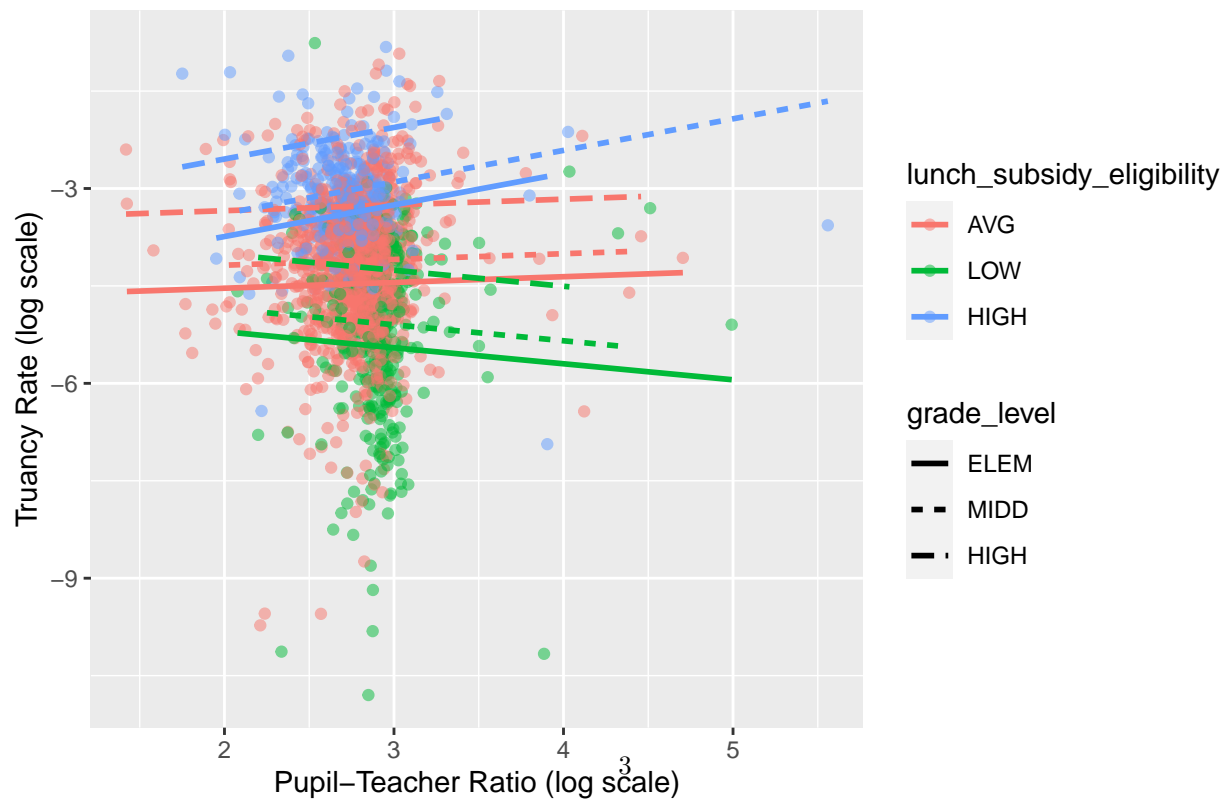
Adding Grade-Level Factor

Grade-Level Modeling

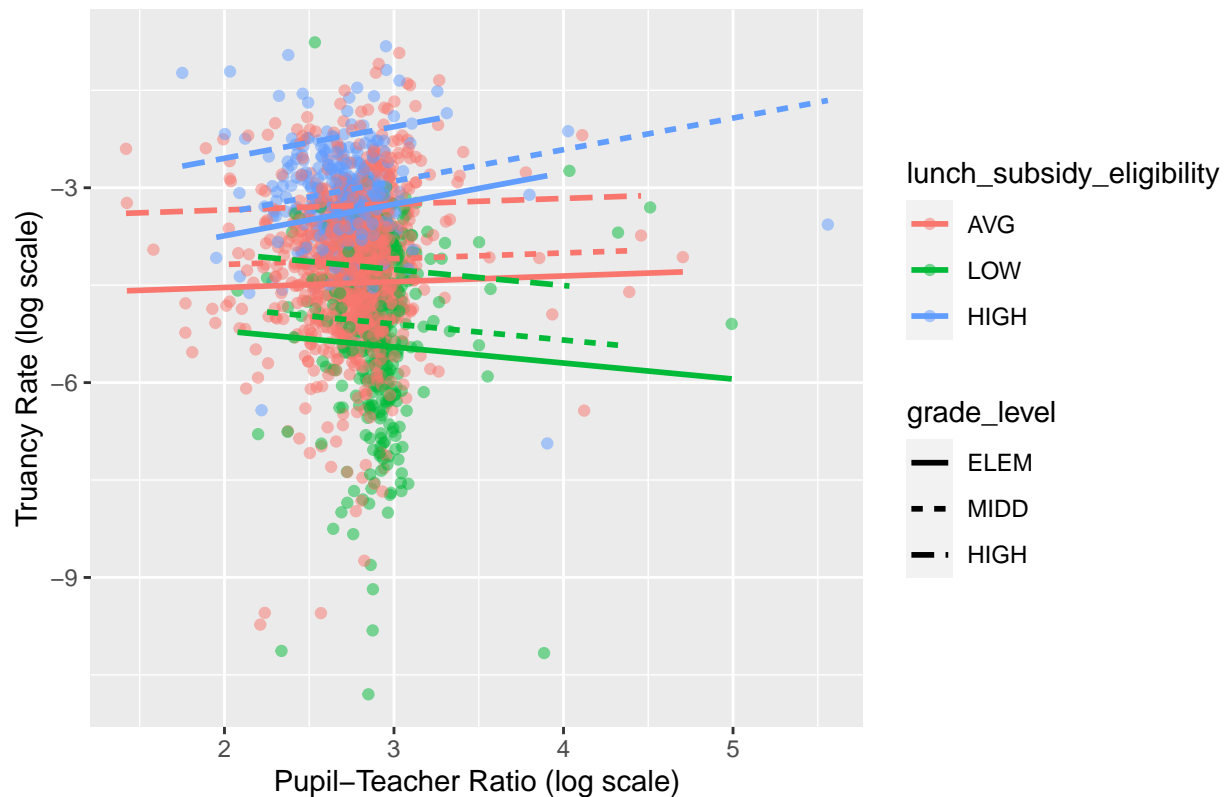
Model 10



Model 11



Model 11



Testing Coefficients

```
## [1] 1.165269
## [1] 0.9763646
## [1] 0.968129

##
## t test of coefficients:
##
##
## Estimate Std. Error
## (Intercept) -4.66236 0.37696
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG 0.18093 0.13565
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW -0.17922 0.13193
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH 0.54533 0.14144
## t value Pr(>|t|)
## (Intercept) -12.3682 < 2.2e-16
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG 1.3338 0.1824583
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW -1.3584 0.1745198
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH 3.8555 0.0001199
##
## (Intercept) ***
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH ***
## ---
```

```

## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##
## t test of coefficients:
##
##
##               Estimate Std. Error
## (Intercept)      -4.712351    0.359003
## grade_levelMIDD      0.353996    0.057925
## grade_levelHIGH      1.193549    0.070540
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG  0.088569    0.129242
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW -0.246578    0.126077
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH  0.486243    0.135138
##
##               t value Pr(>|t|)
## (Intercept)      -13.1262 < 2.2e-16
## grade_levelMIDD      6.1113  1.23e-09
## grade_levelHIGH     16.9202 < 2.2e-16
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG  0.6853  0.49325
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW -1.9558  0.05066
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH  3.5981  0.00033
##
## (Intercept)                ***
## grade_levelMIDD             ***
## grade_levelHIGH             ***
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW .
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##
## t test of coefficients:
##
##
##               Estimate
## (Intercept)      -5.0491e+00
## grade_levelMIDD      3.6579e-01
## grade_levelHIGH      1.2118e+00
## average_salary      9.4128e-06
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG  3.1735e-02
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW -3.1742e-01
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH  4.2410e-01
##
##               Std. Error t value
## (Intercept)      3.4902e-01 -14.4666
## grade_levelMIDD      5.7428e-02  6.3696
## grade_levelHIGH      6.8826e-02 17.6066
## average_salary      2.7083e-06  3.4756
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG  1.2895e-01  0.2461
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW  1.2777e-01 -2.4844
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH  1.3472e-01  3.1480
##
##               Pr(>|t|)
## (Intercept)      < 2.2e-16 ***
## grade_levelMIDD      2.452e-10 ***
## grade_levelHIGH      < 2.2e-16 ***
## average_salary      0.0005229 ***
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG  0.8056412
## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW  0.0130765 *

```

```

## log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH 0.0016732 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Wald test
##
## Model 1: log(truancy_rate) ~ log(pupil_teacher_fte_ratio):lunch_subsidy_eligibility
## Model 2: log(truancy_rate) ~ log(pupil_teacher_fte_ratio):lunch_subsidy_eligibility +
##      grade_level
##      Res.Df Df       F    Pr(>F)
## 1      1653
## 2      1651  2 147.15 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Wald test
##
## Model 1: log(truancy_rate) ~ log(pupil_teacher_fte_ratio):lunch_subsidy_eligibility +
##      grade_level
## Model 2: log(truancy_rate) ~ log(pupil_teacher_fte_ratio):lunch_subsidy_eligibility +
##      grade_level + average_salary
##      Res.Df Df       F    Pr(>F)
## 1      1651
## 2      1650  1 12.299 0.0004654 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Table 1: The Relationship Between Truancy and Pupil Student Ratio (Individual School)

	<i>Dependent variable:</i>		
	Model 10	log(truancy_rate) Model 11	Model 12
grade_levelMIDD		0.354*** (0.063)	0.366*** (0.062)
grade_levelHIGH		1.194*** (0.067)	1.212*** (0.067)
average_salary			0.00001 (0.00000)
log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityAVG	0.181 (0.099)	0.089 (0.091)	0.032 (0.092)
log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityLOW	-0.179 (0.095)	-0.247** (0.087)	-0.317*** (0.089)
log(pupil_teacher_fte_ratio):lunch_subsidy_eligibilityHIGH	0.545*** (0.102)	0.486*** (0.094)	0.424*** (0.095)
Constant	-4.662*** (0.274)	-4.712*** (0.251)	-5.049*** (0.266)
Observations	1,657	1,657	1,657
R ²	0.272	0.390	0.395
Adjusted R ²	0.270	0.388	0.393
Residual Std. Error	1.081 (df = 1653)	0.990 (df = 1651)	0.986 (df = 1651)

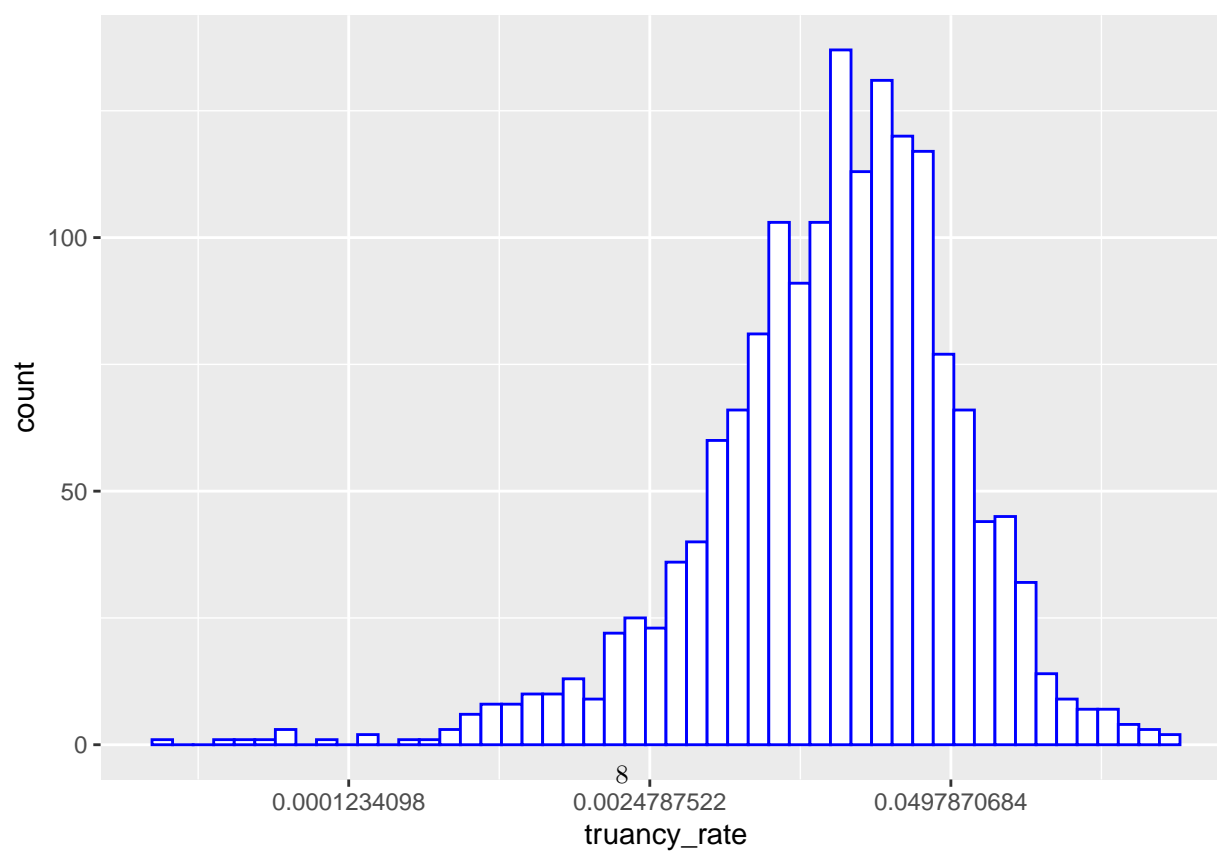
