

# Untitled

## Research Question

What drives the efficiency of schools in the Visegrad countries in terms of standardized test performance?

## Approach

Use nonparametric envelopment techniques to estimate a production(education) frontier for each Visegrad country, and for the region as a whole.

## Data

Data is collected from the 2018 PISA survey, it contains information on schools(and their environment), teachers, and students(and parental engagement).

## Summary statistics of the data

- Sample of schools in the analysis per country:

Our sample is constituted of 623 schools decomposed per the table below

CNT	n
CZE	187
HUN	99
POL	209
SVK	128

The variables we initially decided to use are the following:

- Students:

- `total_students`
- gender characteristics : `students_male` (number of), `students_female` (number of)
- Parents: `ap_parental_eng` (proportion of parents who engage with the school staff regarding their children education)
- Schools:
  - School characteristics: `ratio_f2m` (ratio of female to male students), `ratio_pt2ft` (part time to full time teachers), `ratio_t2s` (students per teacher), `dropout_rate`, `funding` (percentage of government funding)
- Teachers:
  - `teachers_ft` (number of full timer teachers), `teachers_pt` (number of full timer teachers)
  - `total_teachers` : Total number of teachers
- Context:
  - Location `bol_locataion` : 1- school is in Urban area, 0- School is in Rural area
  - Extra activities : `bol_extra_acts` : 1- Yes there are official extra activities in the curriculum, 0- No
  - `bol_competition` : 1- There's at least another school in the area, 0- There's no other schools in the area
  - `bol_career_guidance` : 1- There's an official career guidance curriculum in the school, 0- There's not

Mean and standard deviation tables for each variable per country is depicted as follows:

Table 1: Table of means

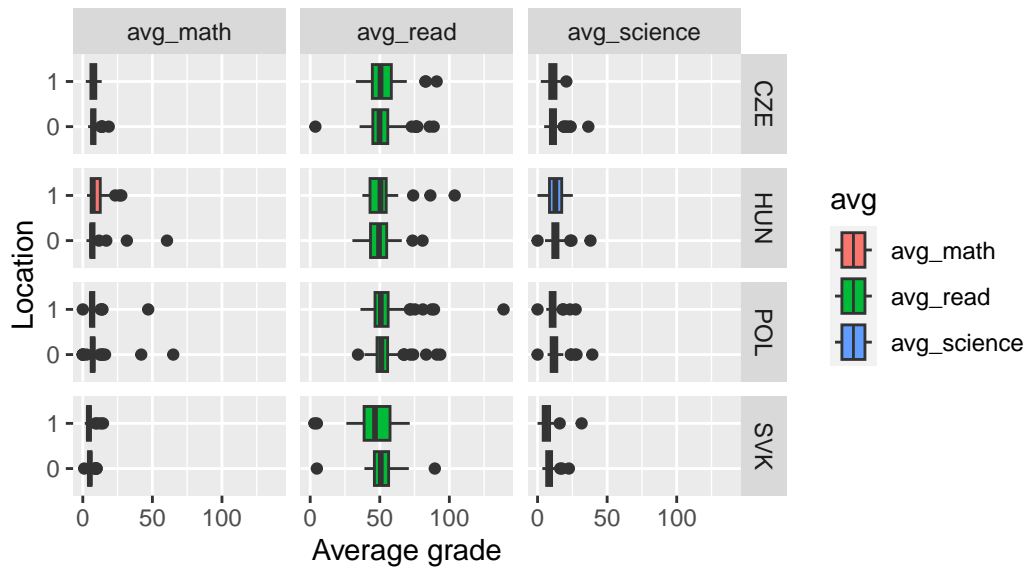
name	CZE	HUN	POL	SVK
bol_location	0.369	0.212	0.469	0.391
bol_extra_acts	0.989	0.990	1.000	1.000
bol_competition	0.882	0.788	0.732	0.859
bol_career_guidance	0.717	0.616	0.383	0.523
funding	0.946	0.974	0.971	0.969
students_male	243.717	270.212	181.134	196.930
students_female	208.695	244.970	173.330	206.289
teachers_ft	34.545	46.020	38.943	29.148
teachers_pt	8.481	6.586	9.191	5.445
total_students	452.412	515.182	354.464	403.219
total_teachers	43.027	52.606	48.134	34.594
ratio_f2m	1.301	1.321	1.078	1.301
ratio_pt2ft	0.342	0.176	0.780	0.217
ratio_ft2pt	7.843	16.056	8.542	8.678
ratio_t2s	0.102	0.119	0.194	0.092
ratio_s2t	10.932	9.620	7.126	11.756
ap_parental_eng	0.256	0.212	0.376	0.284
dropout_rate	0.052	0.033	0.006	0.013
avg_math	7.735	8.602	7.645	5.145
avg_read	52.010	50.511	53.278	49.529
avg_science	11.392	13.003	11.812	7.920

