

Application Behavior, Rank, and Targeted Recruitment

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Outline

Overview

Top Ten Percent Rule

Targeted Recruitment

Conclusion

THE FACTS

- In 1996, *Hopwood v. Texas* ends Affirmative Action in Texas.
- In 1997, House Bill 588—The Top Ten Percent Rule—is signed into law. The law is intended to reverse the decline in minority enrollment at Texas's elite institutions.
- The University of Texas at Austin, in 1999, and Texas A&M-College Station, in 2000, instituted targeted recruitment and financial aid programs at Texas high schools with a history of few students applying to the respective institutions.

THE QUESTIONS

- What is the impact of both the increased emphasis and transparent use of class rank on the score-report sending behavior of Texas's High School Graduates? The sending of a score report to a college or university is our proxy for an application.
- How does targeted financial aid and recruitment affect the application behavior of potential recipients?

THE FINDINGS: IMPACT OF TOP TEN PERCENT RULE

- 1 Test-takers in the top decile, second decile, and second quintile reduce the likelihood that they send out more than four score reports.
- 2 Test-takers in both the top decile and the fifth quintile increased the probability that they would send a score report to UT-Austin. Test takers in the second quintile reduced the likelihood of sending a score report to UT-Austin.
- 3 Test-takers in the third quintile, fourth quintile, fifth quintile, and test takers who didn't report class rank increase the likelihood that they send score reports to Texas A&M.

THE FINDINGS: IMPACT OF TOP TEN PERCENT RULE

- ④ We find decreases in the likelihood of sending to non-selective schools in Texas for every rank designation except for test-takers who report that they are in the fifth quintile.
- ⑤ We find precisely estimated—but small—reductions in the likelihood of students who report being in the top decile sending to elite universities—for example, Yale and Stanford. We also find precisely estimated—but small—increases in the likelihood that test-takers who report being in the second, third, and fourth quintiles send score reports to elite institutions.

THE FINDINGS: IMPACT OF TOP TEN PERCENT RULE

- ⑥ We find decreases in the likelihood of sending score reports to out-of-state institutions for students who report being in the top decile, the second decile, and test-takers who don't report their class rank; there is a small increase in the likelihood of sending a score report to out-of-state colleges for students in the third quintile.

THE FINDINGS: THE TARGETED RECRUITMENT PROGRAMS

- 1 The targeted recruitment programs increase the likelihood that students from “treated” schools send score reports to the University of Texas at Austin and Texas A&M-College Station.
- 2 The effects of the University of Texas at Austin’s program impact students in the top decile, the second decile, and the second quintile. The effects of Texas A&M-College Station’s program is significant only for students who report being in the top decile.

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What does the Top Ten Percent Rule do?

To put it simply, the Top Ten Percent Rule places far more emphasis on class rank in the admissions process. We are not saying that class rank didn't matter in previous regimes; however, under the Top Ten Percent the use of class rank is explicit and known to all interested parties. We exploit the intertemporal variation in the importance of class rank in the admissions process to identify the impacts of the policy regime.

The Data

We combine two sources:

- 1 Student Descriptive Questionnaire Data for every SAT test taker in Texas from 1996–2004.
- 2 Data on public high Schools in Texas from 1996–2004. The data come from Texas's Academic Excellence Indicator system.

Summary of the Data

Descriptive Statistics

Year	No. of Obs	% Black ^{a,b}	% Hispanic	% White ^c	% Female	Mean SAT-V	Mean SAT-M
1996	83,769	–	–	–	54.70	460	466
1997	87,750	–	–	–	54.73	459	467
1998	94,136	–	–	–	54.84	456	463
1999	98,730	11.45	16.54	51.95	54.73	453	459
2000	103,367	11.11	16.57	49.46	54.41	454	461
2001	105,015	11.22	16.73	47.87	54.57	452	459
2002	110,097	11.23	16.58	45.07	54.57	488	499
2003	115,260	10.84	16.37	40.48	54.02	452	460
2004	118,224	12.07	18.28	43.53	54.19	450	458

Notes:

^aWe have no racial data for the 1996–1998 cohorts.

