Online Appendix:
Screening and Recruiting At Teacher Colleges

Sebastian Gallegos
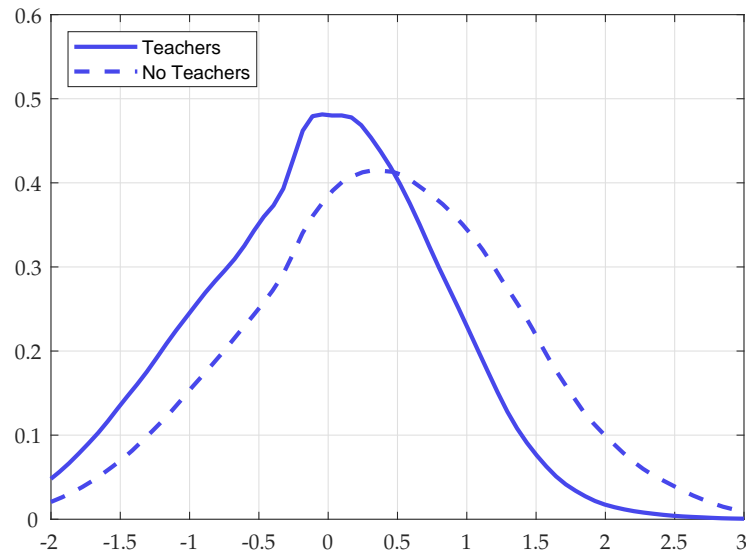IDB

Christopher Neilson
Princeton University and NBER

Franco Calle
Princeton University

November 18, 2019

Figures

Figure 1: Freshmen College Exam Scores: Teachers Colleges vs Other Fields, 2007-2010


Note: In Figure 1, the continuous line plots the distribution of college entrance exam score for freshmen in education and the dotted line plots the distribution for freshman in other careers from 2007 to 2010.

**Figure 2:** Relative Freshmen College Exam Scores, by Field
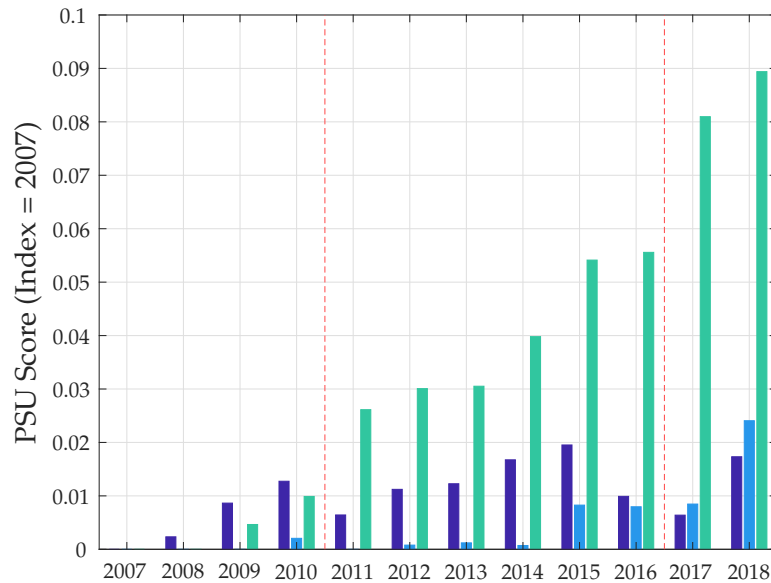
Note: Figure 2 plots the percent change on the average college entrance exam score for freshmen in ■ education, ■ Health and ■ STEM careers, from 2007 to 2018, using 2007 as the base year. The dotted lines in red divide the periods of before and after policy changes (first BVP and after screening rule).

Figure 3: Evolution of enrollment and programs from 2004 to 2018

(a) Students enrolled

(b) Programs available
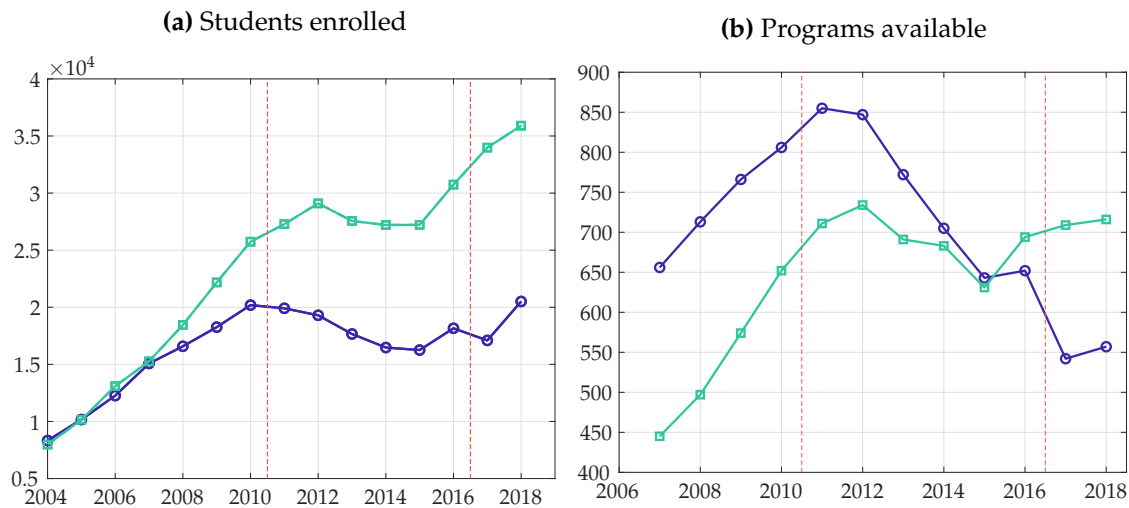
Note: Figure 3 shows raw numbers of the evolution of enrollment and programs available from 2007 to 2018. The ■ line with circles plots the numbers for teachers, while the ■ line with squares plots the numbers for health. Source: MINEDUC and DEMRE.

