

# The Effect of Pupil-Teacher Ratio on Truancy

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Jean-Luc Jackson, Christian Montecillo, and Richard Robbins

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# Project Description

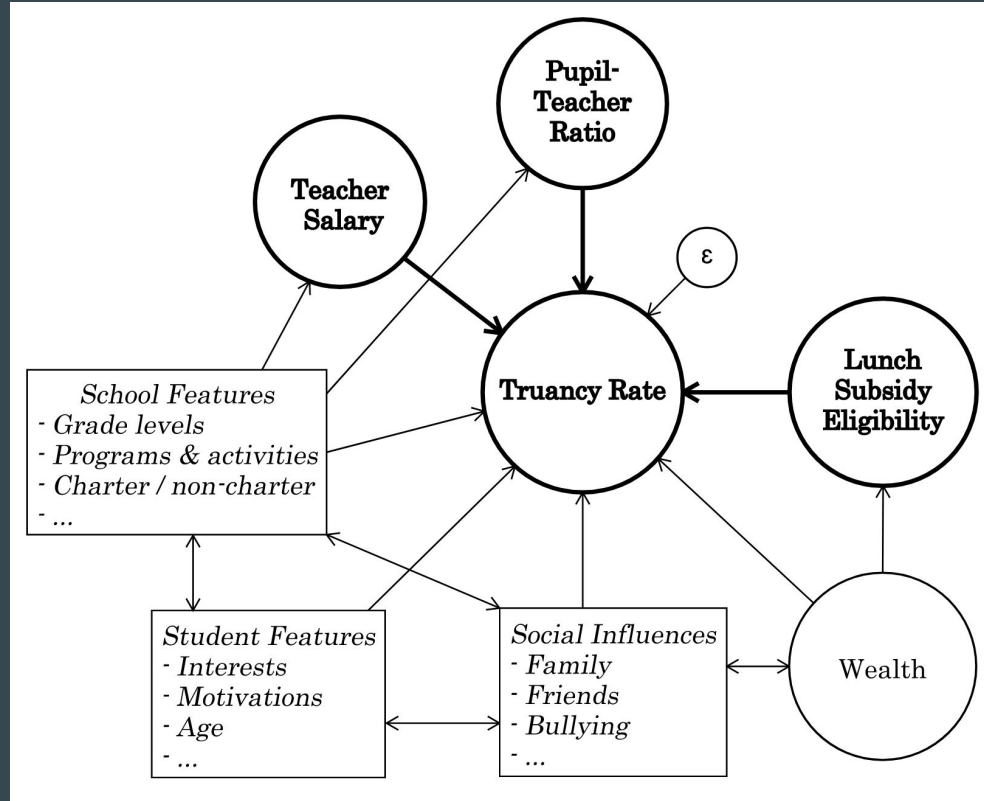


# Research Question

Do pupil-teacher ratios in public schools affect truancy rates?



# Causal Graph



# Data Description

## 2018-19 Attendance and Truancy Rates by School

### Calculations:

\*Attendance Rate = Total Student Days Attended divided by the Total Student Days Possible

\*\*Truancy Rate = Total Student Days Unexcused divided by Total Student Days Possible

**IMPORTANT: Rates are based on days of unexcused absences.**

For an explanation of the process for how CDE determined truancy rates: [http://www.cde.state.co.us/index\\_stats.htm](http://www.cde.state.co.us/index_stats.htm)