^bThe residual race/ethnic category is 'other'.

^cThe decrease in the percent White is primarily matched by a corresponding increase in the percent not reporting race. (Corr coeff = - 0.66)

Score Report Sending: Empirical Specifications

$$Y_{ist} = \alpha_s + \tau + D_{1997} + \beta' X + \sum \Gamma^j R_{ist}^j + \sum \delta_P^j (R_{ist}^j \times Post) + \varepsilon_{ist}$$

Some Caveats

- 1 We are exploiting temporal variation; that is, our comparison group are the set of individuals in Texas public high schools prior to the introduction of the Top Ten Percent Rule.
- 2 We follow Card and Krueger (2005) in using score reports to proxy for college applications.
- 3 We present evidence of heterogeneous effects that vary according to rank. This differs from work by Card and Krueger (2005), Long (2004), and Dickson (2006).

Individual level regressions for score-report sending with fixed effects: Interactions Only

	Dependent Variables ^{a,b,c,d,e,f}					
	>4 Scores	UT-Austin	TX A&M	Non-Selective	Elite	Out-of-State
Post×No Rank	0.038 [0.004]**	0.005 [0.004]	0.013 [0.004]**	-0.025 [0.005]**	0.002 [0.002]	-0.013 [0.005]**
Post×1st Decile	-0.057 [0.004]**	0.03 [0.004]**	-0.003 [0.004]	-0.044 [0.004]**	-0.008 [0.003]*	-0.023 [0.004]**
Post×2nd Decile	-0.019 [0.004]**	0.004 [0.004]	0.003 [0.004]	-0.028 [0.004]**	-0.003 [0.002]	-0.016 [0.004]**
Post×2nd Quintile	-0.015 [0.004]**	-0.016 [0.003]**	-0.002 [0.003]	-0.029 [0.004]**	0.005 [0.001]**	-0.001 [0.004]
Post×3rd Quintile	0.002 [0.004]	-0.006 [0.003]	0.012 [0.003]**	-0.026 [0.004]**	0.007 [0.001]**	0.009 [0.004]*
Post×4th Quintile	0.008 [0.006]	-0.001 [0.006]	0.029 [0.005]**	-0.014 [0.007]*	0.008 [0.002]**	0.009 [0.007]
Post×5th Quintile	0.015 [0.013]	0.033 [0.012]**	0.023 [0.011]*	-0.003 [0.015]	0.007 [0.004]	0.004 [0.015]
<i>N</i>	865,490	865,490	865,490	865,490	865,490	865,490
<i>R</i> ²	0.12	0.14	0.10	0.15	0.12	0.12

Notes:

^aRobust standard errors in brackets

^b * significant at 5%; ** significant at 1%

^cOmitted coefficients include student SAT math and verbal scores, racial composition of the school, % on reduced price meals, number of 12th graders per school, teacher-to-student ratio, teacher experience and whether the school subsequently gets LOS or CS.

^dAll dependent variables are binary.

^eModels include high school fixed effects.

^fStandard errors are clustered at the high school level.

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What should we take away from these regressions?

- 1 The Top Ten Percent Rule affects the choice set of potential college applicants.
- 2 There is treatment effect heterogeneity; that is, the effects of the Top Ten Percent Rule vary across the distribution of self-reported class rank.

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Targeted Recruitment in Texas

The Top Ten Percent Rule did not restore minority enrollment at both the University of Texas at Austin (UT) and Texas A&M-College Station (A&M) to the levels obtained prior to the *Hopwood v. Texas* decision. UT responded by selecting forty high schools in 1999 to receive the Longhorn Opportunity Scholarship program. Additional high schools were added in 2000 and 2001. The high schools selected to receive the program met two criteria:

- 1 Less than $\frac{1}{3}$ of students designate UT to receive a score report.
- 2 Average family income for students in a designated high school is less than \$35,000 per annum.