Table 2: Table of standard deviation

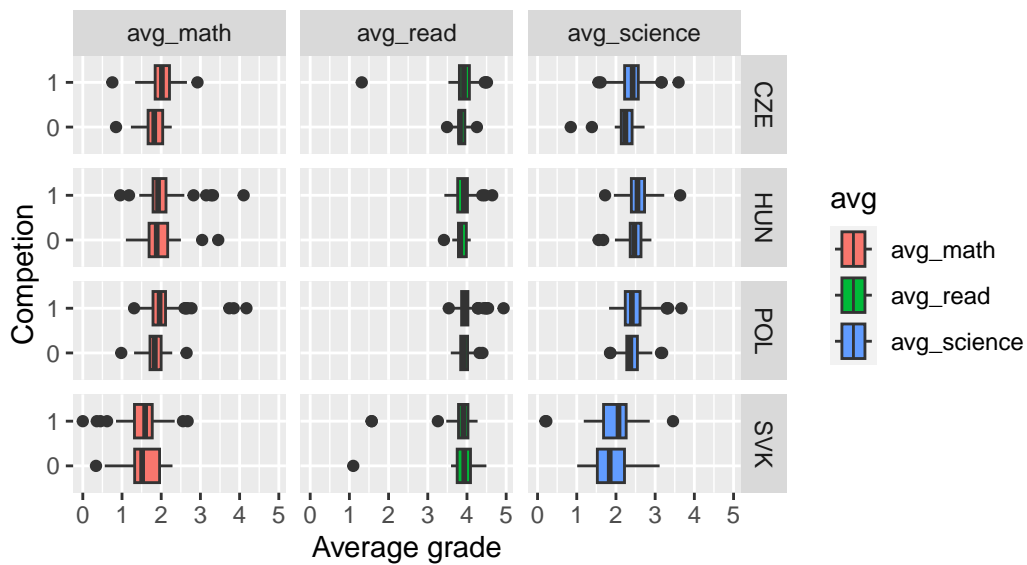
name	CZE	HUN	POL	SVK
bol_location	0.484	0.411	0.500	0.490
bol_extra_acts	0.103	0.101	0.000	0.000
bol_competition	0.323	0.411	0.444	0.349
bol_career_guidance	0.452	0.489	0.487	0.501
funding	0.101	0.077	0.090	0.068
students_male	183.576	230.992	141.259	117.215
students_female	134.320	170.437	130.440	128.833
teachers_ft	20.197	22.383	25.130	13.879
teachers_pt	8.922	6.830	7.776	4.913
total_students	232.565	290.519	261.044	196.683
total_teachers	22.588	24.300	25.650	16.051
ratio_f2m	1.337	1.214	0.936	1.106
ratio_pt2ft	0.576	0.227	2.622	0.184
ratio_ft2pt	8.047	17.792	11.112	7.800
ratio_t2s	0.042	0.062	0.192	0.032
ratio_s2t	3.313	2.897	2.844	2.883
ap_parental_eng	0.137	0.158	0.163	0.162
dropout_rate	0.072	0.057	0.035	0.036
avg_math	2.392	7.116	5.872	2.211
avg_read	11.115	10.893	11.015	11.774
avg_science	3.935	4.878	4.206	3.970