Figure 4: College Entrance Exam Average and Teacher College Exit Exams

(a) Disciplinary Exit Exam

**(b)** General Pedagogy Exit Exam
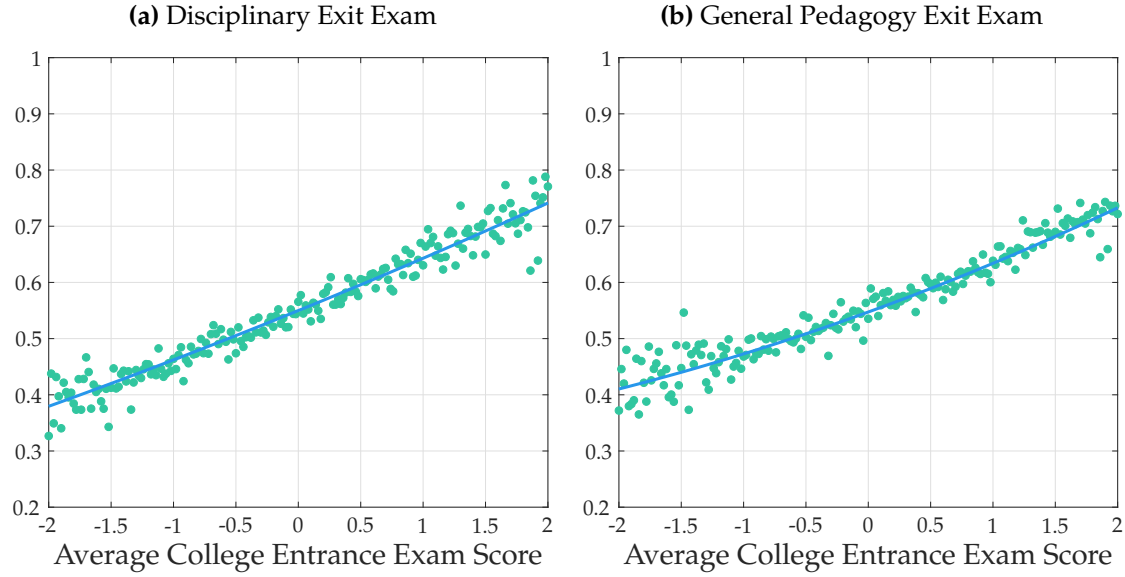
Note: The figures plot the mean of each exit exam for 100 equal-sized bins of the average college entrance exam score fits an estimated line using the underlying data. The data consists in graduates who took the respective exit exam test between years 2009 and 2017. The Figures consider all test-takers with valid scores in the PSU and the Disciplinary test (Figure 4a, $N = 35,355$), and the Pedagogical test (Figure 4b, $N = 33,409$).

Figure 5: College Entrance Exam Average and Graduation from Teacher Colleges

(a) Graduation within 5 years
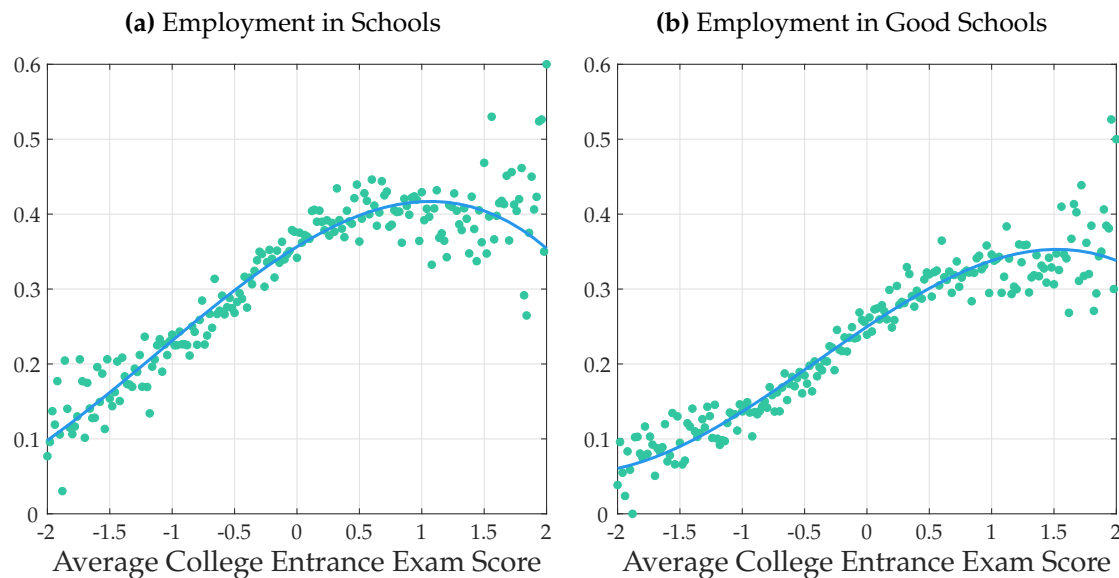
(b) Graduation within 8 years
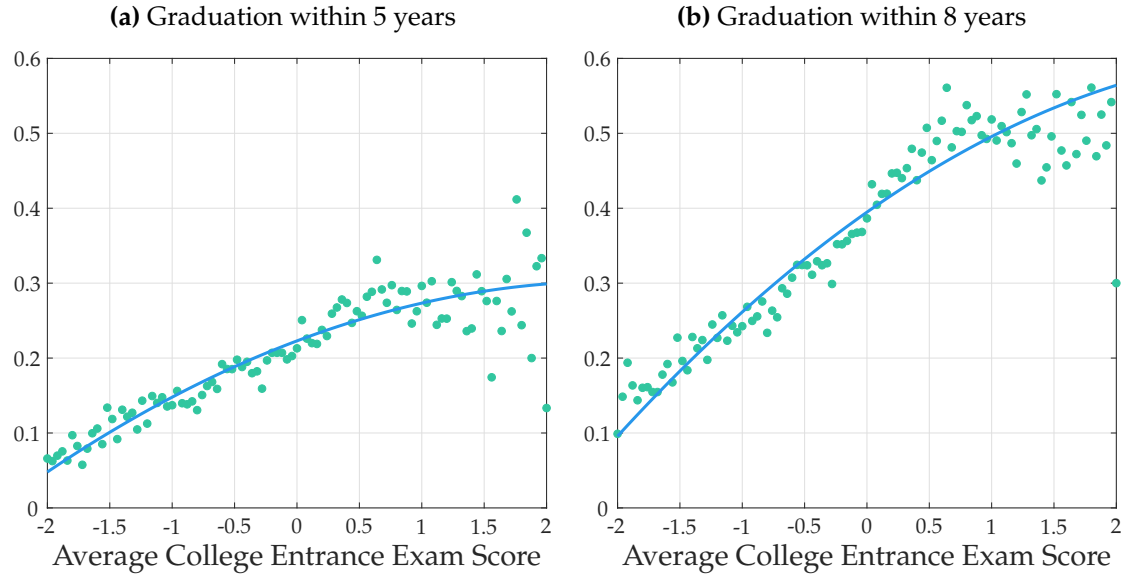
Note: The figures plot the probability of graduation for 100 equal-sized bins of the average college entrance exam score fits an estimated line using the underlying data. The data consists in enrolled students in years 2004 to 2009 who graduated between 2009 and 2017. In both Figures the sample size is of $N = 84,847$.

