Stigma or Acclaim? A Regression Discontinuity Analysis of Graduation Standards and Their Impact on Students' Academic Trajectories

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Big Picture

- High-stakes testing usually considered an evaluative/motivational tool to induce teachers/schools to change behavior.
- Many studies looking at the correlation between academic performance and high-stakes testing interpret this as due to changes made by teachers/schools.
- Do students respond to high-stakes testing? (Do they care about results?)
- How do they respond? (Focus on high school math sequence)

Preview of Results

- Using RD analysis with a treated and a control sample, it is possible to disentangle whether passing or failing a high-stakes exam serves as (on average) a positive or negative motivator for students.
- 9th grade students who just fail the high-stakes test are about 5% less likely to prepare for college.
- 9th grade students who just pass the high-stakes test are not differentially affected.
- 10th grade students who just fail the high-stakes test are not differentially affected.
- 10th grade students who just pass the high stakes test are more likely to prepare for college.

Data

North Carolina Education Data Set (NCEDS)

- NC Education data set of all public school students and teachers.
- Data on 9th grade students from 2005/06 and 2006/07 used.
- Approximately 40,000 observations in 2006/07 (treatment) and 34,000 observations in 2005/06 (control).

NC End-of-Course Exams, High School Exit Standards, and Math Sequence

- HS students take an end-of-course exam, which accounts for 25% of the final grade in the course.
- Beginning in 2006/07, students are subject to a graduation requirement, where students must score at least a level III (out of IV) in 5 subjects, one of which is Algebra I. Students are allowed multiple retakes and may eventually be exempted from passing.
- Beyond Algebra I, students can opt into one of three math tracks: College/University Prep, College Technical Prep, Career Prep.
- 2006/07 is Treatment Year, 2005/06 is Control Year (no HS exit standard).

Summary Stats

Table: Summary statistics

Variable	Treatment Yr Mean (Std. Dev)	Control Yr Mean (Std. Dev)
Minority	0.370 (0.483)	0.348 (0.476)
Female	0.520 (0.500)	0.518 (0.500)
Alg I score	7.846 (8.428)	8.888 (8.676)
Alg I level	3.211 (0.738)	3.283 (0.726)
Best Alg I score	8.105 (8.192)	9.347 (8.234)
Best Alg I level	3.234 (0.714)	3.325 (0.681)
# of Times Took Exam	1.102 (0.352)	1.085 (0.317)
Career Prep / No Math	0.070 (0.254)	0.052 (0.221)
Technical Prep Math	0.144 (0.351)	0.125 (0.331)
University Prep Math	0.786 (0.410)	0.823 (0.381)
Observations	40152	34043