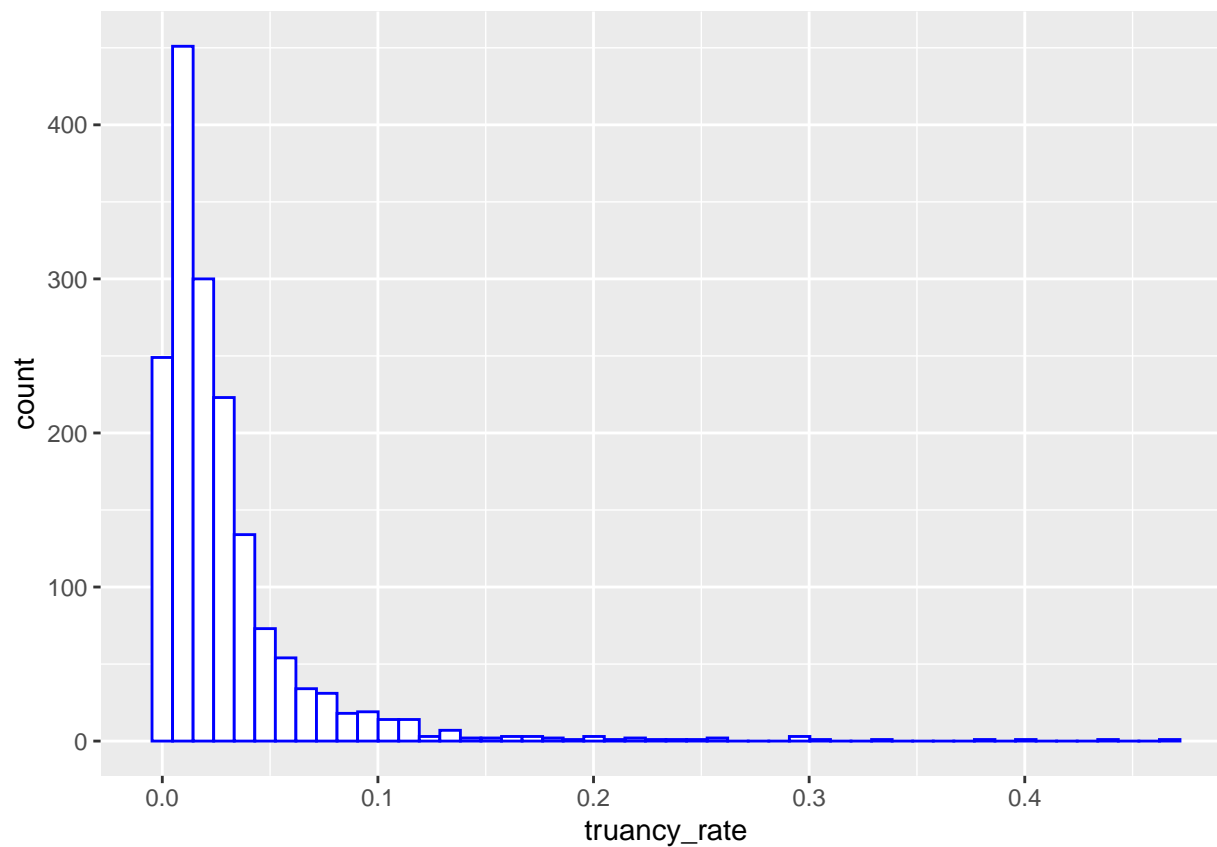
Note:

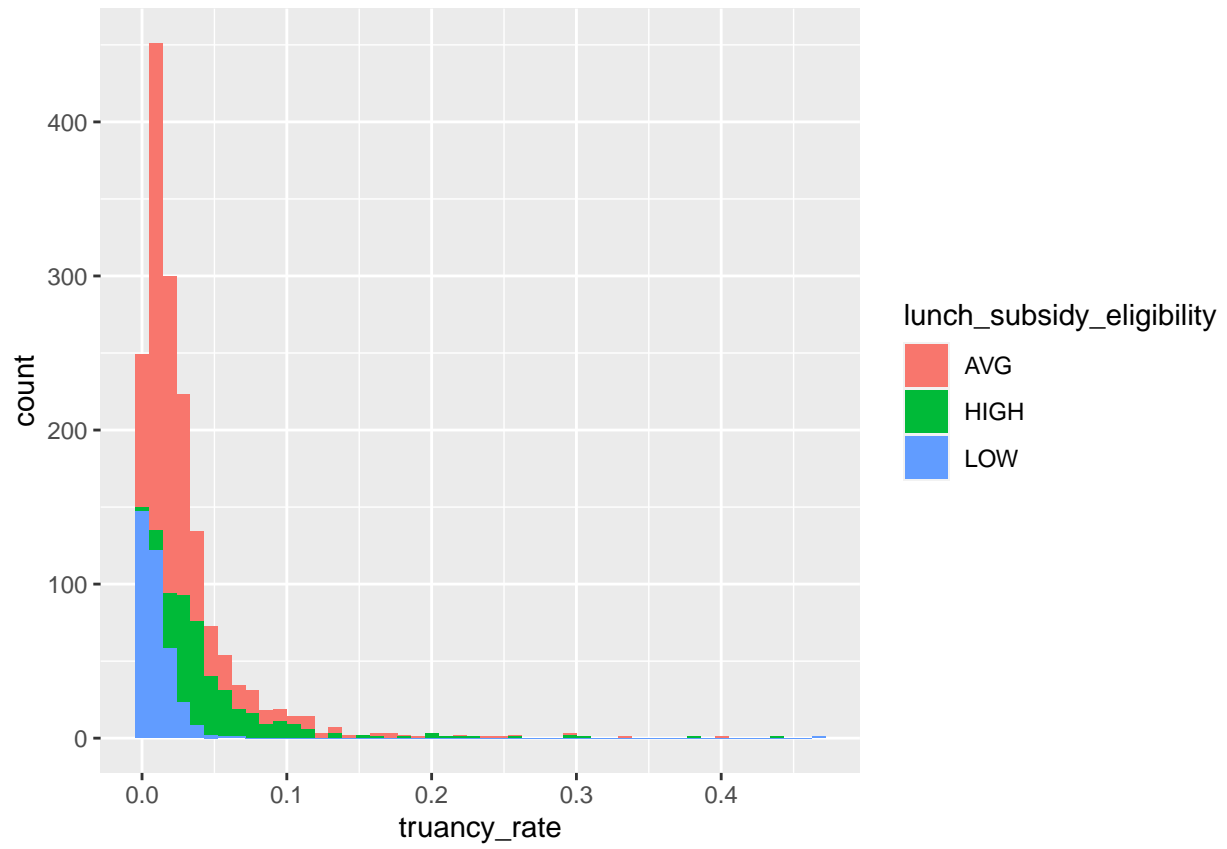
*p<0.05; **p<0.01; ***p<0.001

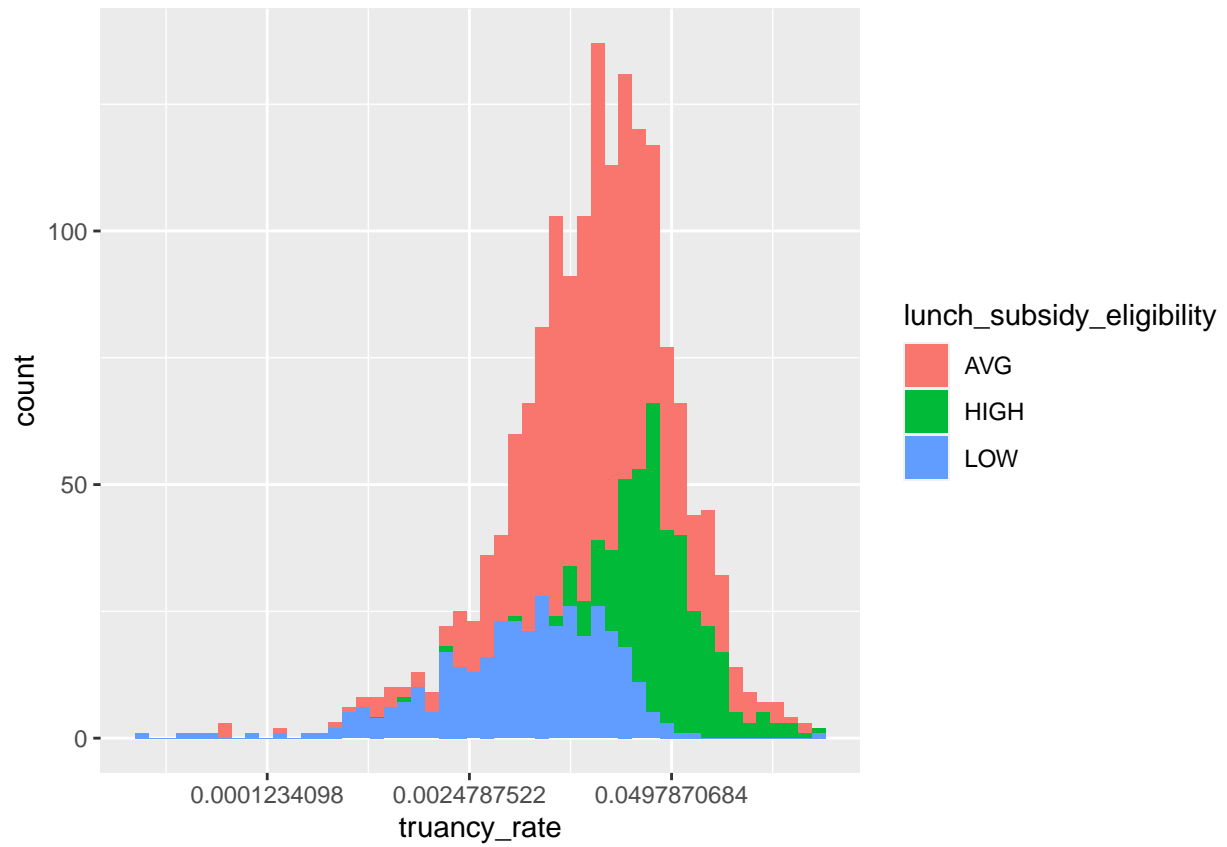
Variable EDA

Truancy Rate

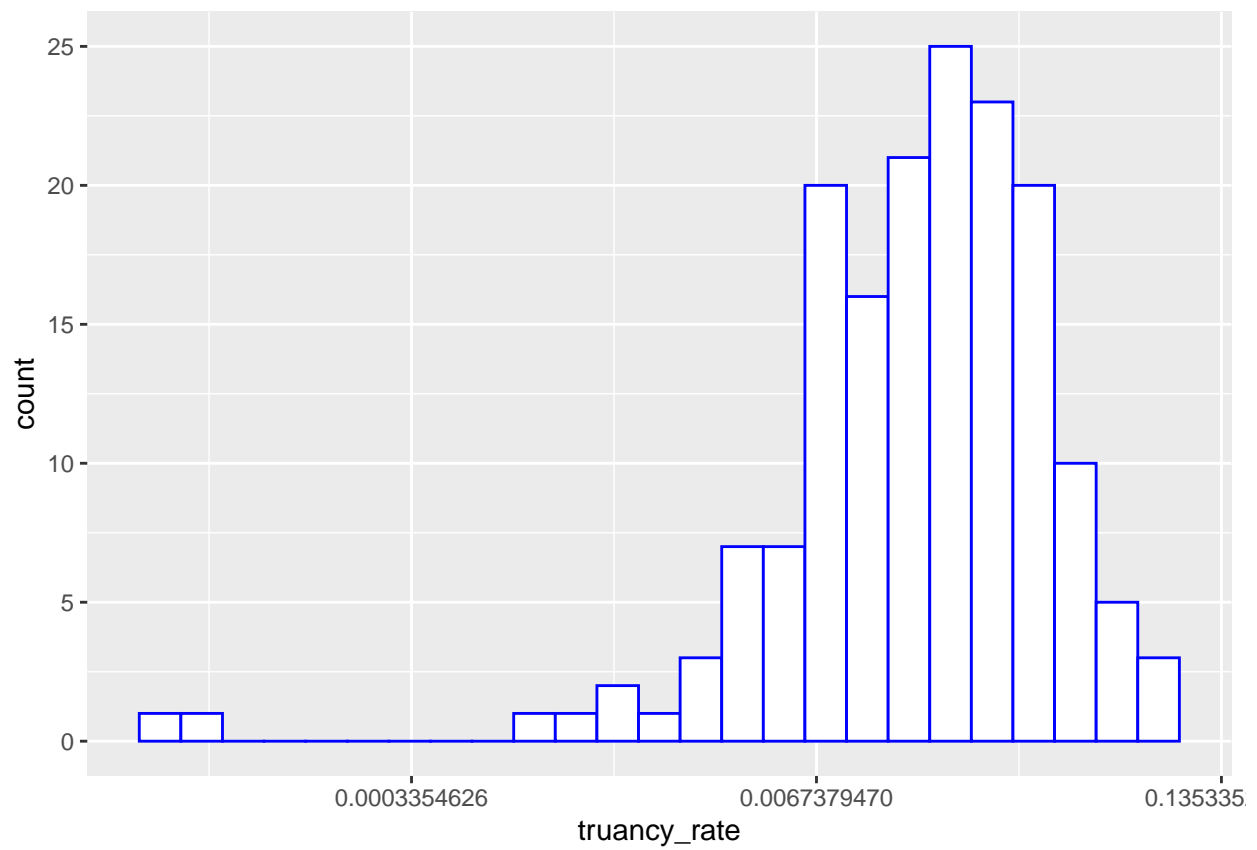
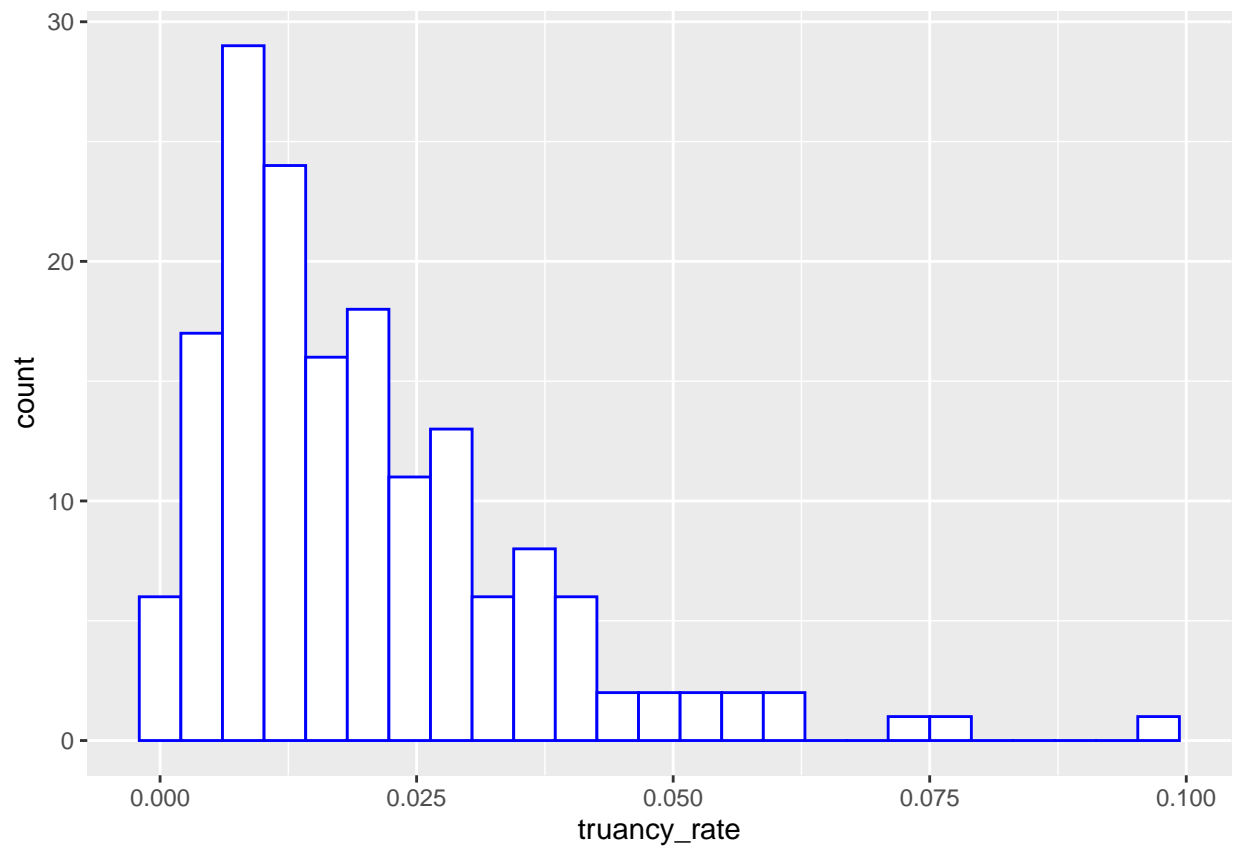
School-Level

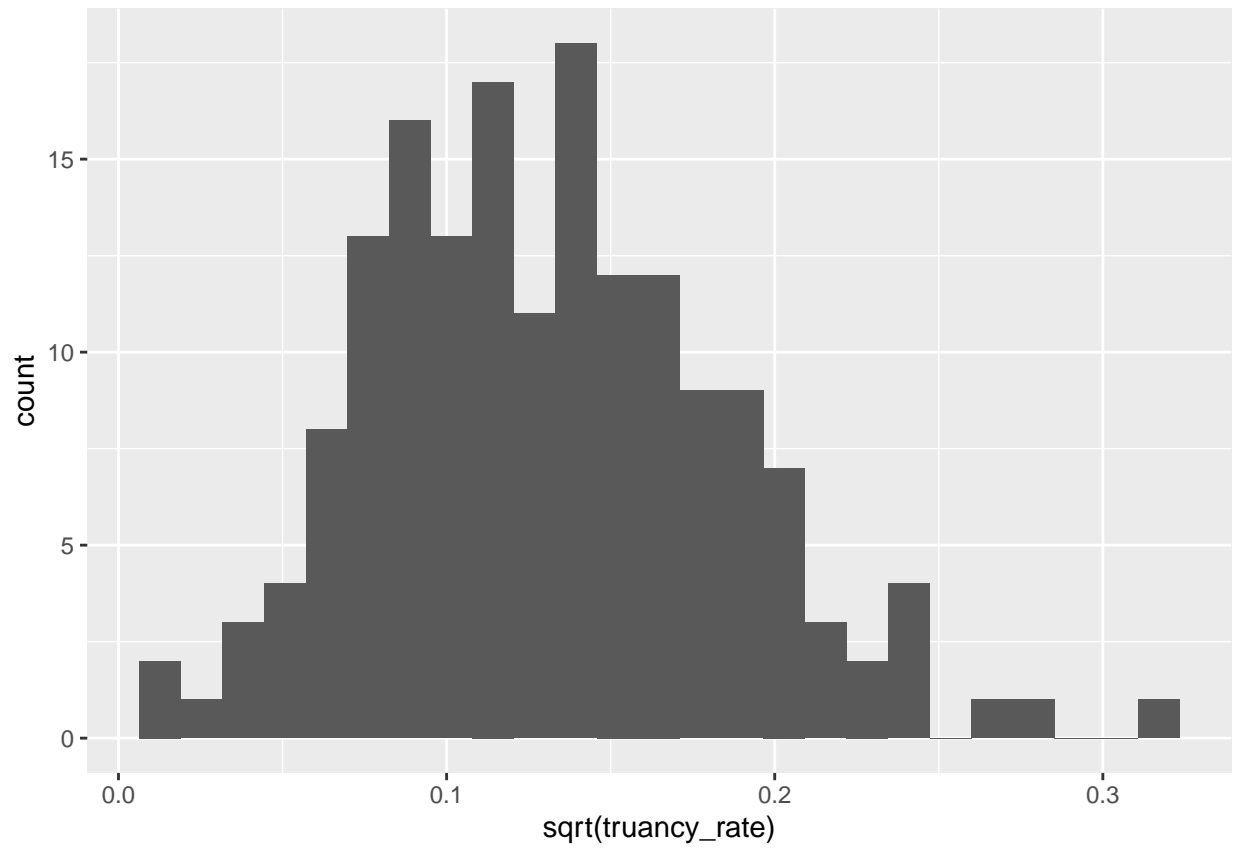






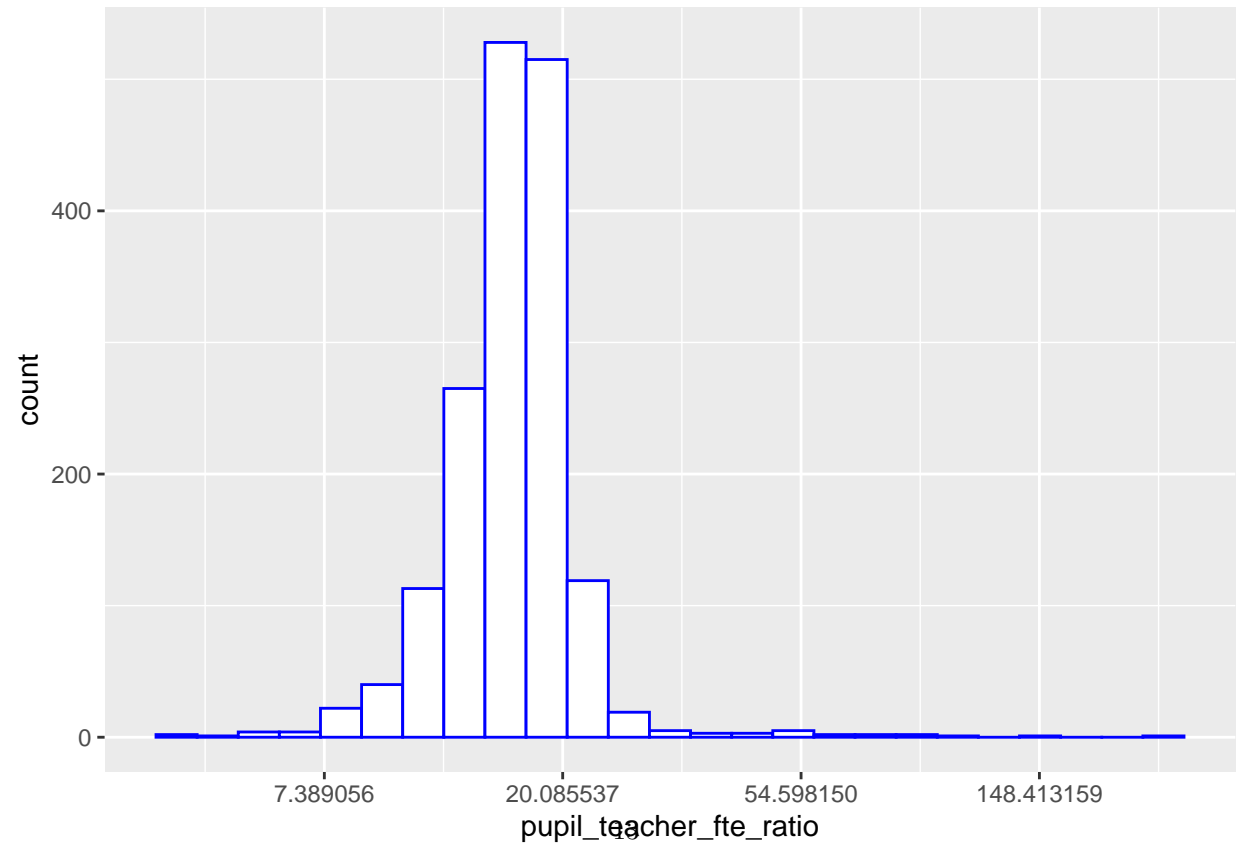
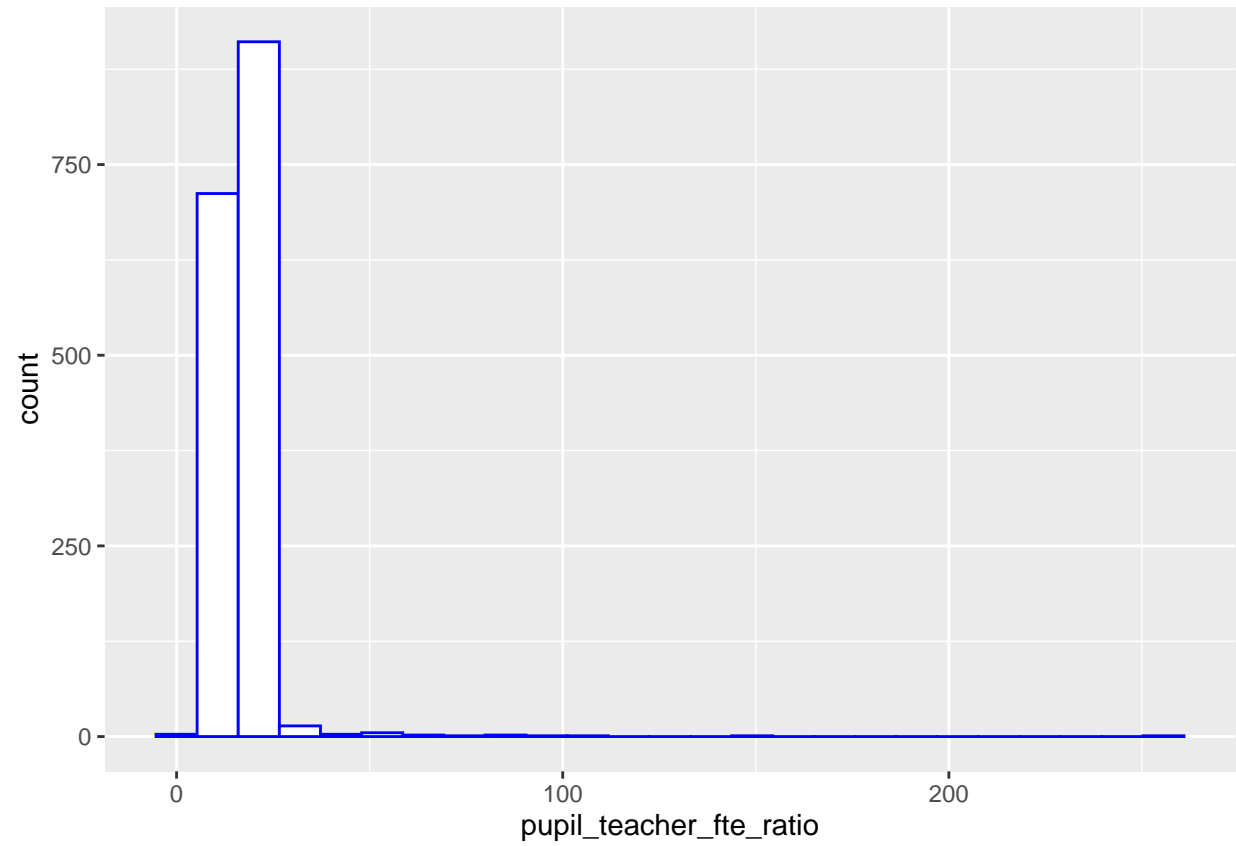
District-Level

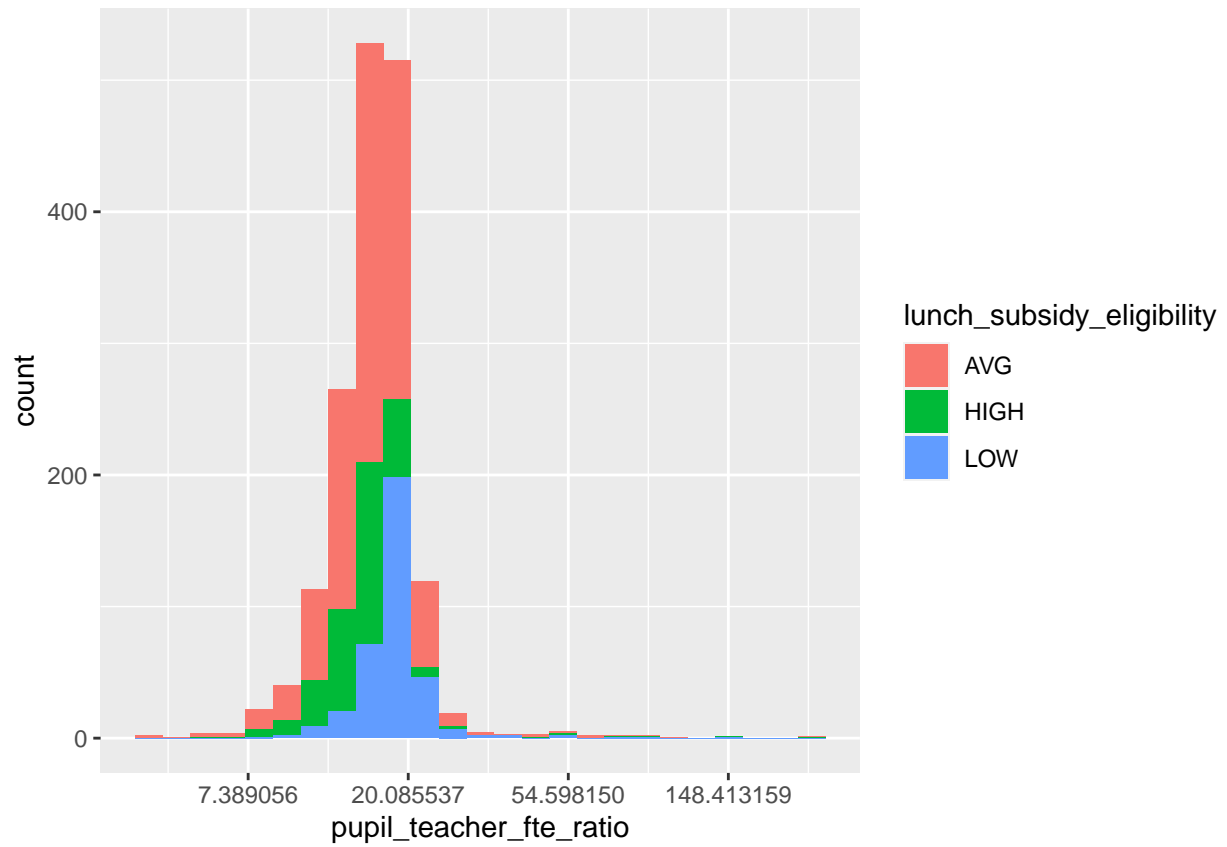




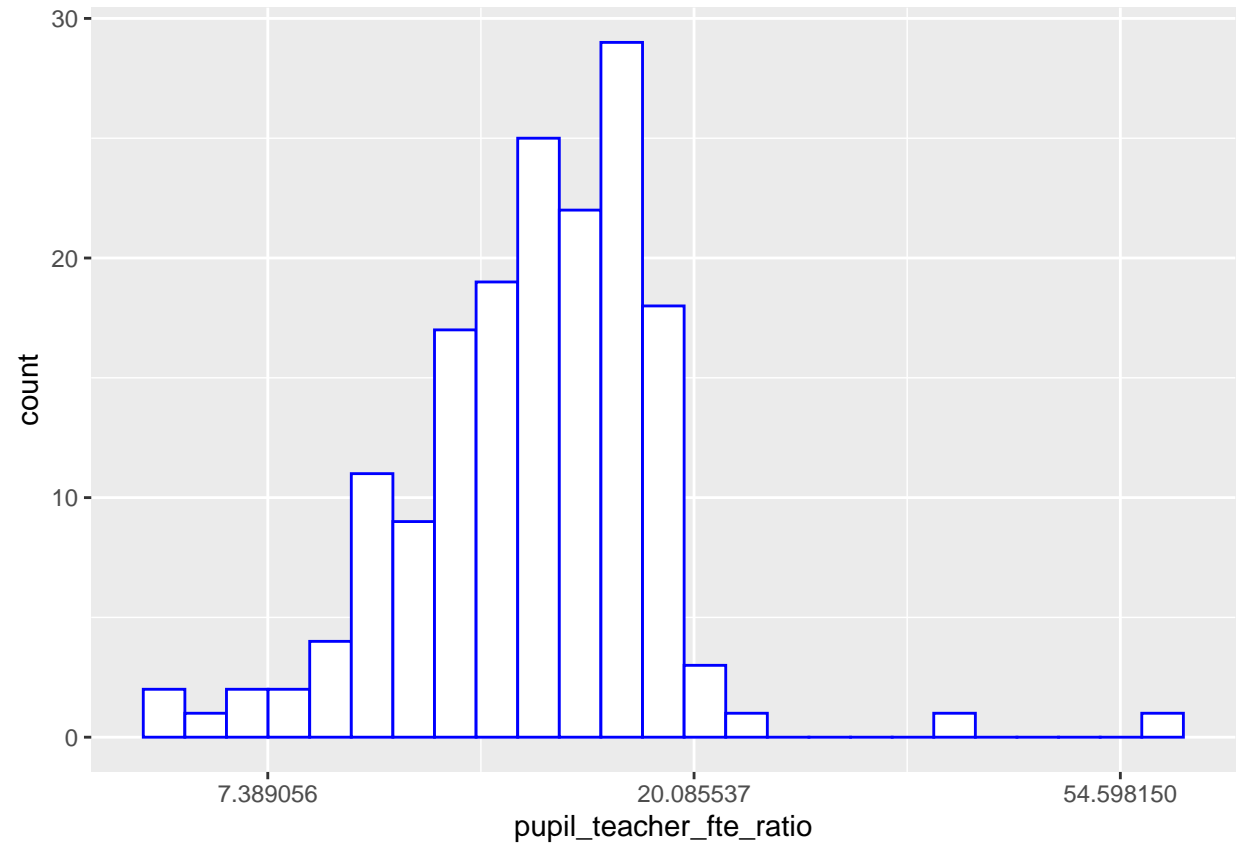
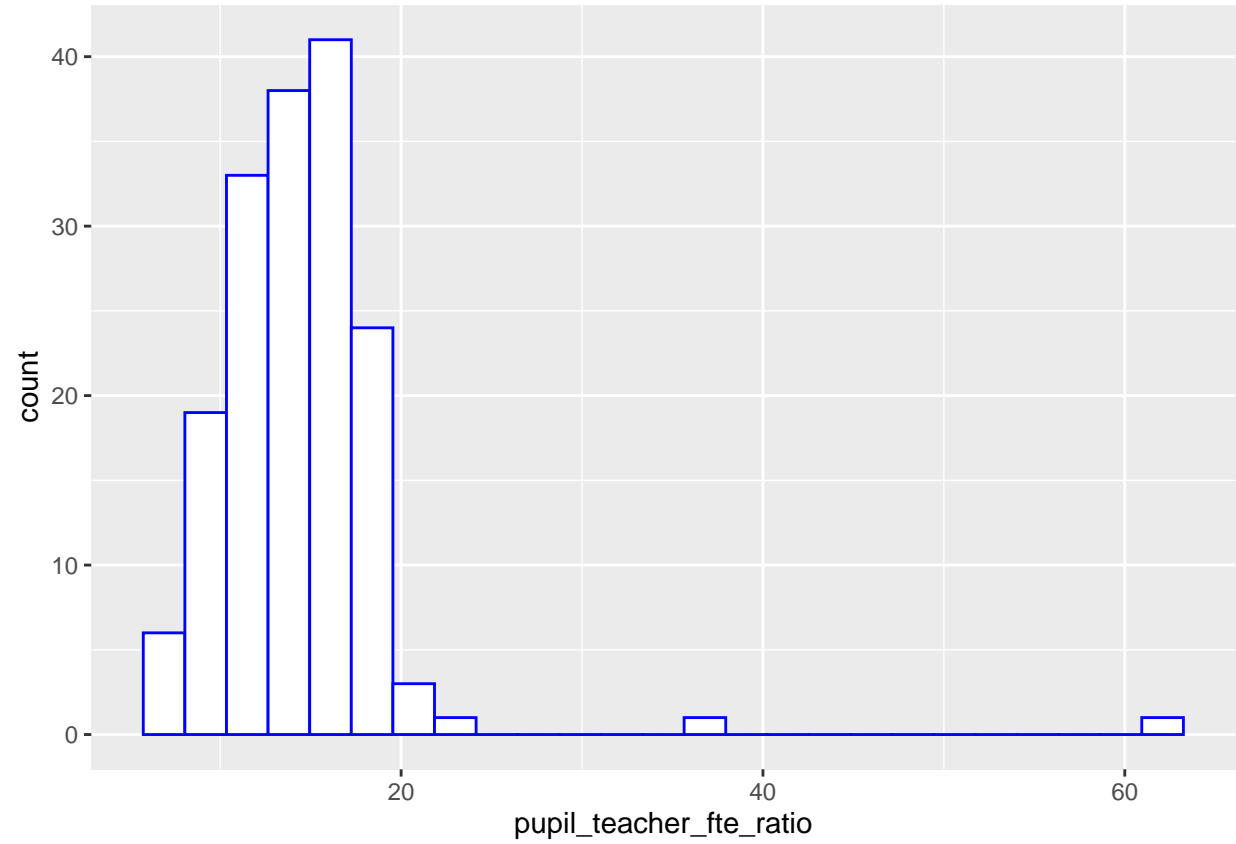
Pupil-Teacher Ratio