Targeted Recruitment in Texas

A&M followed suit in 2000 by selecting some forty high schools in Dallas, Houston, and San Antonio to receive the Century Scholars program. The high schools selected to receive the Century Scholars program were selected based on the high poverty rates of their students and the low number of applications that these schools sent to A&M.

What do these programs do?

These programs represent a drastic change in how these universities do business. UT and A&M are levying resources at high schools that didn't produce many students that attended either institution. These programs offer scholarships, tutoring, mentoring, priority in registration, and specialized housing to the most deserving students at the qualifying high schools. In addition, the program also sends students who receive the scholarships back to their high school to talk about their experiences.

Questions: Are these programs effective? Do they, in fact, incentivize students at these schools to apply to UT and A&M?

Evaluating the Effectiveness of the Programs

The schools that receive the targeted recruitment programs are very different from the average public high school in Texas. Consider the following tables:

Difference in Means between non-LOS and LOS schools: 1996

	I		II		III	
	Full Sample		Trimmed on % White		Trimmed + IPW^a	
	Diff	Std. Error	Diff	Std. Error	Diff	Std. Error
SAT Verbal 1996	84.15801	11.34198	60.58856	12.93527	-90.92864	47.44042
SAT Math 1996	78.6547	11.45268	56.92257	13.18112	-93.42431	49.12743
% Male1996	0.0325368	0.0242761	0.023274	0.0238679	0.083206	0.0787117
% LEP 1996	-9.084674	1.059521	-5.459362	1.445809	-4.71344	3.22563
% Poor 1996	-21.61012	2.473133	-11.18325	2.685984	-6.1775	7.427676
% White 1996	56.14116	3.321822	31.38315	2.542453	-0.6210423	1.621345
% Black 1996	-28.67099	1.961617	-24.29509	2.673292	1.196016	11.77503
% Hispanic 1996	-27.49311	3.472628	-7.445116	3.856238	0.2120572	11.66233
% Twelfth Grade 1996	1.294911	0.8206153	1.777415	0.8510645	-1.765537	0.9858317
Teacher Exper. 1996	-1.515985	0.3045374	-1.31315	0.3138011	-0.7680797	0.8593804
Stud to Teach. ratio 1996	-3.494079	0.3966614	-2.967368	0.4565764	1.250299	1.131446
% Taking Exam 1996	9.445604	2.295984	6.948041	2.451785	-11.03337	7.917645
Sent to Austin 1996	0.0617897	0.0244581	0.0852738	0.0245699	-0.0372799	0.0378221
Sent to A&M 1996	0.1375002	0.0243618	0.1266806	0.0248049	0.1273136	0.1040717

Notes:

^aIPW is our acronym for Inverse Probability Weighting.

Difference in Means between non-CS and CS schools: 1996

	I		II		III	
	Full Sample		Trimmed on % White		Trimmed + IPW^a	
	Diff	Std. Error	Diff	Std. Error	Diff	Std. Error
SAT Verbal 1996	68.17572	14.99566	52.9551	16.2564	-30.04332	31.24498
SAT Math 1996	59.67551	15.12524	46.56986	16.52531	-44.07043	30.64369
% Male 1996	0.019602	0.0316512	0.0134098	0.0312478	-0.0062671	0.0264438
% LEP 1996	-8.322401	1.402859	-5.861777	1.722491	-9.44857	2.925462
% Poor 1996	-8.937653	3.318013	-1.419071	3.441146	3.101535	4.760965
% White 1996	52.02624	4.588233	33.74707	3.832533	1.977166	3.763032
% Black 1996	-43.77545	2.46509	-39.99108	3.003269	4.400638	8.903645
% Hispanic 1996	-6.459595	4.643494	7.787132	4.888569	-3.726579	8.018528
% Twelfth Grade 1996	1.974693	1.068824	2.357043	1.065168	0.6252555	1.272525
Teacher Exper. 1996	-1.794581	0.3975573	-1.493205	0.3934844	-0.2169575	0.7532384
Stud. to Teach. ratio 1996	-4.249474	0.5191005	-3.819428	0.5630014	-0.1400377	0.6145092
% Taking Exam 1996	7.136165	2.96318	5.645703	3.043693	-4.124851	4.334286
Sent to Austin 1996	0.0616316	0.0319056	0.0820423	0.0315237	0.0764248	0.0390597
Sent to A&M 1996	0.1028635	0.0320389	0.0953808	0.0324104	-0.0080894	0.0250781