Checks 1

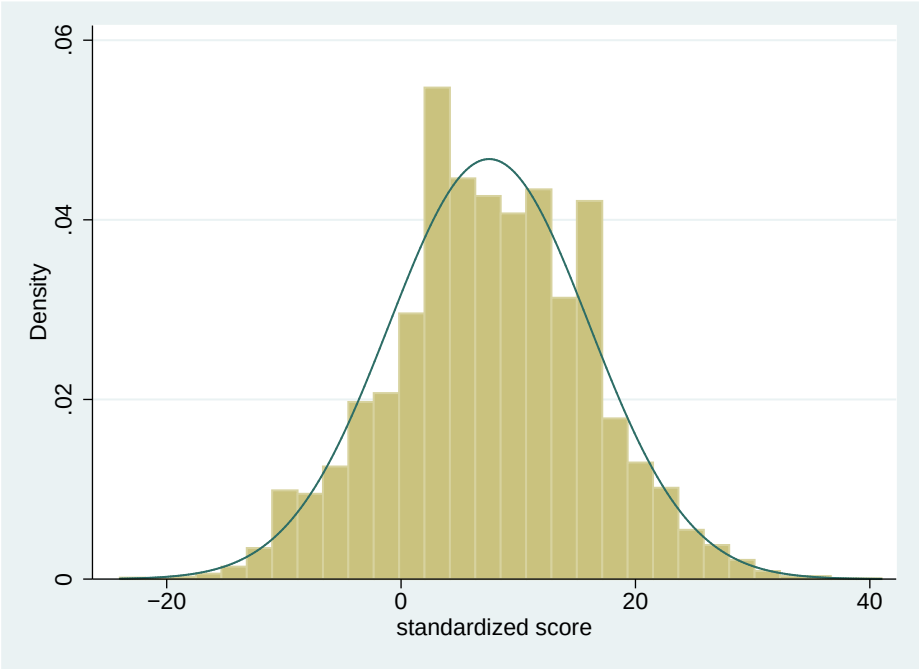


Figure: density of observations across assignment variable

Checks 2

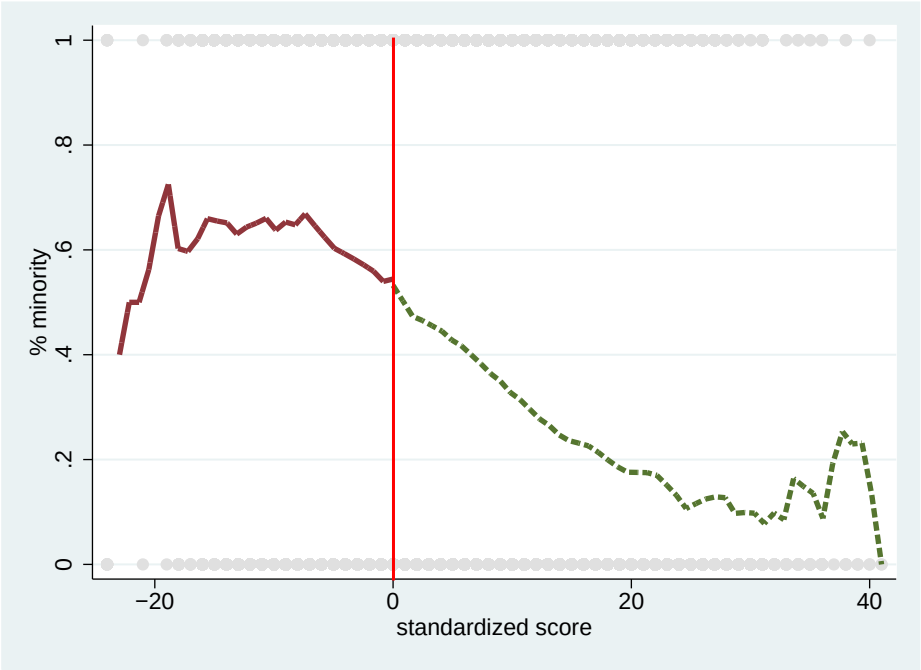


Figure: placebo RD of minority percentage

Checks 3