Figure 6: Teacher Evaluation vs. PSU Scores

(a) Overall Standardized Score

(b) Portfolio Standardized Score
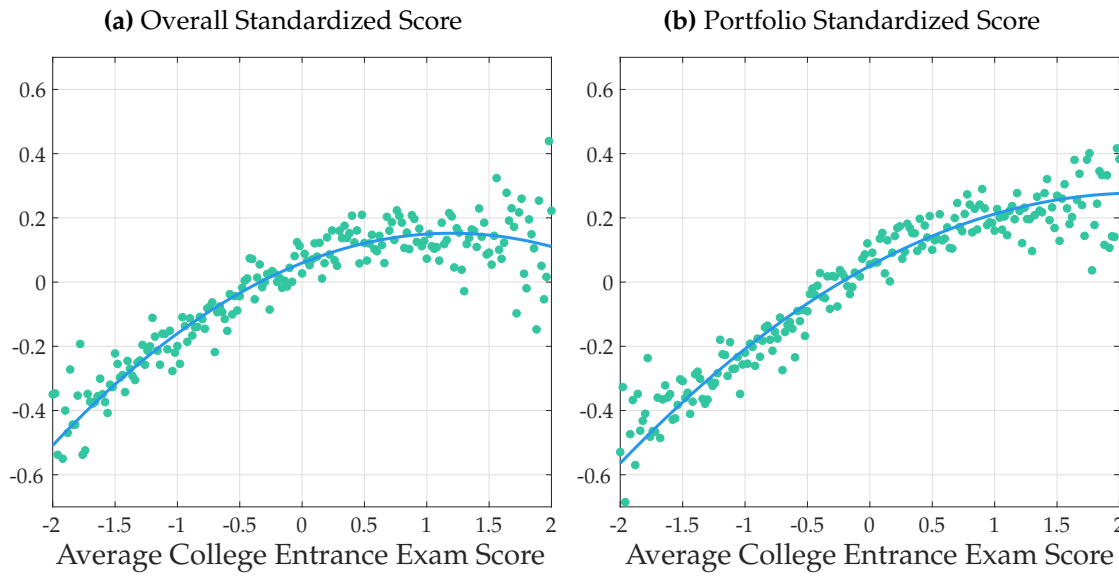
All figures use information for teachers working in the public sector that were evaluated at least once between years 2004 and 2016. The solid lines are fitted values from local linear regressions using a rectangular kernel with a bandwidth of 10 PSU points. The dots plot the average values of each variable within five points of the PSU score. 95% confidence bands are plotted in gray. The PSU score has a mean of 500 points and a standard deviation (SD) of 100 points, so each Figure plots data up to two SD to the left, and two SD to the right.

Figure 7: College Entrance Exam Average and Employment

(a) Employment in Schools

**(b)** Employment in Good Schools

Notes: Figure 7a and Figure 7b plot the mean of the y-axis variable within 100 equal-sized bins of the average college entrance exam score, and fit estimated lines using all the underlying data. The sample sizes are $N = 63,539$ in Figure 7a and $N = 240,549$ in Figure 7b.

Figure 8: College Entrance Exam Average and Earnings of Teachers (USD 2019)

(a) Private Sector
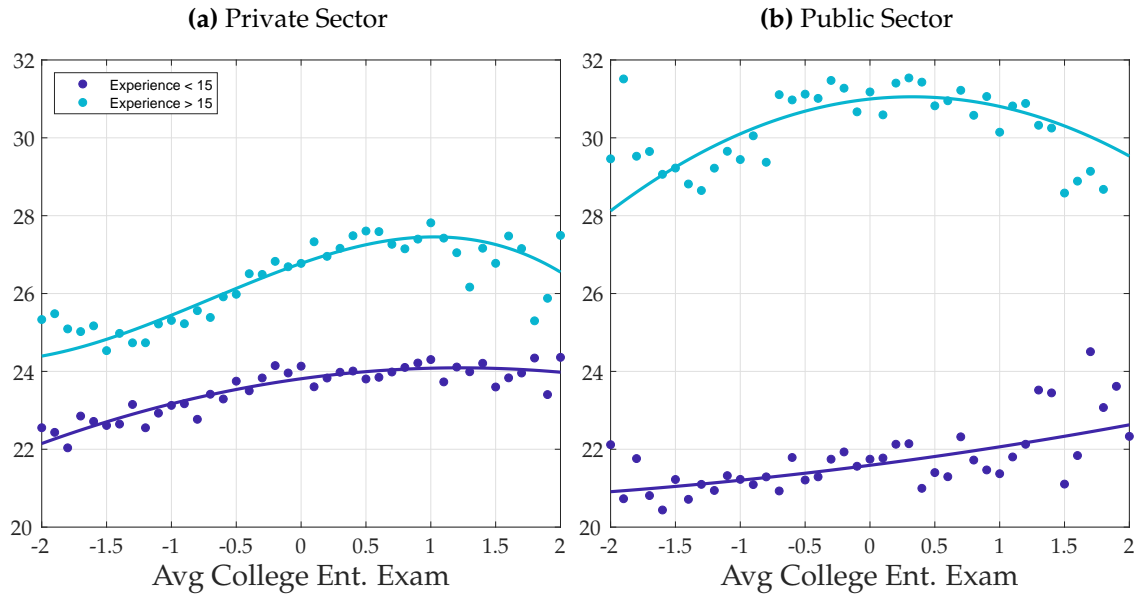
(b) Public Sector

Note: The figures plot the wages for teachers in the public and private sector in dollars in 100 equal-sized bins of the average college entrance exam score fits an estimated line using the underlying data. The data consists in enrolled students in years 2004 to 2009 who graduated between 2009 and 2017. In both Figures the sample size is of $N = 84,847$.