**COLORADO**  
Department of Education

## 2020: School Codes

## COLORADO DEPARTMENT OF EDUCATION

### 2018-2019 PUPIL/TEACHER RATIO

School Year	County Code	County Name	District Code	District Name	School Code	County Code	County Name	District Code	District Name	School Code	School Name	PK-12 Count	Teacher FTE	Pupil/ Teacher FTE Ratio
2018-2019 03	ARAPAHOE	0180	ADAMS-ARAPAHOE 28J	1948	CRAWFORD									
2018-2019 23	GARFIELD	1195	GARFIELD RE-2	2473	ELK CREEK									
2018-2019 30	JEFFERSON	1420	JEFFERSON COUNTY R-1	8300	STOTT ELEM	01	ADAMS	0010	MAPLETON 1	0187	MAPLETON EXPEDITIONARY SCHOOL OF THE ARTS	673	33.96	19.82
2018-2019 35	LARIMER	1550	POUDRE R-1	0898	BOLTZ MIDD	01	ADAMS	0010	MAPLETON 1	0212	MAPLETON EARLY COLLEGE HIGH SCHOOL	243	13.50	18.00
2018-2019 20	ELBERT	0930	KIOWA C-2	4726	KIOWA MIDD	01	ADAMS	0010	MAPLETON 1	0212	MAPLETON EARLY COLLEGE HIGH SCHOOL	217	13.40	16.19
2018-2019 15	ELBERT	0930	KIOWA C-2	4726	KIOWA MIDD	01	ADAMS	0010	MAPLETON 1	0212	MAPLETON EARLY COLLEGE HIGH SCHOOL	435	23.00	18.91
2018-2019 12												407	27.50	14.80
2018-2019 30												517	27.00	19.15
2018-2019 30												816	42.82	19.06
2018-2019 48												387	22.25	17.39
2018-2019 34												546	30.75	17.76
2018-2019 30												418	23.00	18.17
2018-2019 42												367	23.90	15.36
2018-2019 21												459	29.50	15.56
2018-2019 18														
2018-2019 30														

### COLORADO DEPARTMENT OF EDUCATION

#### 2018-2019 PRESCHOOL (PK) THROUGH 12th GRADE FREE AND REDUCED LUNCH ELIGIBILITY BY DISTRICT AND COUNTY

revised 1/11/2019

COUNTY CODE	COUNTY NAME	DISTRICT CODE	DISTRICT NAME	PK-12 COUNT	FREE LUNCH ELIGIBLE	REDUCED LUNCH ELIGIBLE	NOT ELIGIBLE	FREE AND REDUCED	% FREE	% REDUCED	% FREE AND REDUCED
01	ADAMS	0010	MAPLETON 1	8934	3909	1183	3842	5092	44%	13%	57%
01	ADAMS	0020	ADAMS 12 FIVE STAR SCHOOLS	39282	11344	3329	24609	14673	29%	8%	37%
01	ADAMS	0030	ADAMS COUNTY 14	7060	4947	998	1115	5945	70%	14%	84%
01	ADAMS	0040	ADAMS COUNTY 14	12713	4003	1400	2320	6392	27%	8%	34%
01	ADAMS	0050	ADAMS COUNTY 14	12713	4003	1400	2320	317	20%	8%	29%
01	ADAMS	0060	ADAMS COUNTY 14	12713	4003	1400	2320	788	20%	10%	30%

### COLORADO DEPARTMENT OF EDUCATION 2018-2019 TEACHERS FTE AND AVERAGE SALARY

Organization Code	Orgnization Name	Charter Schools		Non-Charter Schools		All Schools	
		Total FTE	Average Salary	Total FTE	Average Salary	Total FTE	Average Salary
0010	MAPLETON 1	0.00	0	452.11	55,358	452.11	55,358
0020	ADAMS 12 FIVE STAR SCHOOLS	183.14	41,984	1,816.77	63,508	1,999.91	61,537
0030	ADAMS COUNTY 14	0.00	0	371.18	60,289	371.18	60,289
0040	SCHOOL DISTRICT 27J	125.52	39,867	721.88	54,766	847.40	52,560
0050	BENNETT 29J	0.00	0	61.77	39,338	61.77	39,338
0060	STRASBURG 31J	0.00	0	61.27	41,064	61.27	41,064
0070	WESTMINSTER PUBLIC SCHOOLS	0.00	0	514.65	60,485	514.65	60,485
0100	ALAMOSA RE-11J	0.00	0	125.13	50,098	125.13	50,098
0110	SANGRE DE CRISTO RE-22J	0.00	0	26.92	40,582	26.92	40,582
0120	ENGLEWOOD 1	0.00	0	182.03	56,468	182.03	56,468
0123	SHERIDAN 2	0.00	0	86.55	54,053	86.55	54,053
0130	CHERRY CREEK 5	50.13	45,717	3,135.37	74,626	3,185.50	74,171
0140	LITTLETON 6	69.03	59,980	777.31	70,219	846.34	69,384
0170	DEER TRAIL 26J	0.00	0	18.68	40,196	18.68	40,196
0180	ADAMS-ARAPAHOE 28J	350.43	40,978	1,857.86	59,315	2,208.28	56,405
0190	BYERS 32J	35.78	42,465	35.40	42,853	71.18	42,658
0220	ARCHULETA COUNTY 50 JT	6.16	31,833	95.30	42,907	101.46	42,234
0230	WALSH RE-1	0.00	0	18.43	34,327	18.43	34,327
0240	PRITCHETT RE-3	0.00	0	7.55	37,133	7.55	37,133
0250	SPRINGFIELD RE-4	0.00	0	28.73	38,300	28.73	38,300