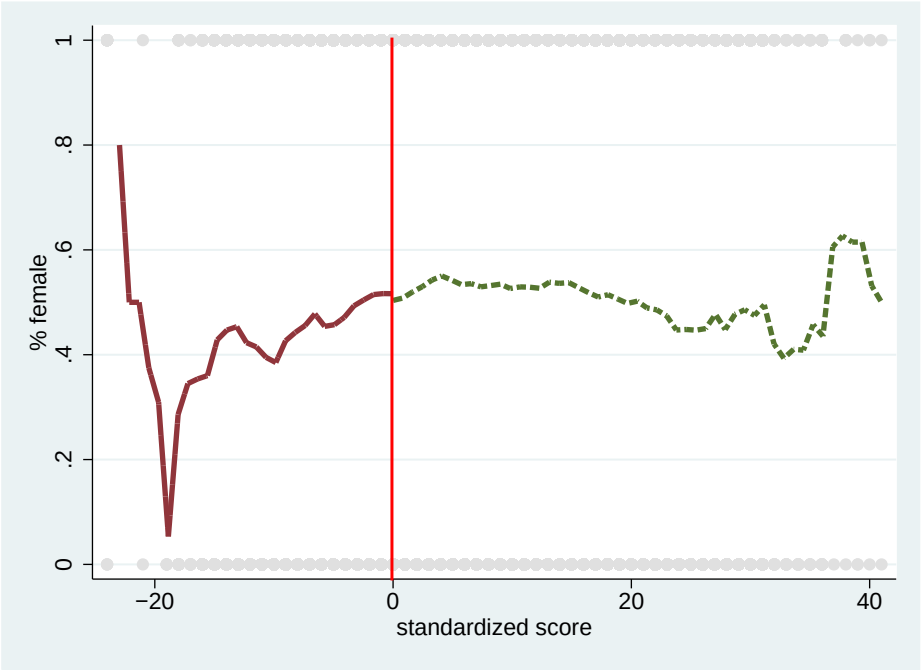


Figure: placebo RD of female percentage

Checks 4

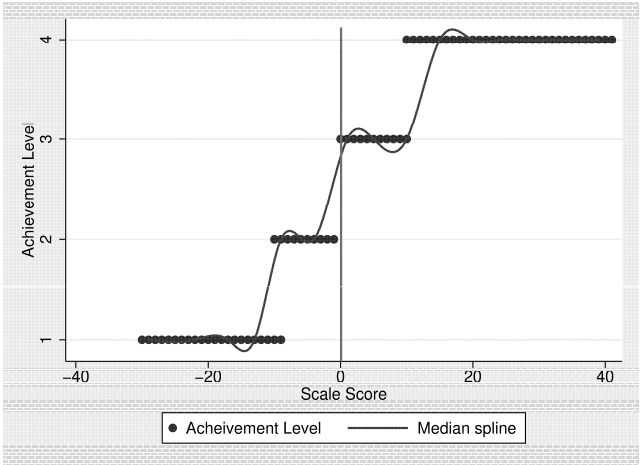
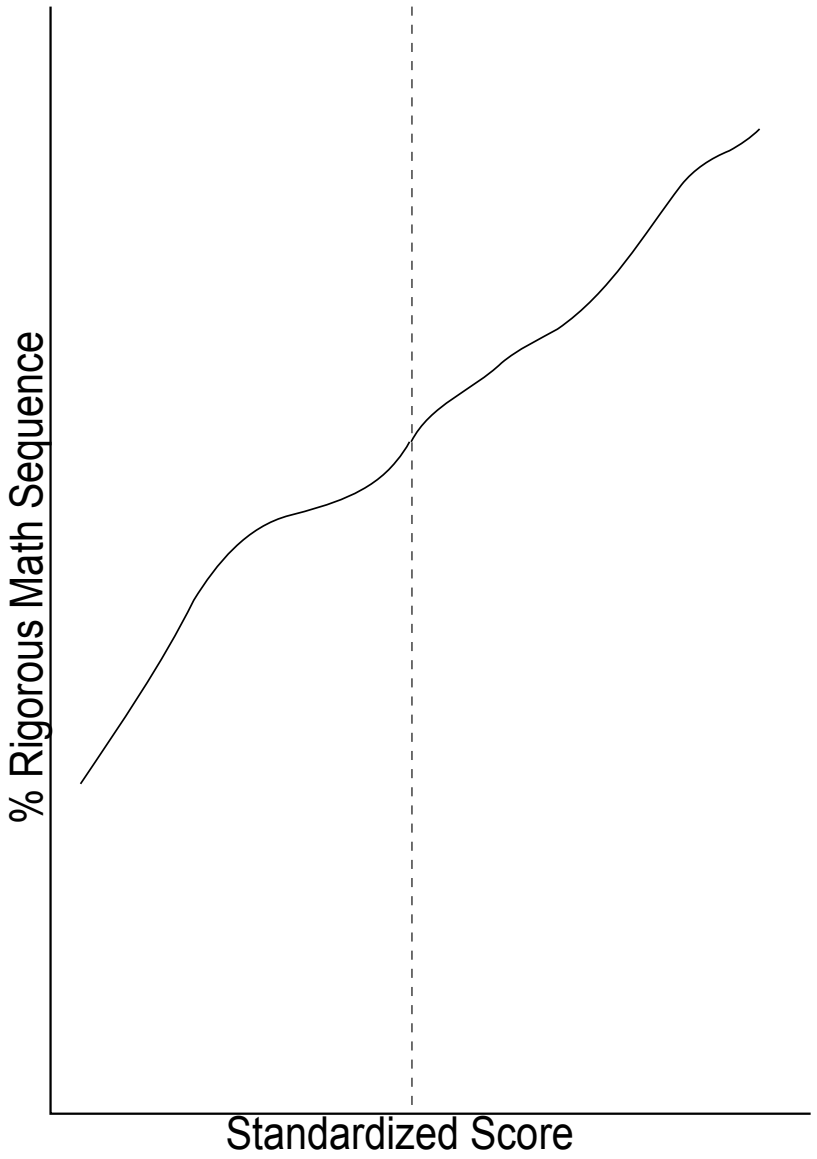
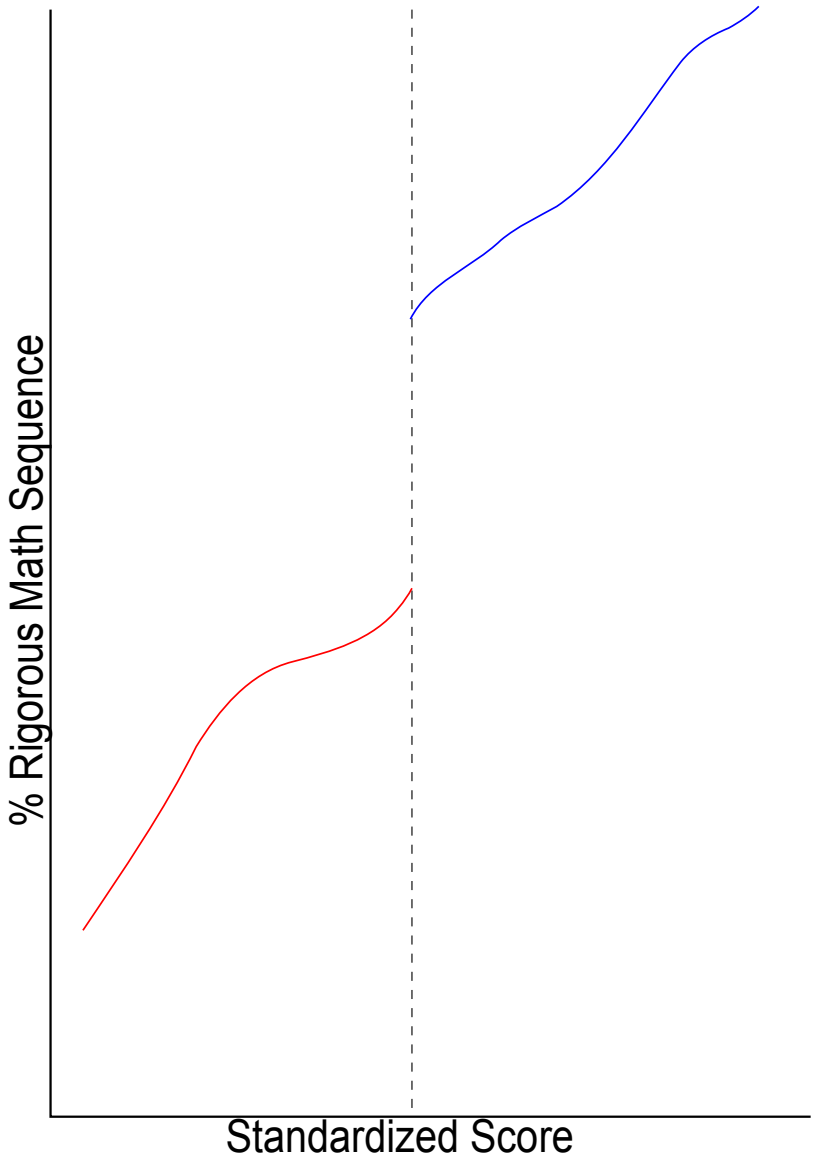