Figure 9: Teaching Colleges Program Participation given Average Score in 2010
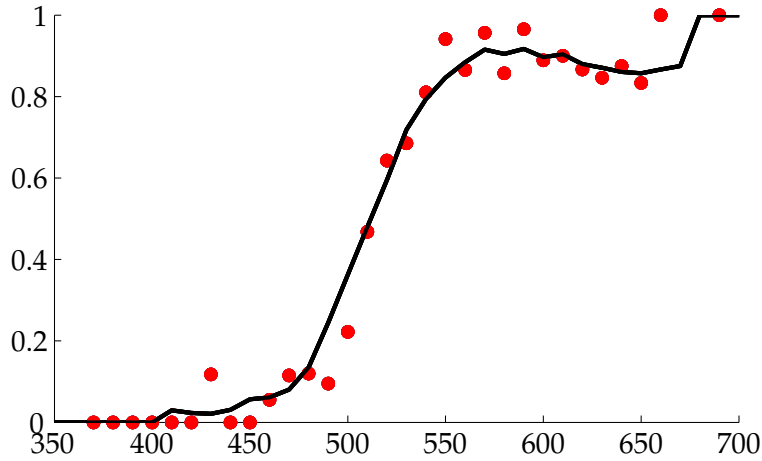
Notes: Figure 9 plots the probability of teacher college participation in the BVP policy in 2011 as a function of the average entrance exam of the freshman matriculated there in 2010.

Figure 10: Aggregate Effects of *Beca Vocacion Profesor*

**(a)** Distribution of Entrance Exam Scores

**(b)** Porportions of Entrance Exam Scores
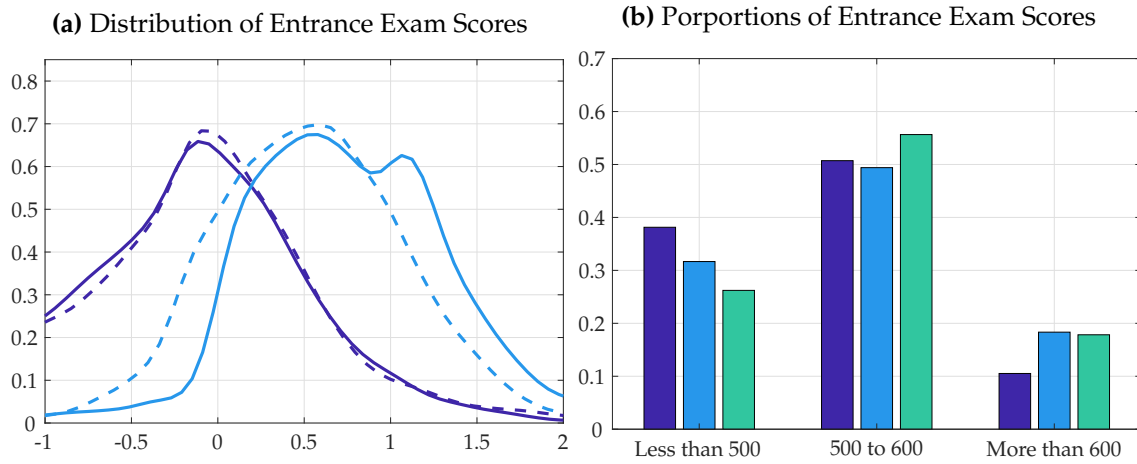
Note: In Figure 10a the continuous and dotted lines show the scores distribution for year 2010 and 2011 respectively. The ■ represents scores distribution for non BVP schools while the ■ shows the distribution for BVP schools.In Figure 10b ■ represent the shares in 2010 ■ represents shares for 2011 and ■ for 2017. Source: MINEDUC and DEMRE.

Figure 11: $Pr(\text{Enrollment}|\text{Exam})$ at Teaching Colleges

(a) $Pr(\text{Enrollment}|\text{Exam})$ in Any Teaching College

(b) $Pr(\text{Enrollment}|\text{Exam})$ in Eligble Teaching Colleges
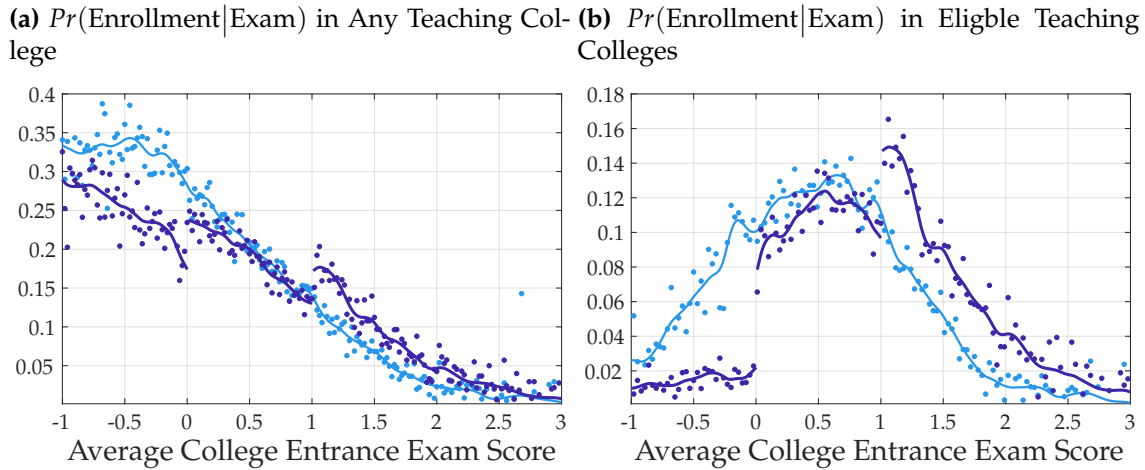
Note: This figure shows how the conditional probability of enrolling in teaching colleges changed after the introduction of *Beca Vocacion Profesor*. The left panel shows the probability of enrolling in any teaching college and the right panel shows the same but only for programs that opted into the BVP program and were willing to exclude low performing students. Color ■ represent the probabilities for 2011, while ■ the probabilities for 2010. Source: MINEDUC and DEMRE.