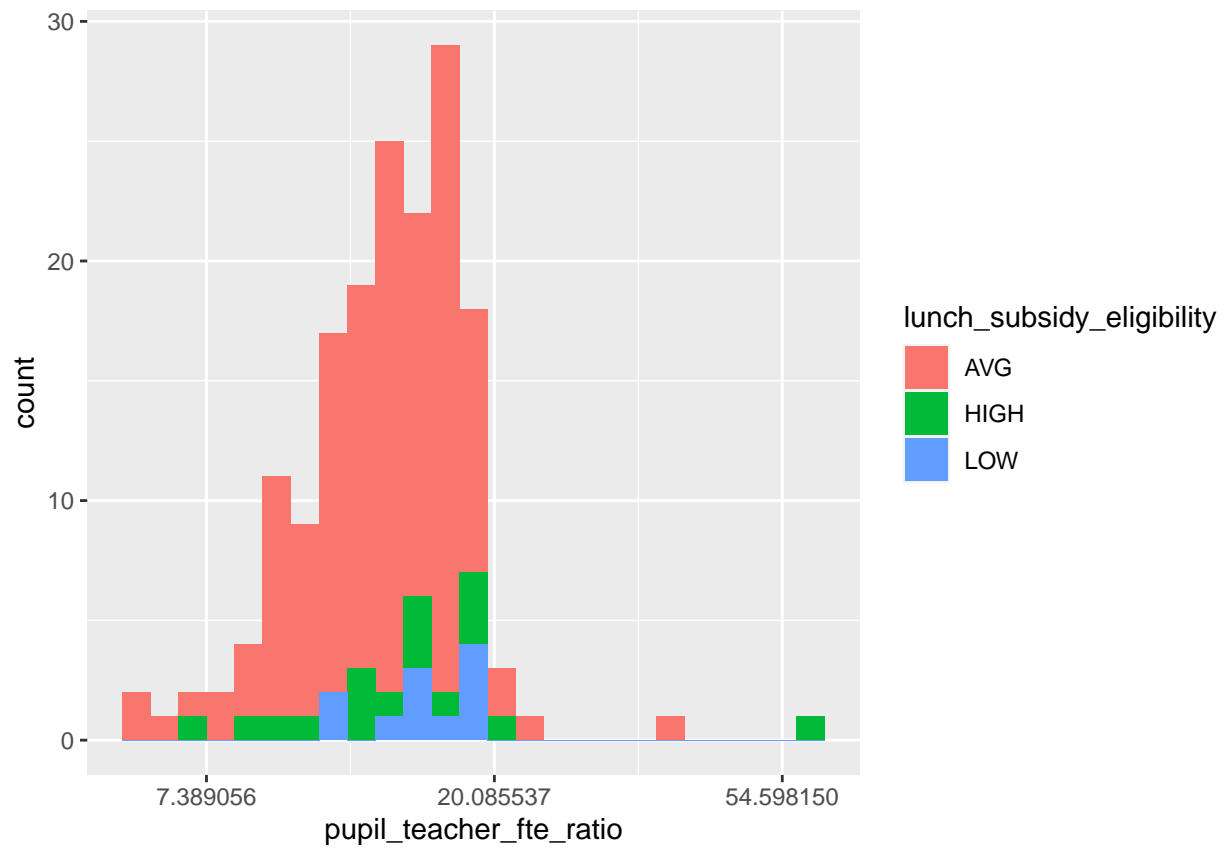
School-Level





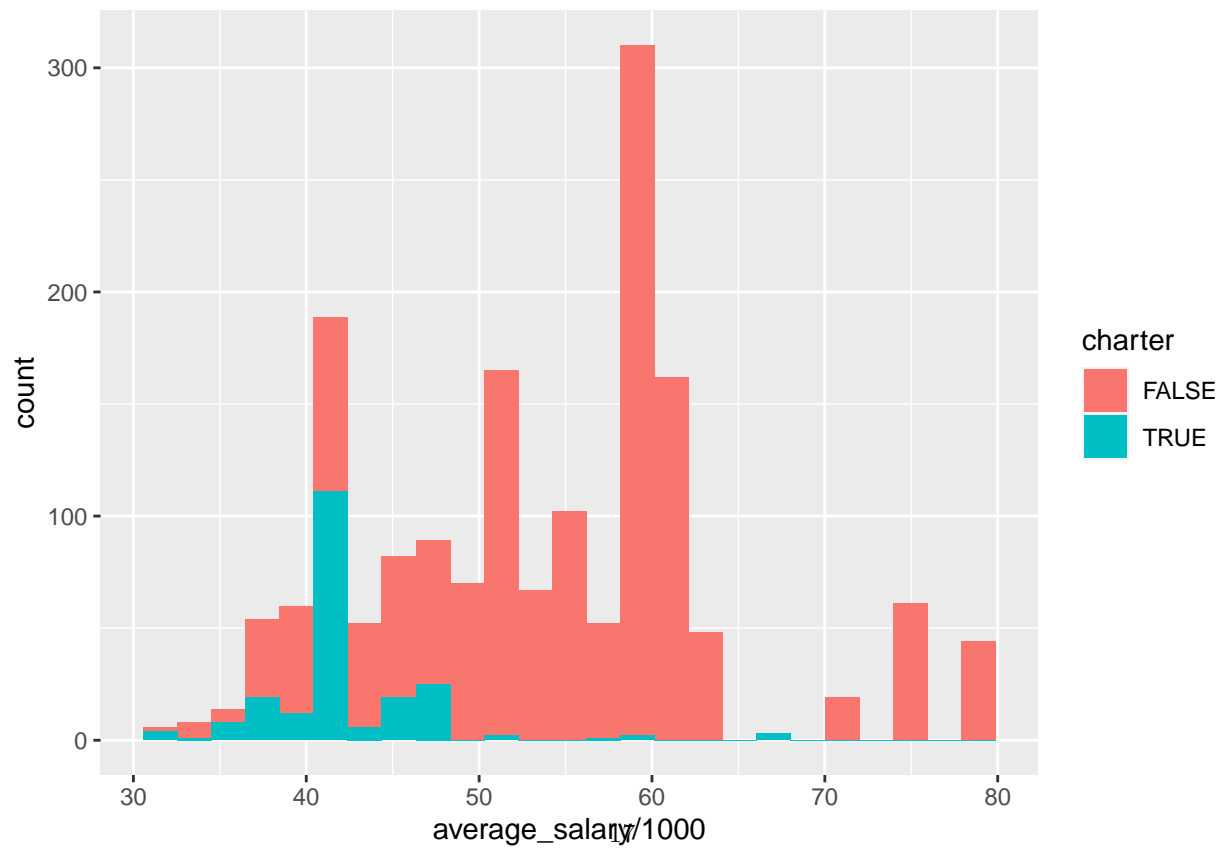
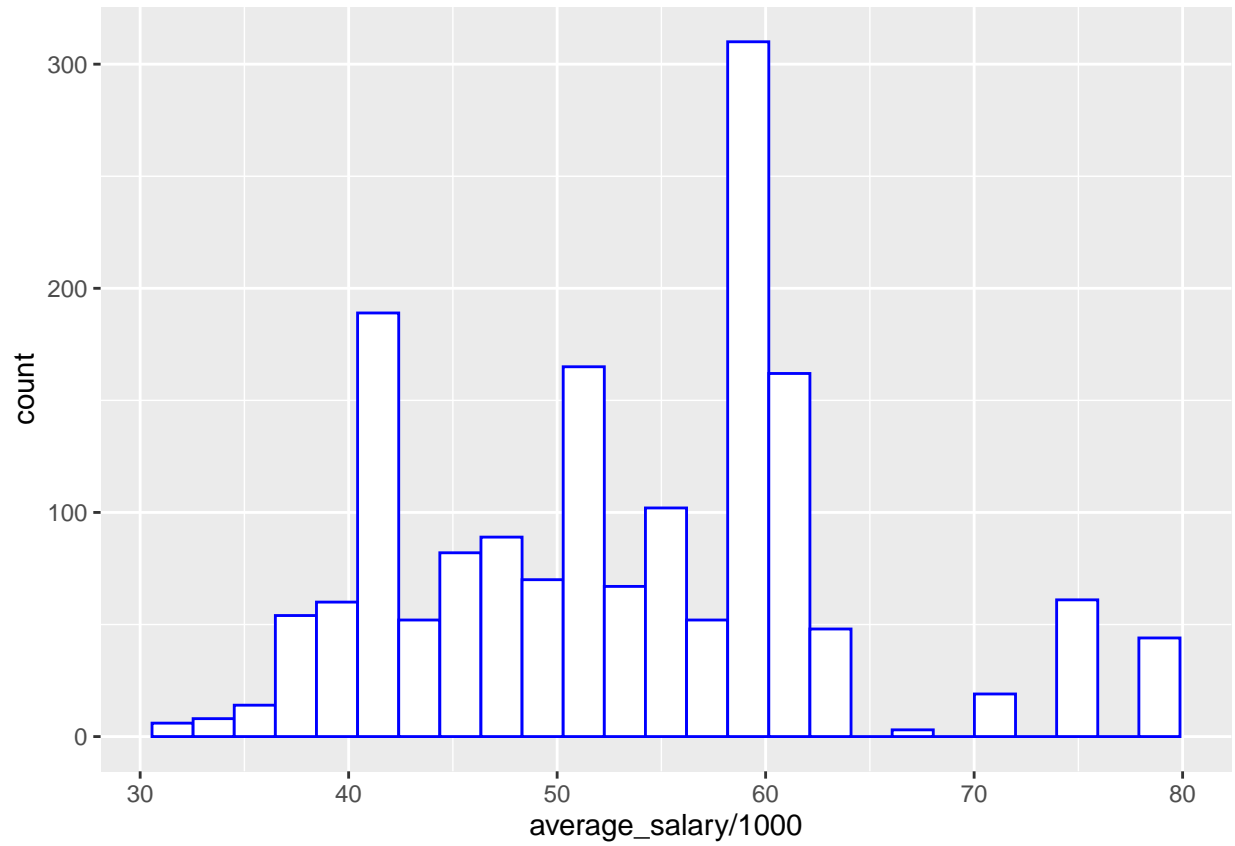
District-Level

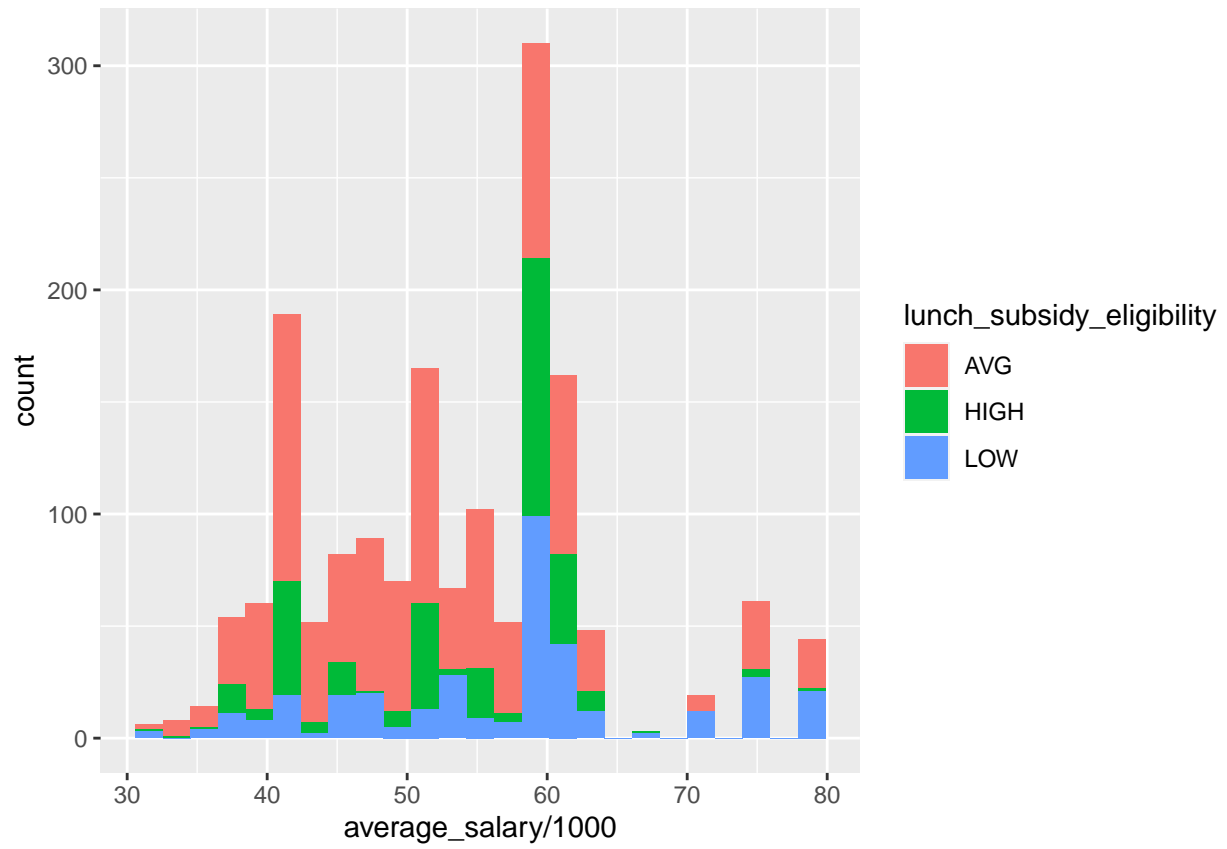




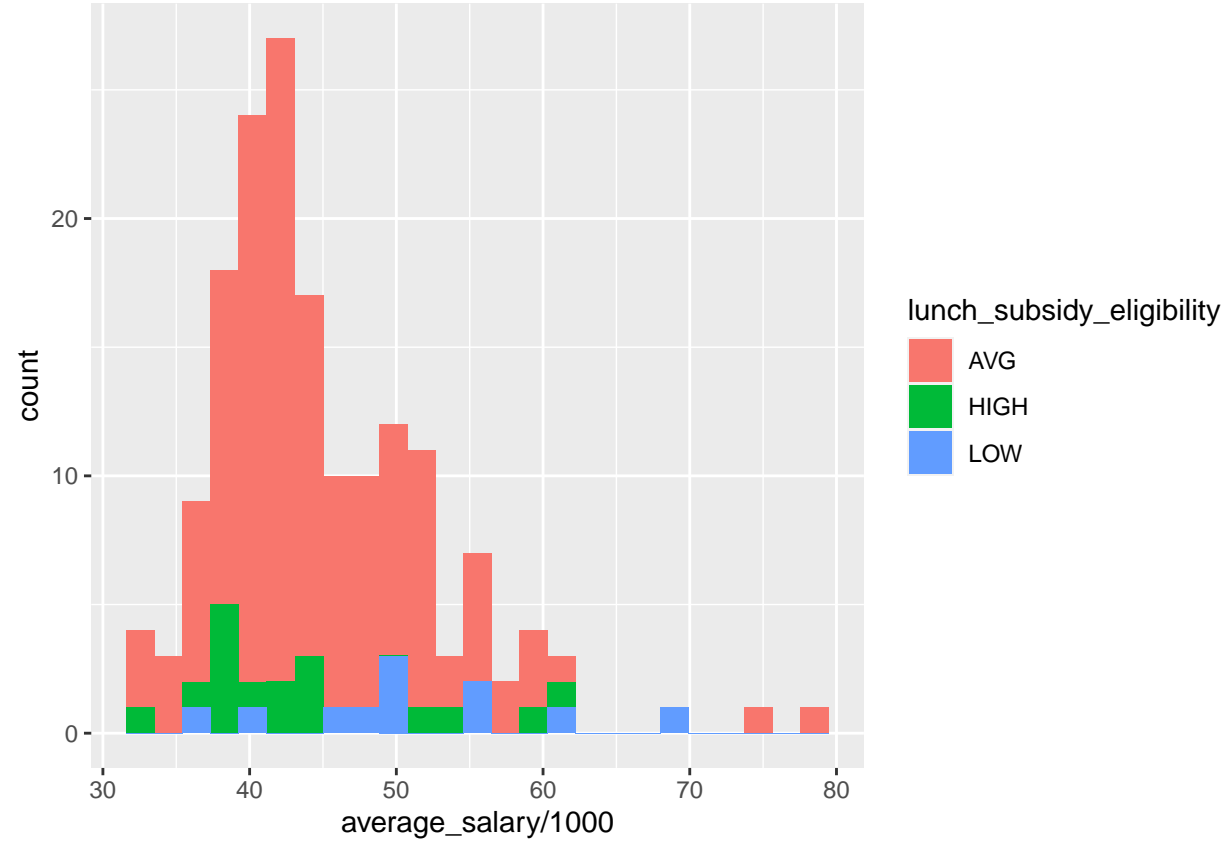
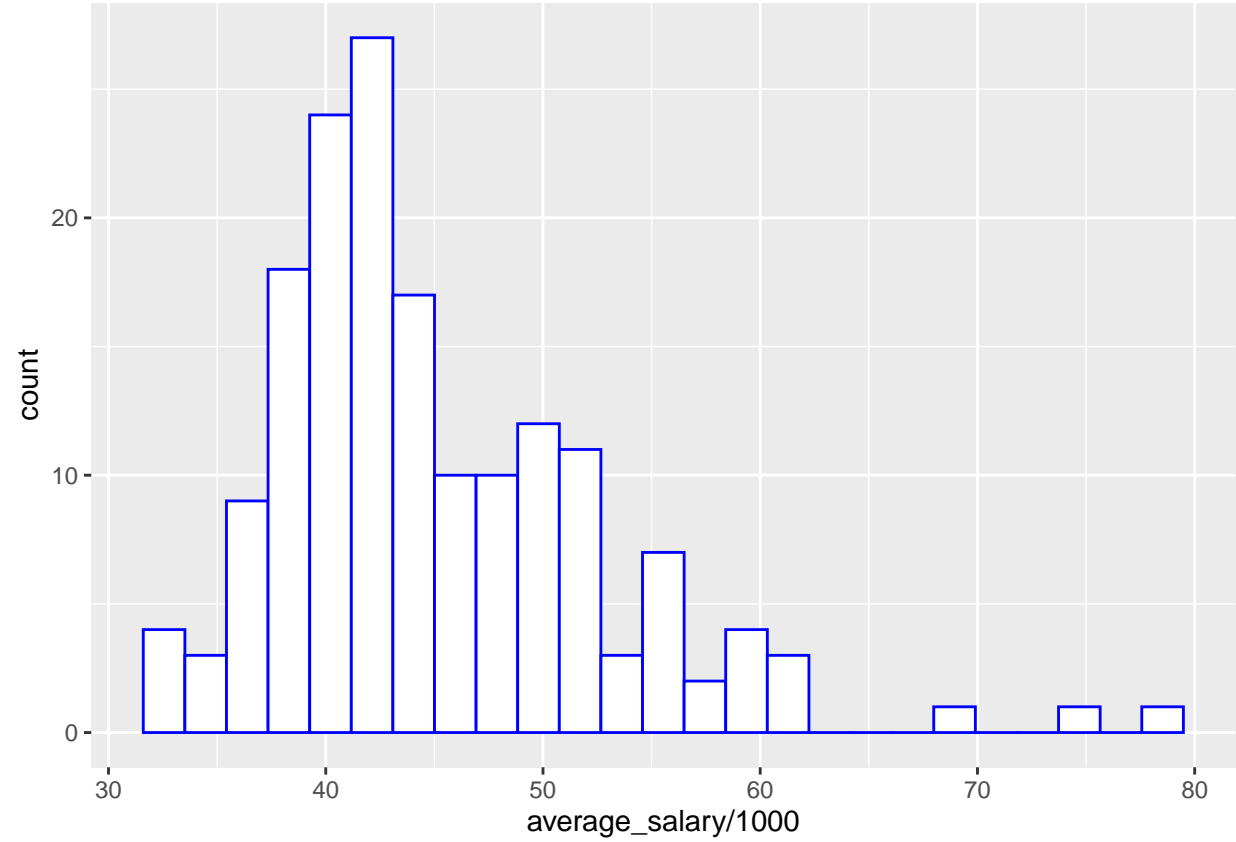
Average Teacher Salary

School-Level



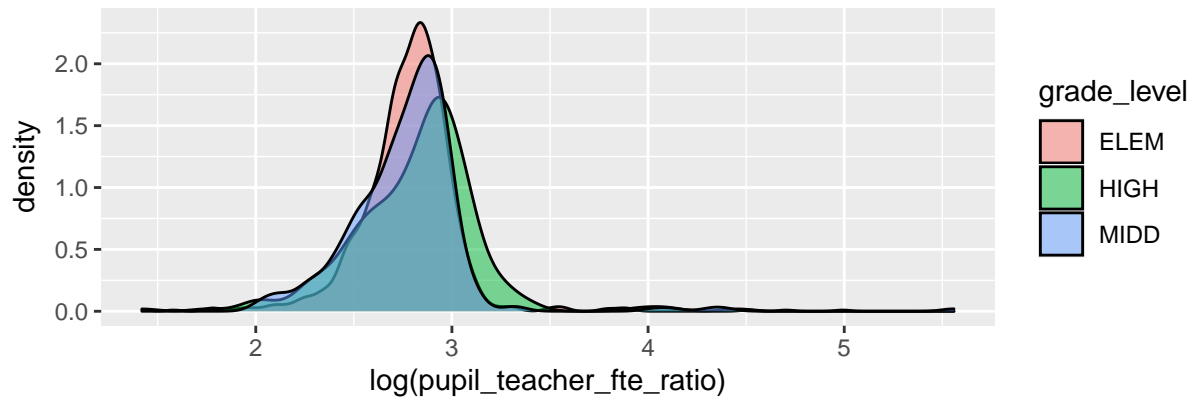
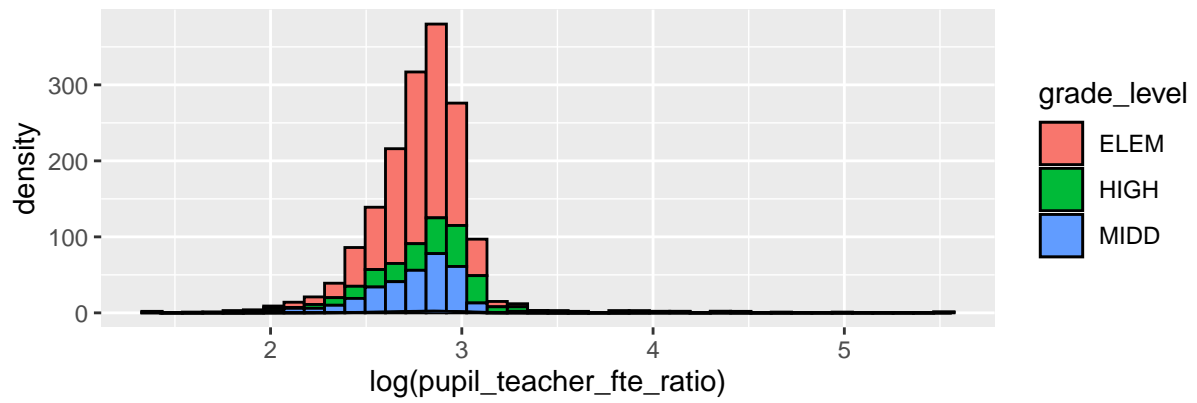


District-Level



Grade Level

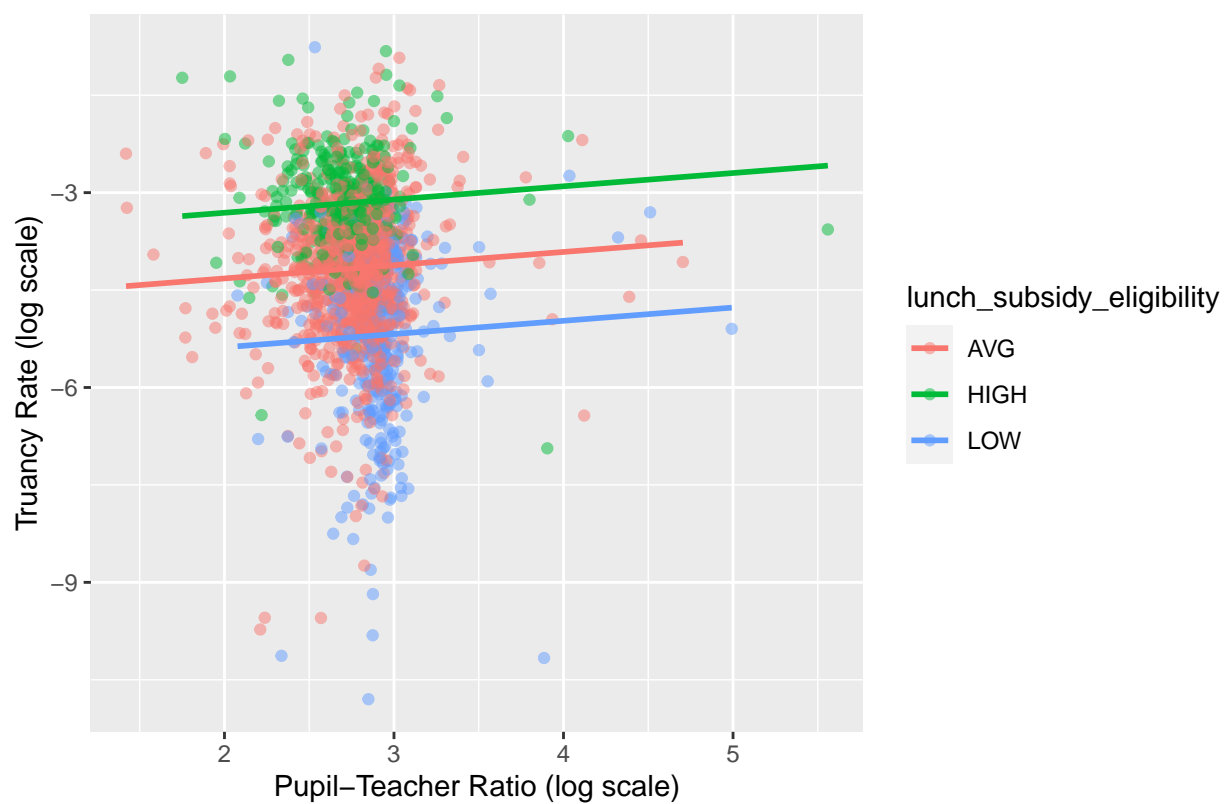
School-Level



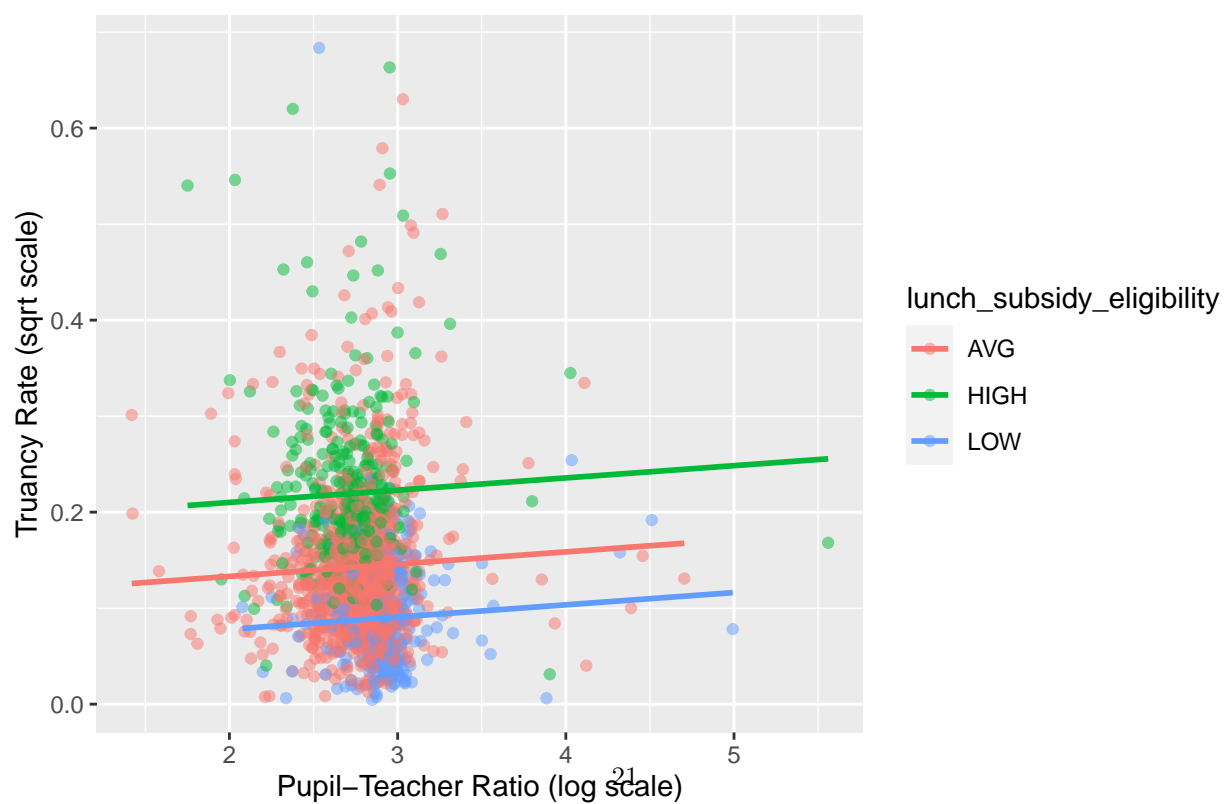
Inspecting Models

School-Level

Model 2



Model 5



Model 8