Figure: existence of sharp discontinuity

RD Explanation



RD Explanation



Results 1

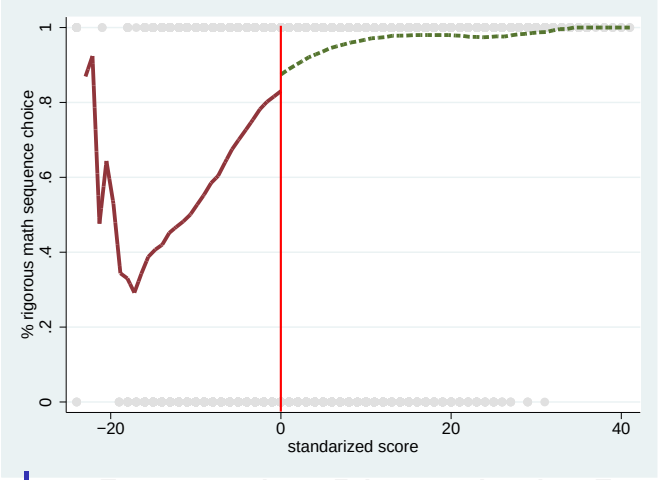


Table: Regression Discontinuity Results for Treatment

Outcome Measure	RD Effect (Std. Err)	Bandwidth
Take College Technical Prep or above	0.0549(0.0159)***	1.557
	0.0484(0.0220)**	3.114
	0.0545(0.0182)***	4.282
Take University Prep	0.0619(0.0214)***	1.746
	0.0275(0.0287)	3.493
	0.0256(0.0236)	4.802