Figure 12: Change in $Pr(\text{Enrollment}|\text{Exam})$ in Eligble Teaching Colleges
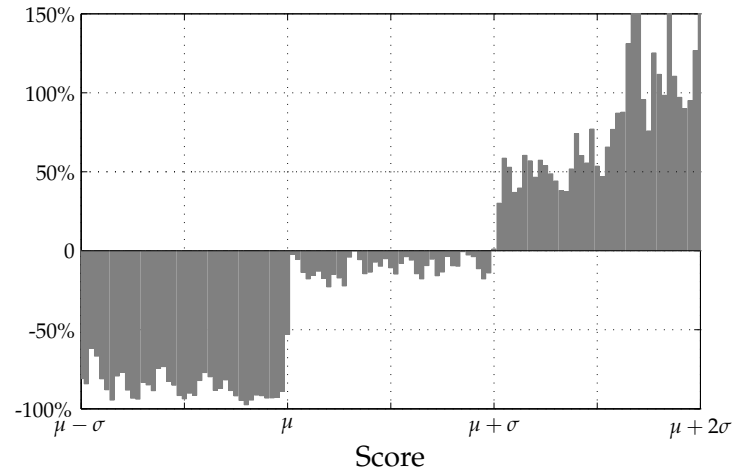
Figure 13: Effects of BVP over Enrollment

(a) Enrollment at Teacher Colleges
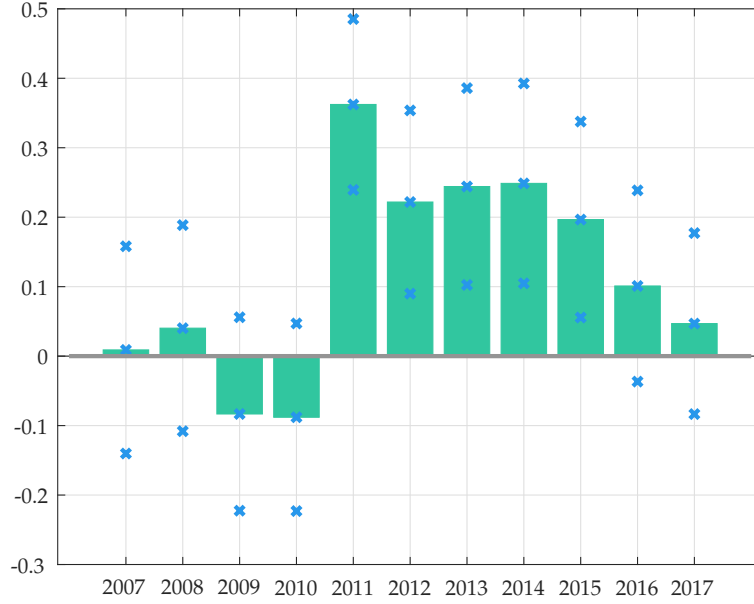
(b) Enrollment Overall
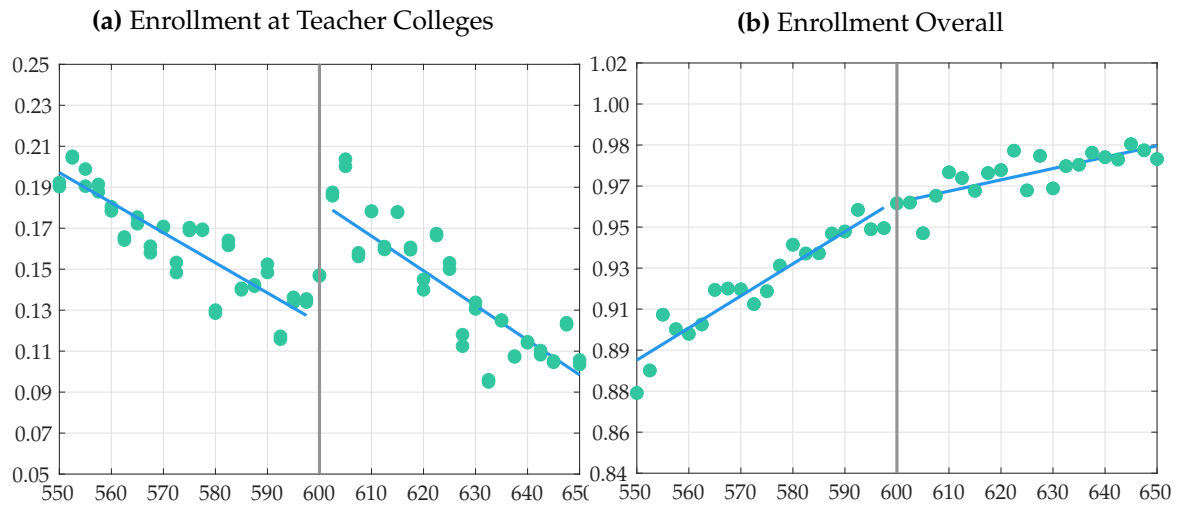
Note: Figure 13a plots the threshold crossing effect over the number of students enrollment into any teaching program conditional on PSU score while, Figure 13b shows the probability of enrollment in any program conditional on PSU score.