Notes:

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Evaluating the Effectiveness of the Programs

Any evaluation that ignores the non-random selection into treatment risks yielding biased estimates of the effects of the program. Given the differences in the covariates, a regression analysis that attempts to evaluate the program will invariably extrapolate between the treatment and control groups over a multidimensional space. We take several steps to deal with this issue.

Evaluating the Effectiveness of the Programs

First, we trim the sample of schools with a high percentage of white students; schools with such demographics had no possibility of receiving the programs and, therefore, aren't comparable to the treated schools. In conjunction with the trimming, we use the propensity score—the probability that a given school receives the program conditional on its covariates—to construct a comparable set of schools. We weight the students in the non-treated schools by $\frac{\mathcal{P}}{1-\mathcal{P}} \times \frac{1-\Pi}{\Pi}$ where \mathcal{P} is equal to the propensity score for either the LOS program or the CS program for the particular school that the student attends and Π is equal to the unconditional probability of being either a LOS school or a CS school. This approach re-weights students in non-treated schools so that, on average, they are similar to students in treated schools. Students in treated schools receive a weight of one.

Evaluating the Effectiveness of the Programs

Using the weights defined in the previous slide, we estimate models of the following form on our trimmed sample:

$$Y_{ist} = \alpha_s + \tau + D_{1997} + \beta' X + \sum \Gamma^j R_{ist}^j + \sum \delta_P^j (R_{ist}^j \times Post) + \sum \delta_T^j (D_T \times R_{ist}^j) + \varepsilon_{ist}$$