Results 2

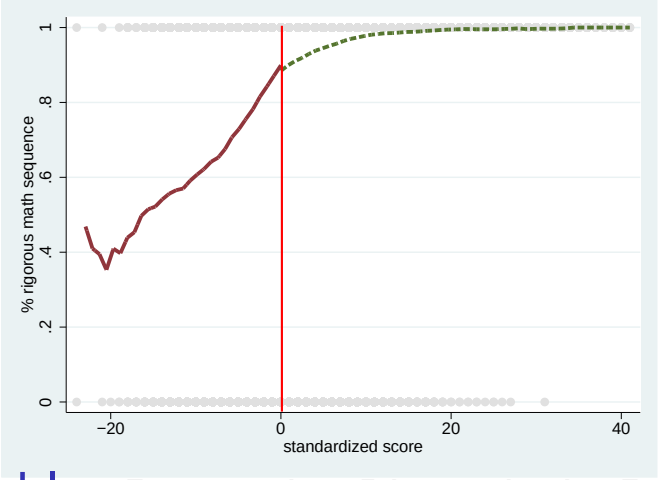
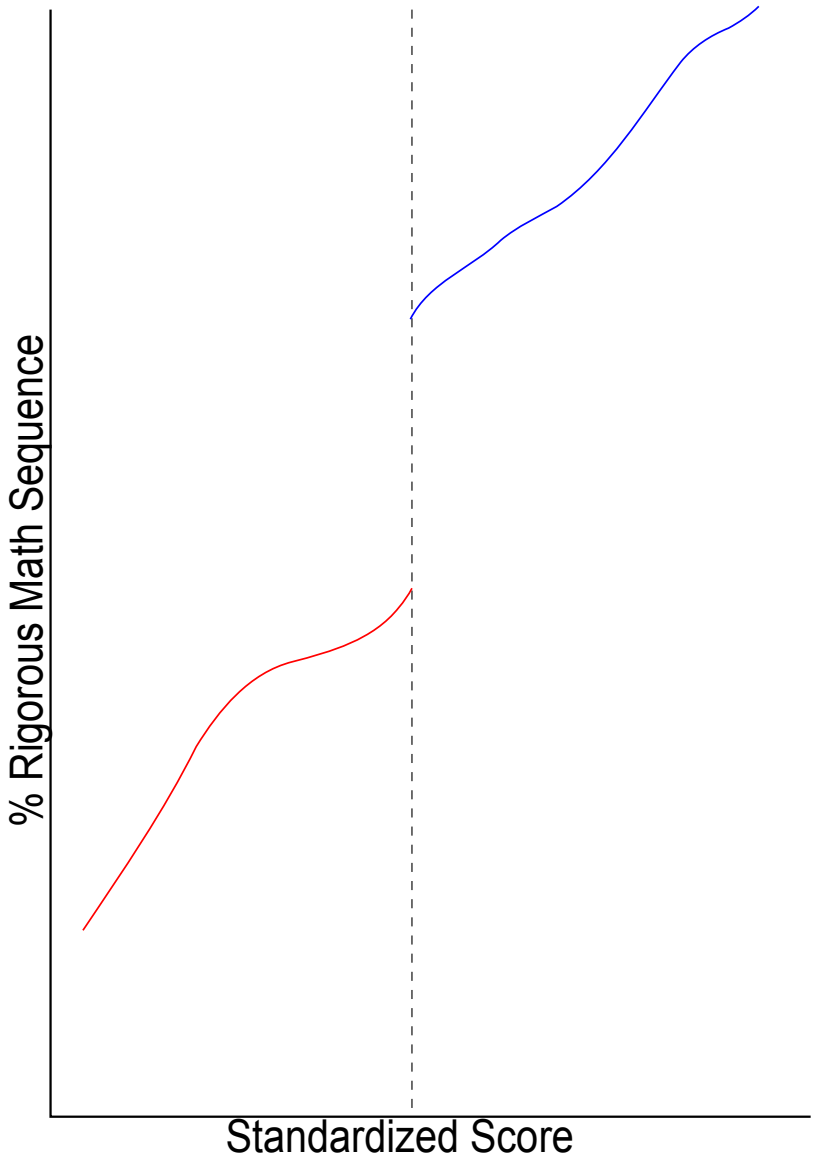