Figure 14: Effects of BVP over Enrollment

(a) Number of graduates to 6 years

(b) Pr graduation to 6 years

(c) Works in school after 7 years

(d) Pr work after 7 years

(e) Works in good school after 7 years

(f) Pr good school after 7 years
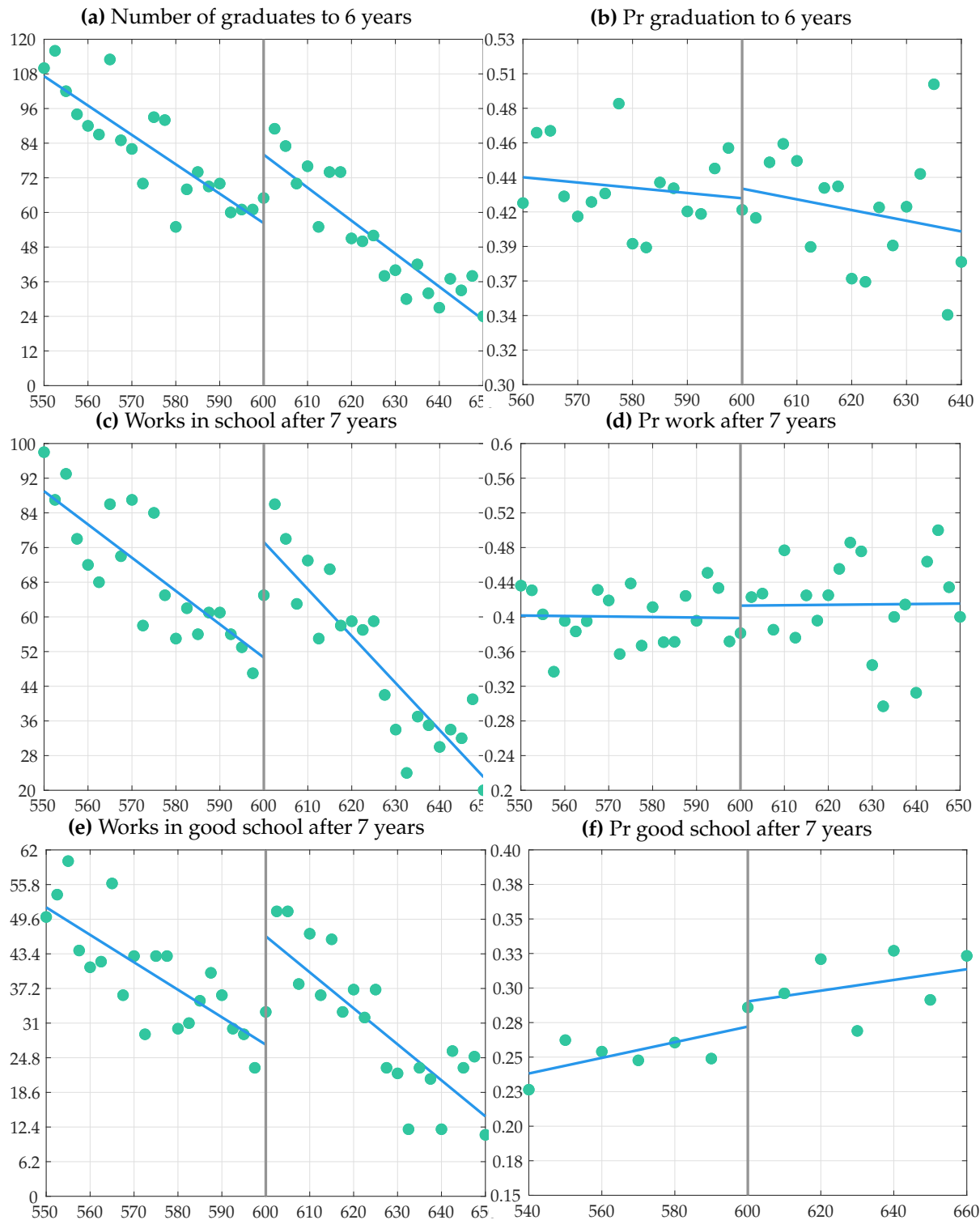
Notes: the figures graph a set of outcomes over PSU scores for all freshmen enrolled in 2011 who took the the college entrance exam in 2011 and where eligible for the BVP scholarship. In particular, figure Figure 14a plots the probability of enrollment in teacher colleges in 2011, Figure Figure 14b plots the probability of college graduation between March, 2013 and February, 2018, Figure Figure 14f plots the probability of employment in schools between 2013 and 2018; figure Figure 14c use data from years 2016 and 2017 to plot the pedagogical test scores conditional on taking the exam.

Figure 15: RDD Estimates on Freshmen Enrollment in Teacher Colleges

Notes: Figure 15 plots the coefficient α_1 over the average for each year (with 95% confidence intervals) estimated from the equation $Y = \alpha_0 + \alpha_1 BVP + f(Score) + \mu$ where Y is freshmen enrollment in teacher colleges each year, BVP is a dummy for being eligible for the BVB (i.e., having a college entrance exam score of 600 or above, and $f(score)$ is a function of the college entrance exam score, which allows for different slopes on either side of the threshold. The estimating sample for each year is composed by students with scores in a window between 550 and 650 points.

Figure 16: Score distribution for students enrolled in pedagogy
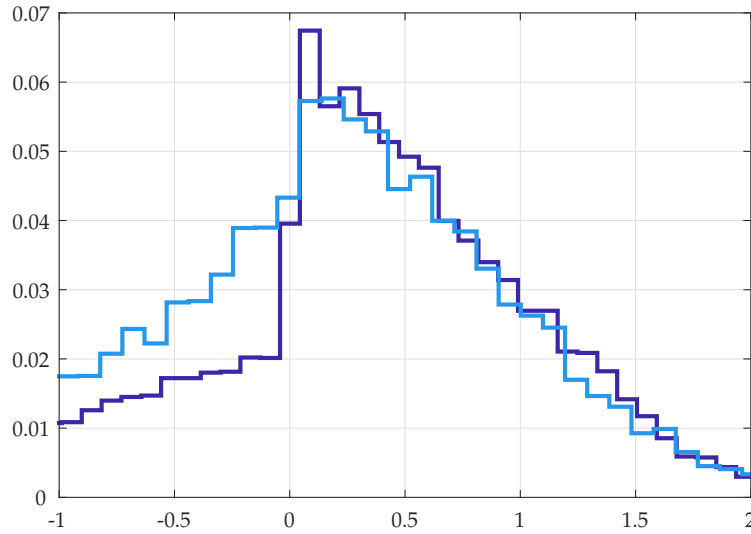
Note: In Figure 16, color ■ shows the score distribution for students enrolled in 2016, while ■ does the corresponding with students enrolled in 2017. The y axis are percentage of students in each bin from the total number of students in each the sample. Source: MINEDUC and DEMRE.

Figure 17: Screening Rule Back in Time

(a) Rule Applied To Past Teaching Students

(b) Simulation over performance outcomes
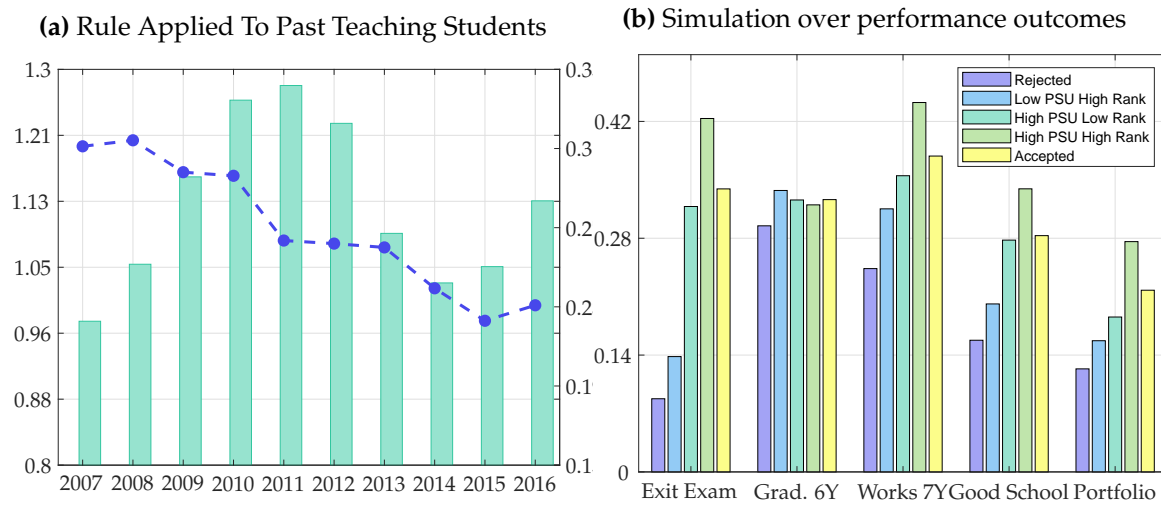
Note: Figure 17 shows trends and outcomes for students that would have been admitted by P17 from 2007 to 2016. In Figure 17a ■ shows the share of students that would have been rejected by the policy, meanwhile ■ shows the number of students (in thousands) that would have been accepted by the rule. Figure 17a shows the labor outcomes for each group of students enrolled in pedagogy from 2007 - 2016.