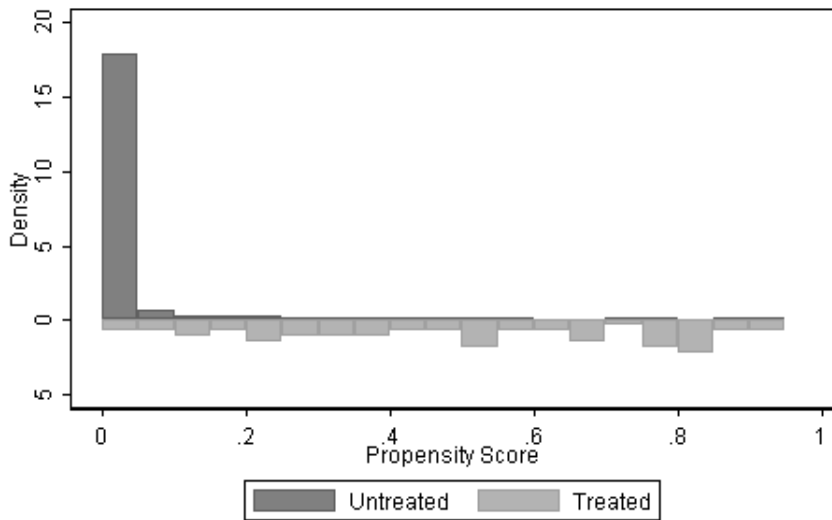
Propensity Score Estimates

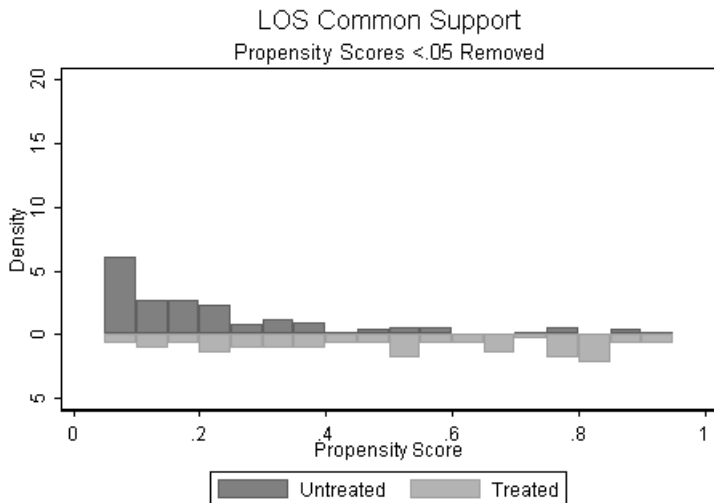
	LOS	CS
% sending to UT-Austin-1996	-2.073*	
	(0.936)	
% sending to UT-Austin-1997	-1.457	
	(1.059)	
% sending to UT-Austin-1998	-1.190	
	(1.133)	
% sending to Texas A&M-1996		-1.305
		(1.262)
% sending to Texas A&M-1997		0.614
		(1.395)
% sending to Texas A&M-1998		0.355
		(1.440)
% Poor-1996	0.0242	-0.0170
	(0.0149)	(0.0169)
% Poor-1997	-0.0100	0.00716
	(0.0148)	(0.0184)
% Poor-1998	0.000476	0.0156
	(0.0124)	(0.0153)
% Black-1996	-0.0186	0.156**
	(0.0786)	(0.0597)
% Black-1997	0.117	-0.0825
	(0.112)	(0.0892)
% Black-1998	-0.0843	-0.0530
	(0.0648)	(0.0681)
% White-1996	-0.0347	-0.00302
	(0.0743)	(0.0826)
% White-1997	0.0446	0.0277
	(0.111)	(0.136)
% White-1998	-0.0488	-0.0435
	(0.0737)	(0.0872)
% Taking College Entrance Exam-1996	0.00722	0.00925
	(0.0107)	(0.0150)
% Taking College Entrance Exam-1997	-0.00731	-0.00674
	(0.0115)	(0.0170)
% Taking College Entrance Exam-1998	0.00739	-0.00794
	(0.0123)	(0.0158)
Student/Teacher Ratio-1996	0.119	0.100
	(0.0647)	(0.0714)
Student/Teacher Ratio-1997	-0.00566	-0.0113
	(0.00429)	(0.0175)
Student/Teacher Ratio-1998	0.0983	0.169*
	(0.0607)	(0.0708)
Pseudo R^2	0.629	0.594
χ^2	302.5	192.0
N	1001	1001

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

Table contains coefficients from probit regressions. Standard errors are in parentheses. Sample consists of Texas Public High Schools.