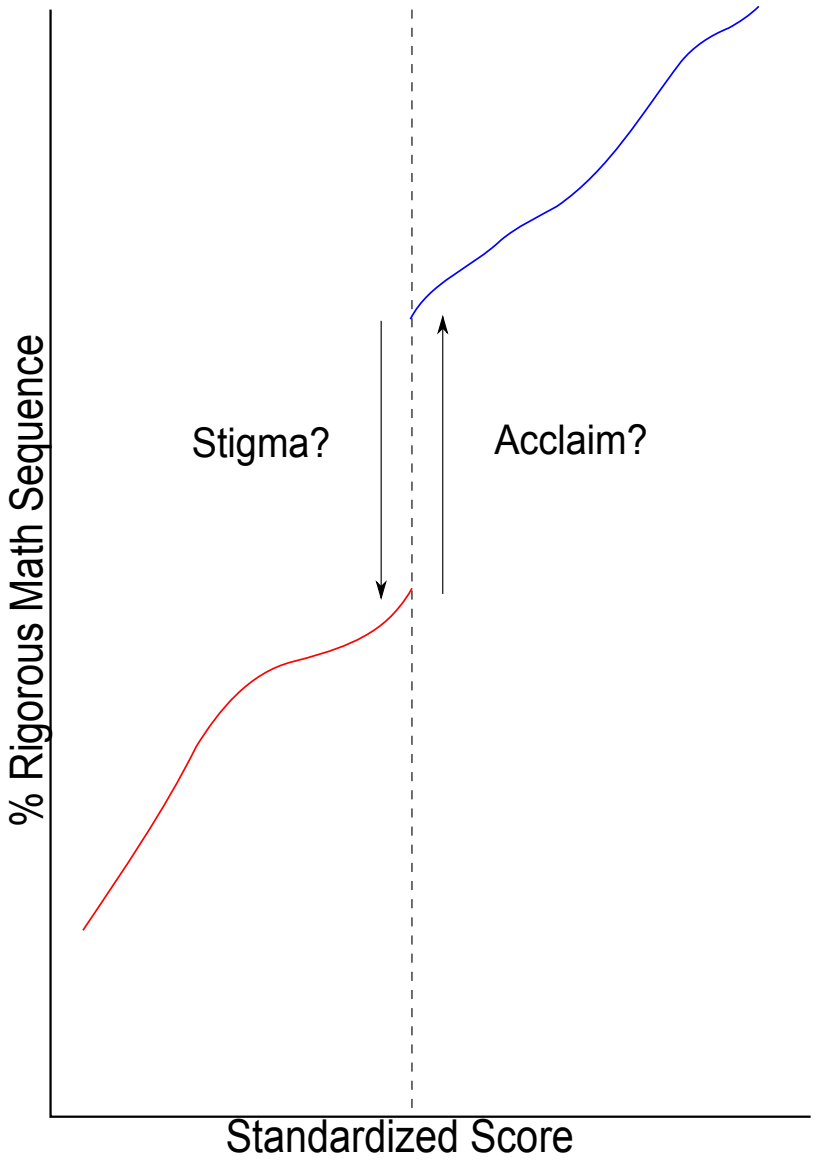
Table: Regression Discontinuity Results for Control

Outcome Measure	RD Effect (Std. Err)	Bandwidth
Take College Technical Prep or above	0.0136(0.0166)	1.511
	−0.0166(0.0235)	3.022
	−0.0035(0.0194)	4.155
Take University Prep	0.0440(0.0247)*	1.874
	−0.0048(0.0334)	3.748
	−0.0082(0.0240)	5.153