Figure 18: Contour Plot of the Estimated Conditional Mean of Observational Teacher Evaluations
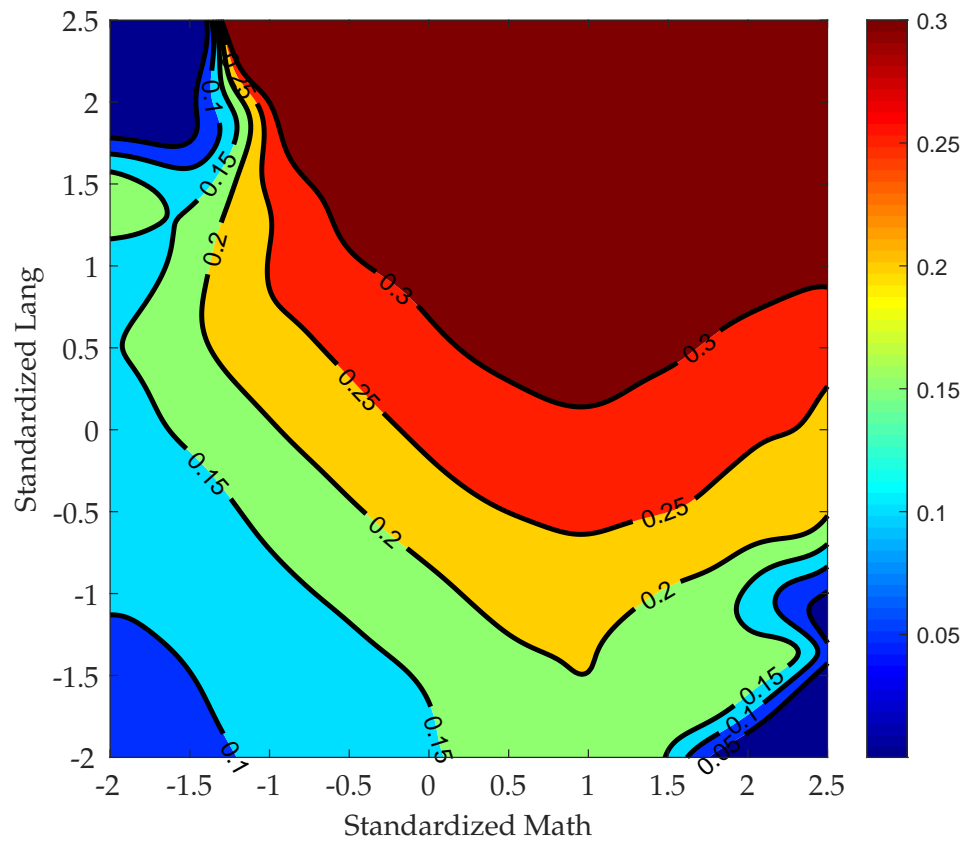
Note: This figure shows the contour plot of the mean of teacher evaluations conditional on pre-college academic achivement in math and language scores.

Figure 19: Outcomes for Those Screened In Simulation ML

(a) With school level characteristics

(b) Student Level Characteristics
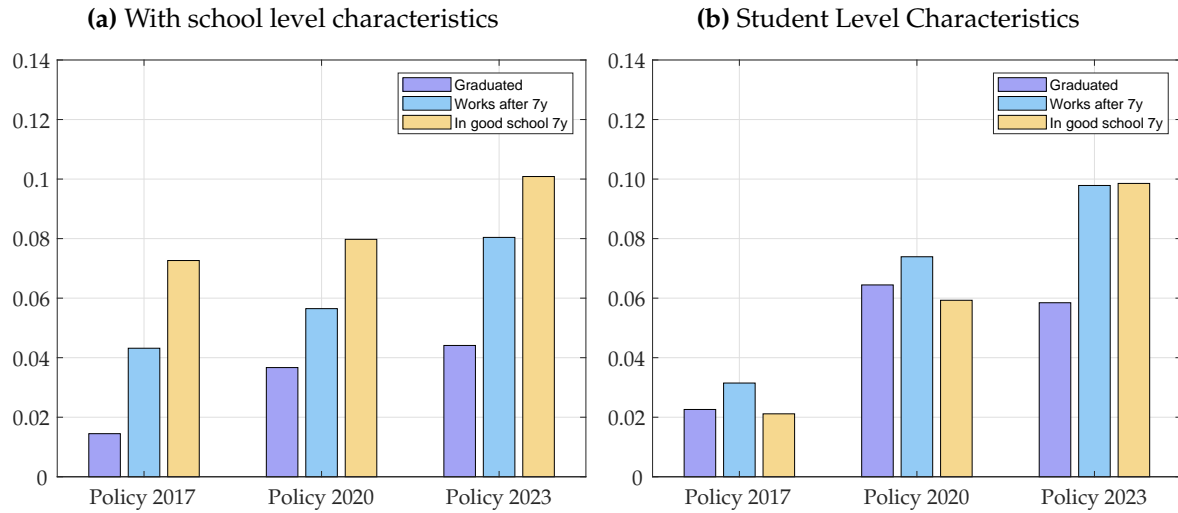
Note: The figures above show the percentage increase in each Graduation, working after 7 years and working in a good school for the students that would have been admitted by an ML screening method with a count of students rejected equivalente to those screened out by the rules proposed by the government. Figure 19a shows the results when using studen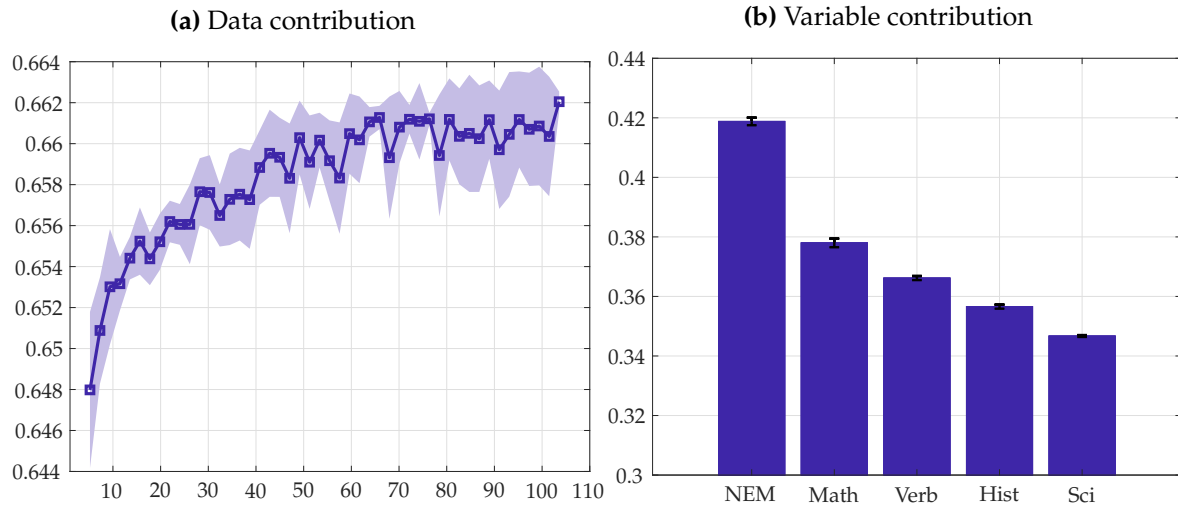t level characteristics and school level characteristics such as socioeconomic status. Figure 19b shows results from the ML model by only using pre college human capital measures such as NEM, scores in PSU exams.