## Visualisations

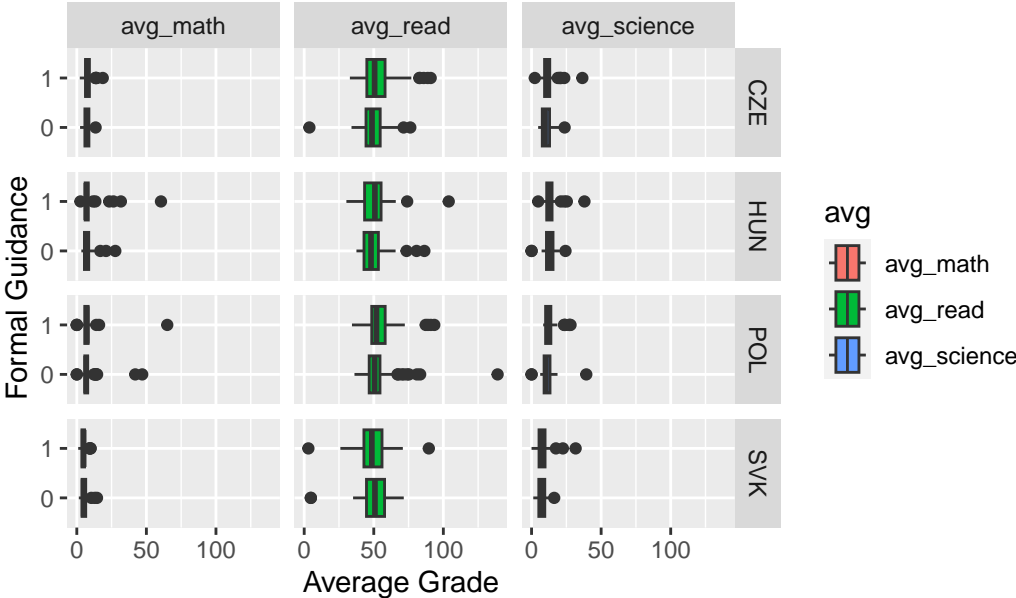
Average grad in the three subjects  
controlled by location



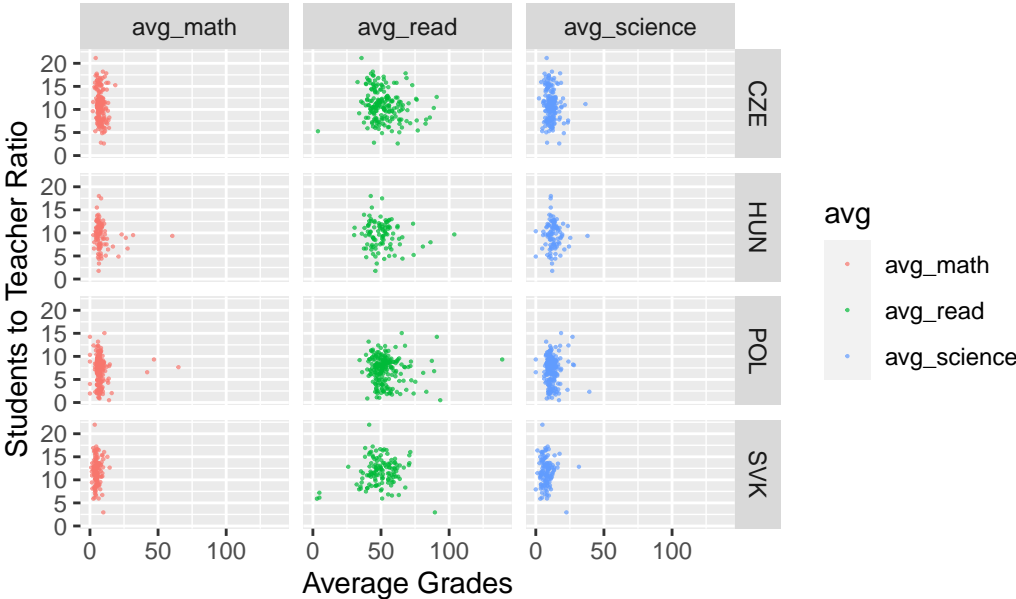
Average grades and Competition of school area  
Controlled by subject