### Ability by School

Revised 1/22/2019

	PK-12 COUNT	FREE LUNCH	REDUCED LUNCH	NOT ELIGIBLE	FREE AND REDUCED COUNT	% FREE	% REDUCED	% FREE AND REDUCED
MAPLETON EXPEDITIONARY SCHOOL OF THE ARTS	673	349	97	227	446	52%	14%	66%
MAPLETON EARLY COLLEGE HIGH SCHOOL	243	111	42	90	153	46%	17%	63%
GLOBAL LEADERSHIP ACADEMY	217	133	33	51	166	61%	15%	76%
ACADEMY HIGH SCHOOL	435	213	66	156	279	49%	15%	64%
MONTEREY COMMUNITY SCHOOL	407	241	67	99	308	59%	16%	76%
MEADOW COMMUNITY SCHOOL	517	261	82	174	343	50%	16%	66%
YORK INTERNATIONAL	816	381	149	286	530	47%	18%	65%
WELBY COMMUNITY SCHOOL	387	183	39	165	222	47%	10%	57%
ACHIEVE ACADEMY	546	313	65	168	378	57%	12%	69%
EXPLORE ELEMENTARY	418	192	63	163	255	46%	15%	61%
ADVENTURE ELEMENTARY	367	206	53	108	259	56%	14%	71%
CLAYTON PARTNERSHIP SCHOOL	459	247	81	131	328	54%	18%	72%
BIG PICTURE COLLEGE AND CAREER ACADEMY	176	99	29	48	128	56%	16%	73%
COLORADO CONNECTIONS ACADEMY	2270	402	152	1716	554	18%	7%	24%
GLOBAL INTERMEDIATE ACADEMY	275	168	53	54	221	61%	19%	80%
GLOBAL PRIMARY ACADEMY	273	160	45	68	205	59%	16%	75%
NORTH VALLEY SCHOOL FOR YOUNG ADULTS	81	31	11	39	42	38%	14%	52%
VALLEY VIEW K-8	374	219	56	99	275	59%	15%	74%

# Models

The dependent variable for each model is  $\log(truancy\_rate)$

The *subsidy\_level* variable is a factor with three levels, *high*, *average*, and *low*.

## Model 1

$$\beta_0 + \beta_1 pupil\_teacher\_ratio$$

## Model 2

$$\beta_0 + \beta_1 pupil\_teacher\_ratio + \beta_{2,3} subsidy\_level$$

## Model 3

$$\beta_0 + \beta_{1,2} subsidy\_level + \beta_{3,4,5} subsidy\_level \cdot pupil\_teacher\_ratio$$