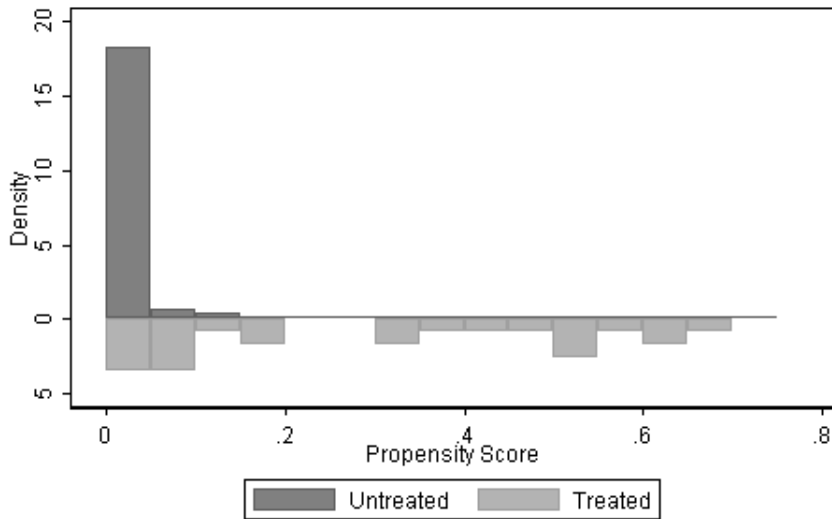
Common Support for LOS

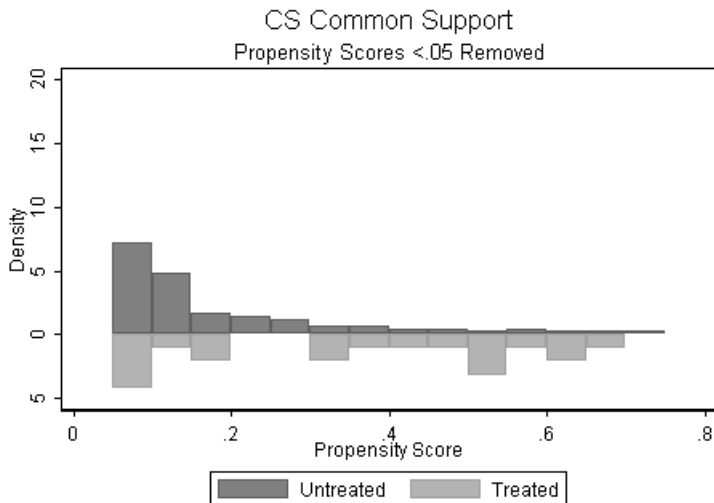




Note: Adjusted graphs are identical to the unadjusted graphs except that the huge spike at zero in the unadjusted graph has been removed.

Common Support for CS





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Effects of LOS

	Dependent Variable ^{a,b,c}	
	UT-Austin	
LOS×No Rank	-0.005 [0.013]	-0.012 [0.013]
LOS×Top Decile	0.099 [0.013]**	0.092 [0.013]**
LOS×2nd Decile	0.033 [0.011]**	0.026 [0.011]*
LOS×2nd Quintile	0.024 [0.008]**	0.017 [0.008]*
LOS×3rd Quintile	0.007 [0.011]	0.001 [0.011]
LOS×4th Quintile	0.002 [0.013]	-0.004 [0.014]
LOS×5th Quintile	-0.028 [0.030]	-0.033 [0.031]
Observations	189,354	151,262
R^2	0.10	0.11

Notes:

^aThe dependent variable is a binary variable that assumes a value of one if a student sends a score report to UT-Austin.

^bModels include high school level fixed fixed effects.

^cStandard errors are clustered at the high school level.

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Effects of CS

	Dependent Variable ^{a,b,c}	
	TX A&M	
CS×No Rank	0.02 [0.012]	0.021 [0.013]
CS×Top Decile	0.042 [0.019]*	0.042 [0.019]*
CS×2nd Decile	0.016 [0.015]	0.016 [0.014]
CS×2nd Quintile	0.011 [0.013]	0.012 [0.012]
CS×3rd Quintile	0.017 [0.011]	0.018 [0.012]
CS×4th Quintile	0.005 [0.016]	0.006 [0.018]
CS×5th Quintile	0.002 [0.034]	0 [0.036]
Observations	265,849	211,966
R^2	0.08	0.08

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CS×2nd Quintile	0.011 [0.013]	0.012 [0.012]
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Effects of Targeted Recruiting

- 1 The effects are concentrated in the higher self-reported rank designations.
- 2 The effects are large when compared to sending rates prior to the programs.

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Race Neutral admissions in Texas is an interesting mix of both student and institution response. This work shows that potential applicants change behavior when confronted with new information. This work also demonstrates that elite institutions are able to effectively respond to changes in the legal environment in order to attract a diverse student body.