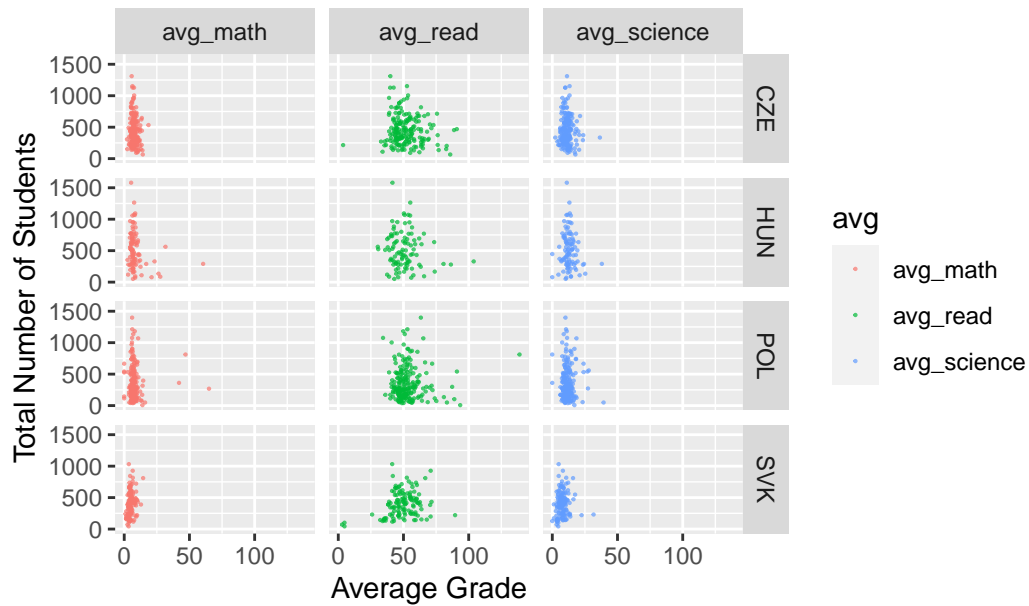
Average grades and Career guidance



Average Grades by the Students to Teacher Ratio

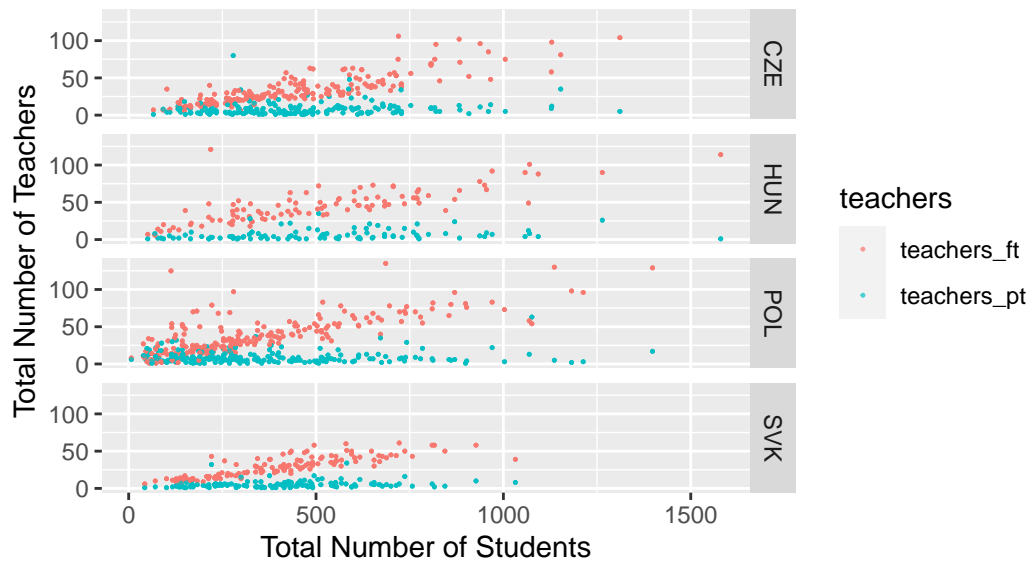


## Total Number of Students and Average grades

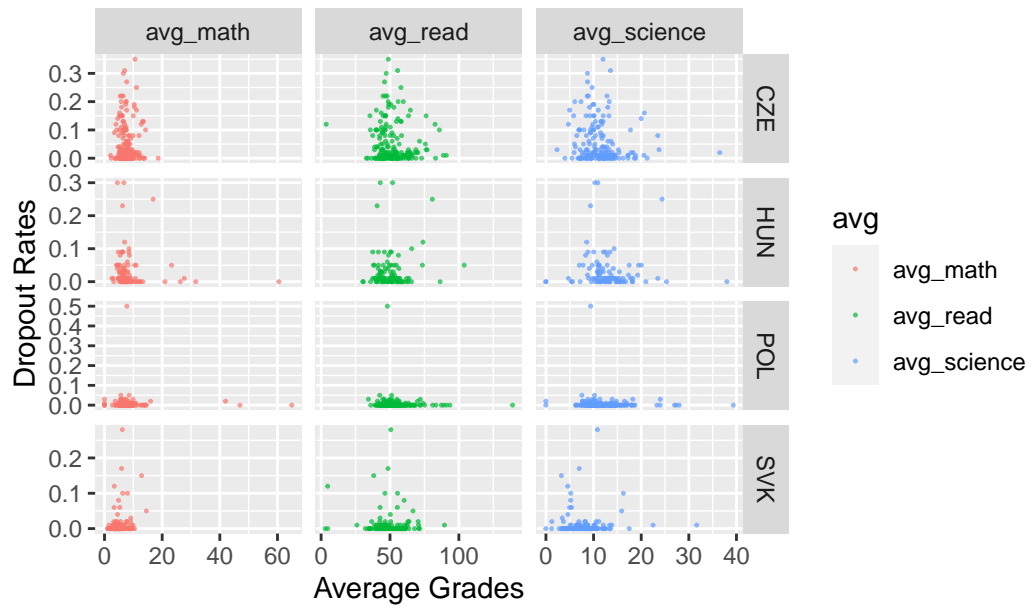