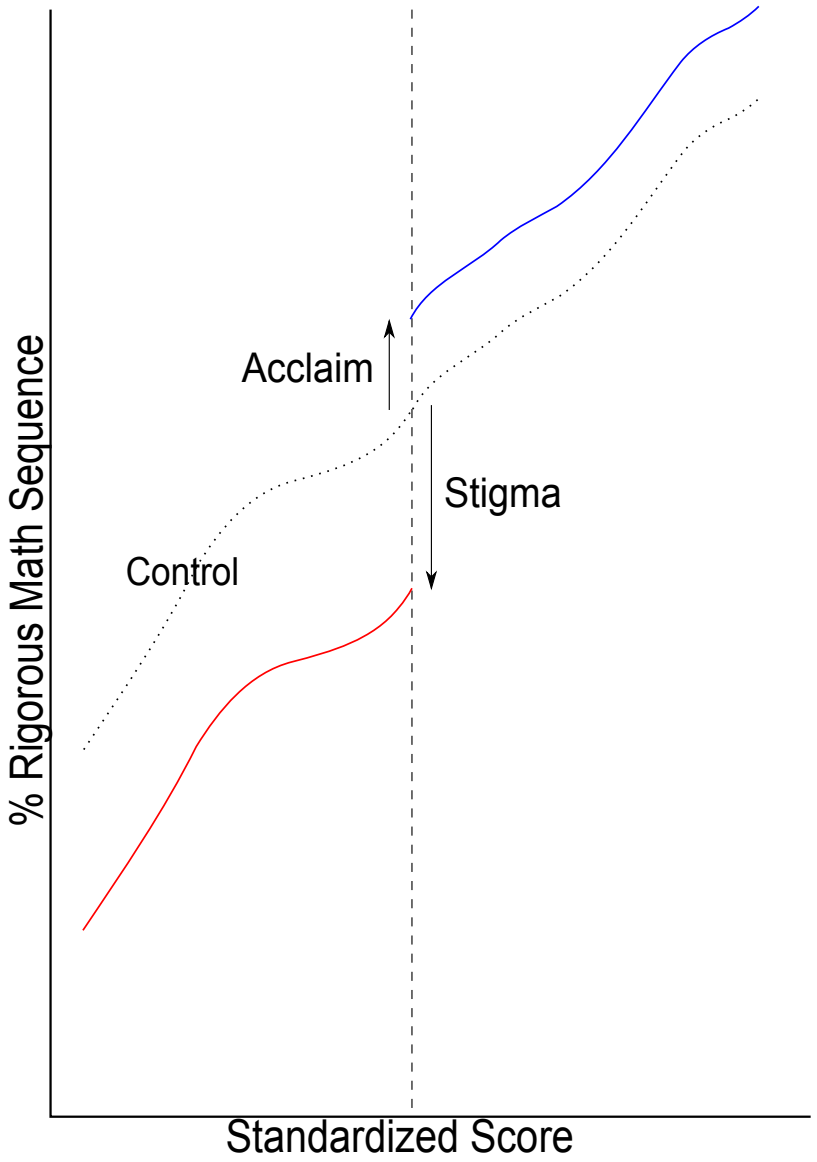
RD Explanation



Stigma or Acclaim?



Stigma or Acclaim?