## Model 4

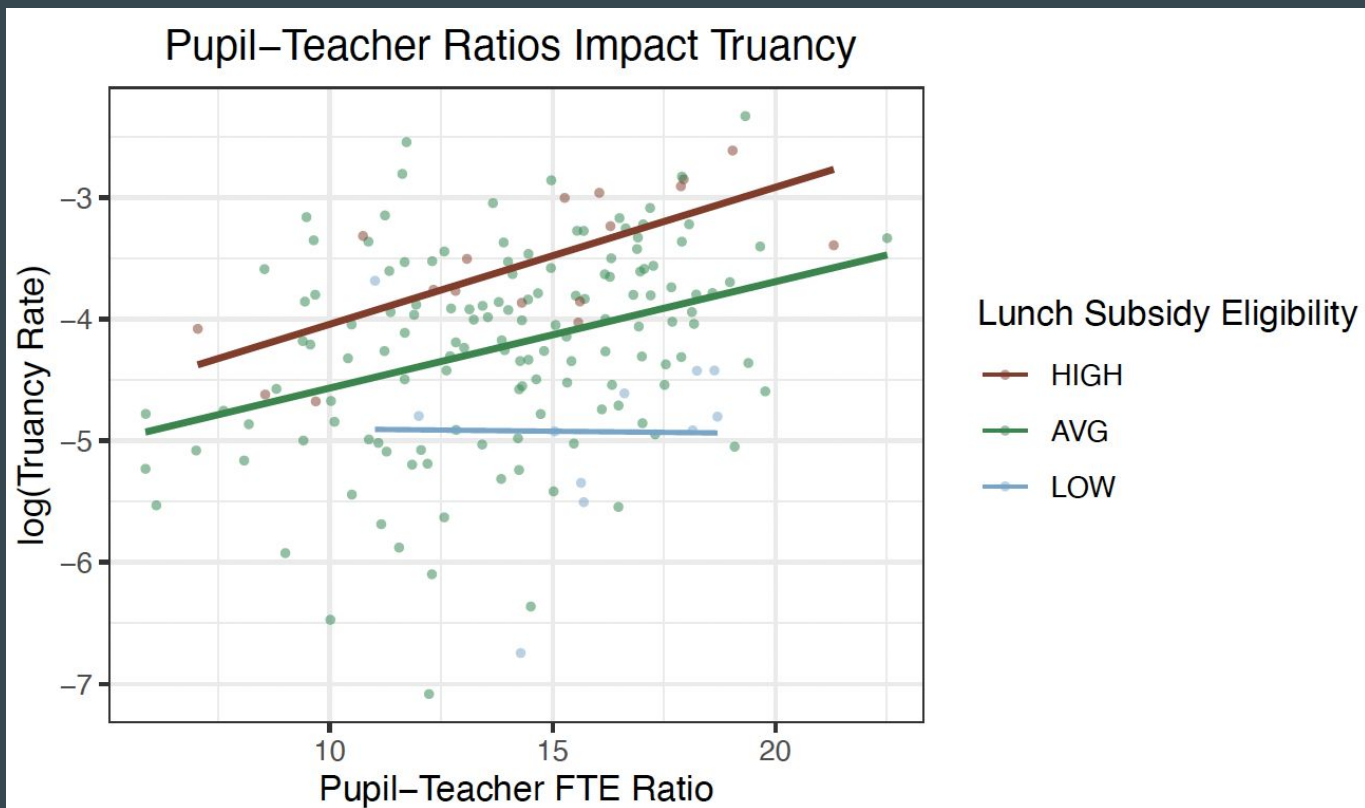
$$\beta_0 + \beta_{1,2} subsidy\_level + \beta_{3,4,5} subsidy\_level \cdot pupil\_teacher\_ratio + \beta_6 \cdot \frac{average\_salary}{1000}$$

# Results

	Dependent variable:			
	log(truancy rate)			
	Model 1	Model 2	Model 3	Model 4
pupil-teacher ratio	0.080*** (0.017)	0.087*** (0.017)		
high subsidy:pupil-teacher ratio			0.113** (0.038)	0.092** (0.036)
average subsidy:pupil-teacher ratio			0.088*** (0.019)	0.072*** (0.020)
low subsidy:pupil-teacher ratio			-0.004 (0.160)	-0.021 (0.173)
high subsidy		1.501*** (0.287)	-0.304 (2.815)	-0.175 (3.107)
average subsidy		0.867** (0.275)	-0.577 (2.775)	-0.534 (3.059)
average salary (in thousands)				0.015 (0.008)
constant	-5.323*** (0.258)	-6.307*** (0.418)	-4.865 (2.761)	-5.340 (3.142)
Observations	165	165	165	165
R <sup>2</sup>	0.096	0.222	0.228	0.240
Adjusted R <sup>2</sup>	0.090	0.207	0.203	0.211
Residual Std. Error	0.812	0.758	0.760	0.756
F Statistic	17.217***	15.284***	9.379***	8.306***
Note:			*p<0.05; **p<0.01; ***p<0.001	