## Total Number of Students and Total Number of Teachers

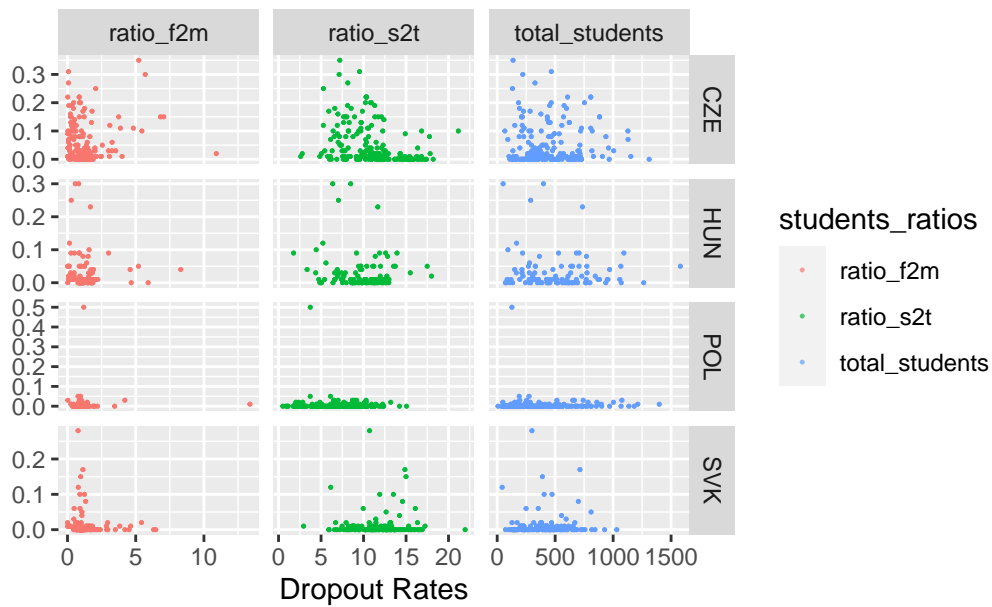
Controlled by Part time and Full time employment types



## Average Grades and Dropout Rates



## Dropout Rates and school/student characteristics





## Average Grades and Students to teachers Ratio