Figure 20: Model accuracy composition

(a) Data contribution

(b) Variable contribution

Note: Figure 20a plots the area under the curve evaluated in the test sample obtained by training the same model with different sample sizes (in thousands) as shown in the X axis, the error bars are the cross validation standard errors. Figure 20b shows the prediction loss $1 - AUC$ in terms if we remove independently each of the variables from the model.

List of Tables

Table 1: Summary table: Teaching Performance vs PSU Scores

Graduation	Years after enrollment			
	5 Years	8 Years		
PSU Score	0.073***	0.118***		
	(0.002)	(0.002)		
(PSU Score)^2	-0.027***	-0.026***		
	(0.001)	(0.001)		
Observations	[84,847]	[84,847]		
Dep. Var. Mean	0.322	0.473		
Exit Exams	Disciplinary Test	Pedagogy Test	Writing Test	ICT Test
PSU Score	0.509***	0.506***	0.463***	1.27 ***
	(0.005)	(0.007)	(0.007)	(0.014)
(PSU Score)^2	0.043***	0.033***	-0.021***	-0.07 ***
	(0.003)	(0.311)	(0.200)	(0.443)
Observations	[35,355]	[33,409]	[11,300]	[5,517]
Dep. Var. Mean	0.000	0.000	0.000	
Productivity Measures:	Teacher Evaluation Overall	Teacher Evaluation Portfolio	Wages in Public Schools	Wages in Private Schools
PSU Score	0.615 ***	0.477 ***	0.536 ***	0.628 ***
	(0.041)	(0.04)	(0.046)	(0.043)
(PSU Score)^2 S	-0.048 ***	-0.031 ***	-0.049 ***	-0.055 ***
	(0.001)	(0.001)	(0.002)	(0.002)
Observations	[63539]	[63539]	[36771]	[58523]
Dep. Var. Mean	0.000	0.000	0.000	0.000
Employment in Schools	Years after graduation			Value Added
	5 Years	10 Years	20 Years	
PSU Score	0.298***	0.260***	0.269***	0.334***
	(0.044)	(0.044)	(0.089)	(0.016)
(PSU Score)^2	-0.027***	-0.025***	-0.024***	0.004
	(0.114)	(0.113)	(0.235)	(0.056)
Observations	[13,201]	[13,201]	[13,201]	[3,756]
Dep. Var. Mean	0.470	0.435	0.287	0.000

Note: Robust standard errors in parentheses. Significance levels: $*p < 0.10, **p < 0.05, ***p < 0.01$. The regression table reports the coefficients of 14 separate regressions for different teacher performance outcomes over PSU score. Dependent variable PSU is expressed in terms of standard deviations in all cases. In the 'Graduation Time' panel regressions are controlled by year fixed effects and teacher specialization level (primary and secondary levels) fixed effects. In the 'Exit Exam' panel, the dependent variables are % of correct answers except in the writing exam which is a standardized variable; variables are controlled by year and teacher specialization fixed effects. In the 'Productivity Measures' panel, all dependent variables are standardized and regressions are controlled by year and teacher specialization level fixed effects and a second order polynomial for experience. Finally, in 'Works as a Teacher' panel, regressions are controlled by year and teacher specialization fixed effects. In all cases coefficients should be read as the change in the outcome given one standard deviation (SD) of increase in the PSU scores.

Table 2: RDD Regression across different BVP Thresholds

	Threshold = 600		Threshold = 700		Threshold = 720	
	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
Above Threshold	0.0538***	4	0.0262***	2.42	-0.007	-0.72
Constant	0.1204***	20.01	0.0283***	4.6	0.0033***	5.38
PSU	-0.0007***	-1.54	-0.0015***	-3.18	-0.005***	-1.12
N. Observations	18007		5450		4150	

Table 3: RDD Estimates for the BVP Scholarship

	(1) Enrollment in Education	(2) Graduation	(3) Dropout	(4) Employment in Schools	(5) Takes Exit Exam	(6) Score Exit Exam
$\widehat{\alpha_1}$	0.052***	0.002	-0.001	0.026***	-0.002	0.076
	(0.008)	(0.010)	(0.005)	(0.005)	(0.003)	(0.103)
Mean below cutoff	0.154	0.425	0.093	0.076	0.025	0.259
Effect Size ($\alpha_1 / Mean$)	0.339	0.004	0.008	0.343	0.063	0.295
Observations	44,418	44,418	44,418	44,418	44,418	1,079

Note: Table 3 shows the results of estimating the equation $Y = \alpha_0 + \alpha_1 BVP + f(Score) + \mu$ where Y are the outcomes in each column, BVP is a dummy for being eligible for the BVB (i.e., having a college entrance exam score of 600 or above, and $f(score)$ is a function of the college entrance exam score, which allows for different slopes on either side of the threshold. The sample size for columns 1 to 5 is of 44,418 students with scores in a window between 550 and 650 points. In column 6 the sample is conditional on taking the exit exam (approximately 2.5% of the sample size of 44,418 students).