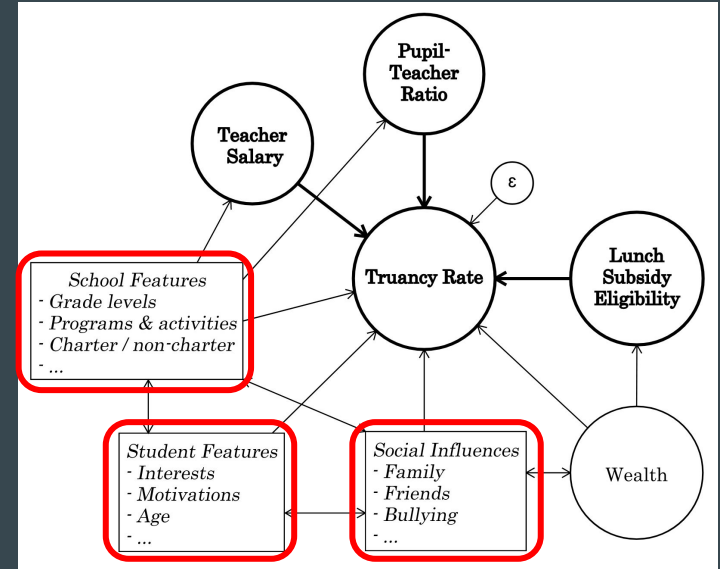
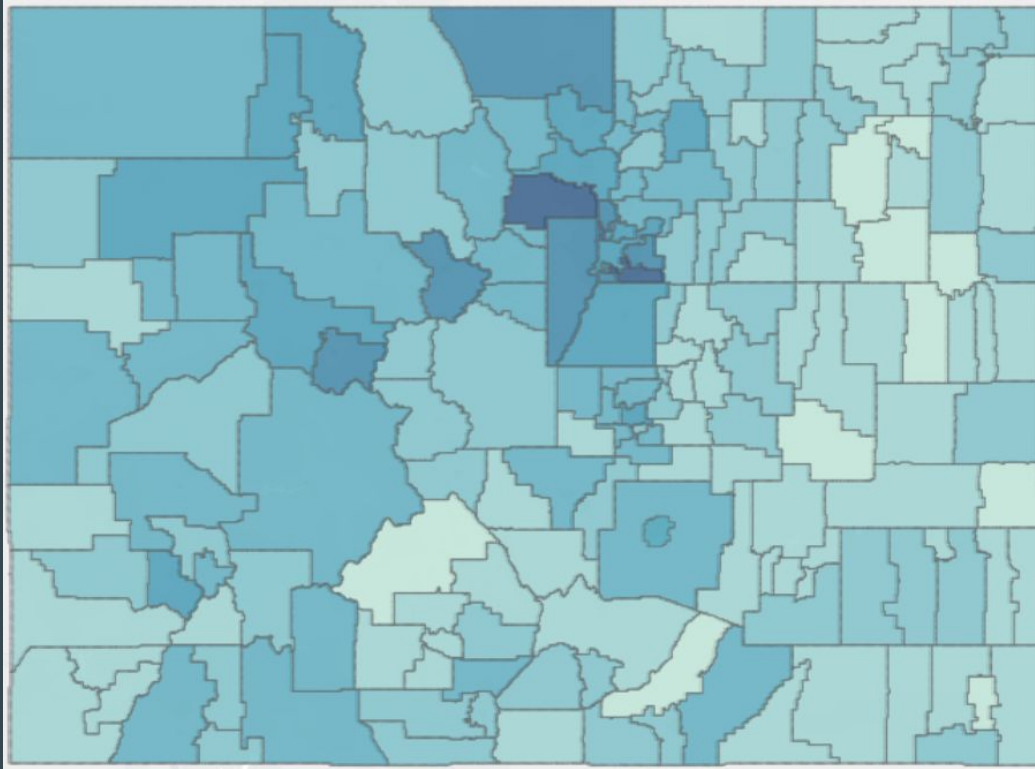


# Results



# Limitations

Map of Colorado School Districts



# Implementation

District (Pupils)	Subsidy Level	Pupil:Teacher Change	Resulting Truancy Change	Change in Absences	Add'l Teachers	% Increase in Teacher Salary Budget
Denver County (90,396)	Average	15.0 → 14.0	5.7% → 5.3%	-71,330	431	7.1%
Trinidad 1 (937)	Average	19.3 → 18.3	9.7% → 9.0%	-154	3	5.5%
Pueblo City (16,266)	High	17.9 → 16.9	5.5% → 5.0%	-11,900	53	5.9%
Monte Vista (856)	High	13.1 → 12.1	3.0% → 2.7%	-365	5	8.3%

# Conclusion



# Thank you

Jean-Luc Jackson, Christian Montecillo, and Richard Robbins