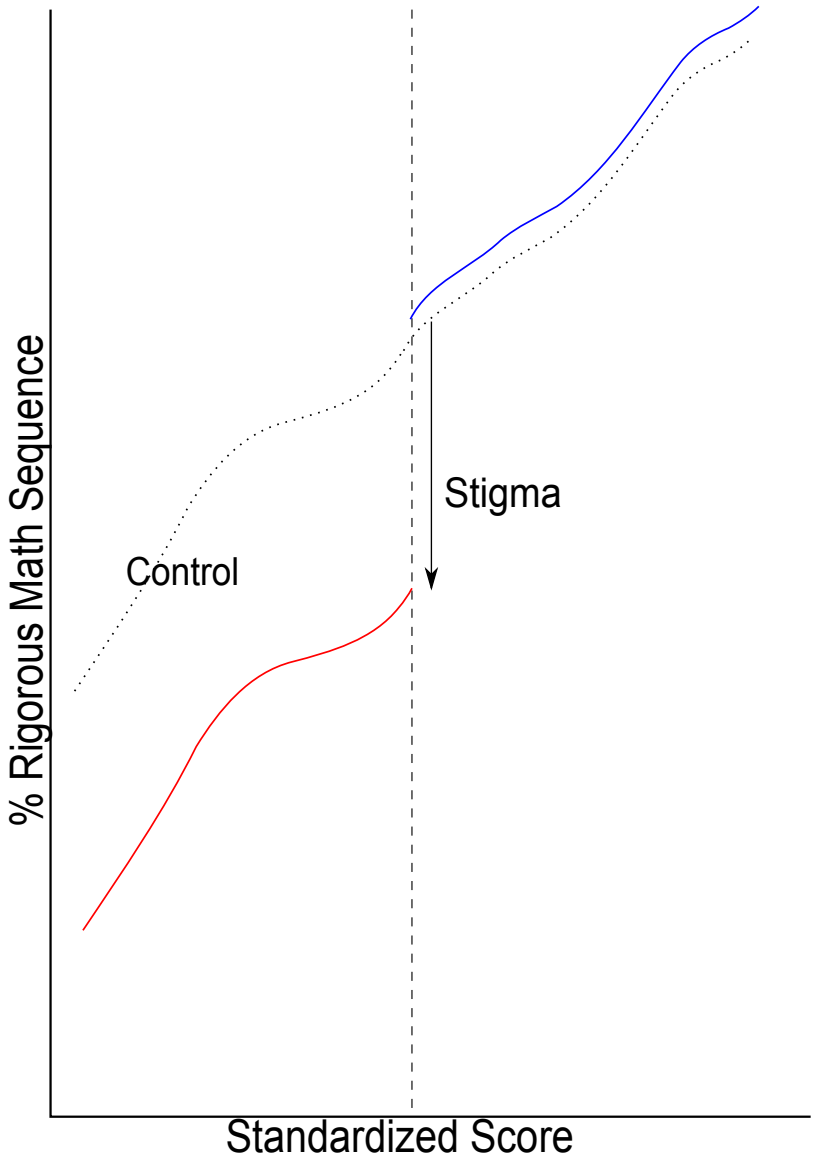


Results 3

Table: RD Results for Stigma vs. Acclaim: 9th Graders

Outcome Measure	RD Effect (Std. Err)	Bandwidth
$\tau_{acclaim}$	$-0.0027(0.0146)$	1.205
	$0.0294(0.0267)$	2.410
	$0.0136(0.0181)$	3.314
τ_{stigma}	$-0.0513(0.0167)^{***}$	1.616
	$-0.0472(0.0227)^{**}$	3.233
	$-0.0501(0.0190)^{***}$	4.445

Stigma or Acclaim? 9th grade



9th graders vs. 10th graders

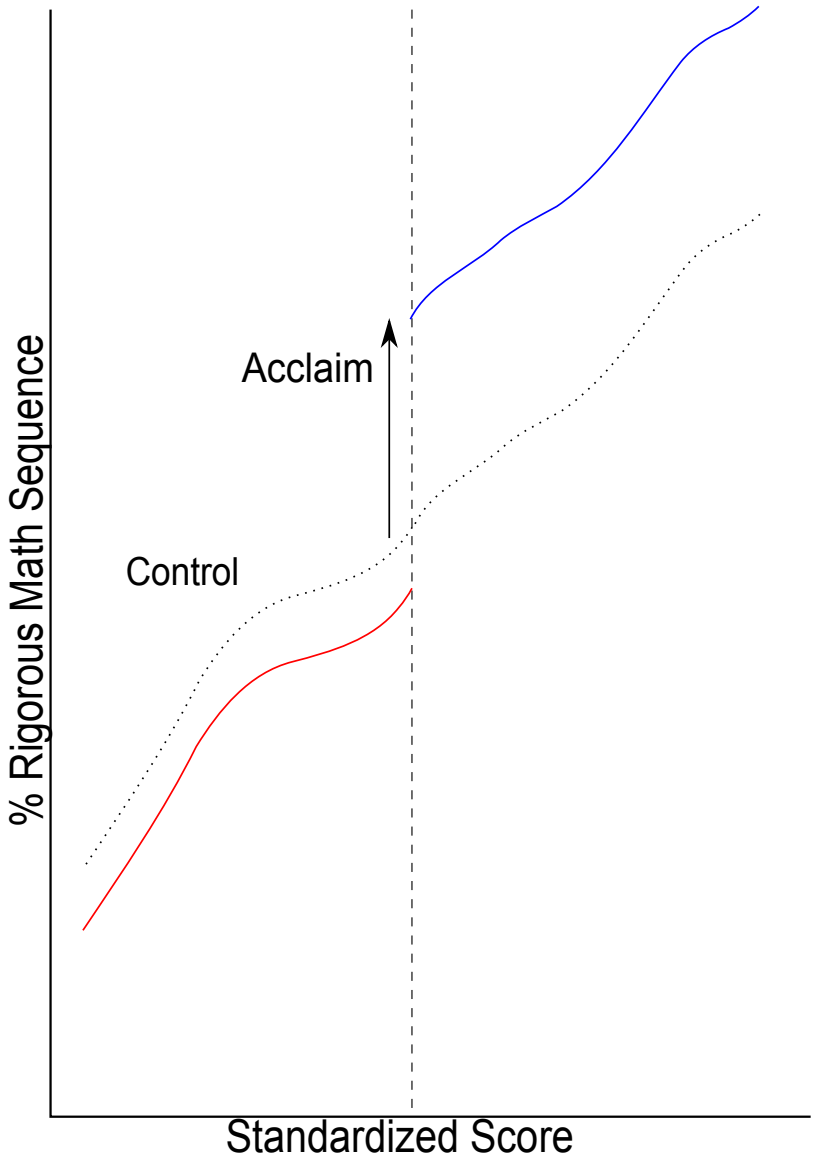
- Would a 9th grader and a 10th grader process failure/passing differently?
- 9th graders have had less signals on their academic potential compared to 10th graders.
- 10th graders taking the Algebra I EOC exam for the first time have had more negative signals on their academic potential.

Results 4

Table: RD Results for Stigma vs. Acclaim: 10th Graders

Outcome Measure	RD Effect (Std. Err)	Bandwidth
$\tau_{acclaim}$	0.0221(0.0317)	1.658
	0.0517(0.0414)	3.317
	0.0644(0.0307)**	4.560
τ_{stigma}	−0.0079(0.0324)	1.764
	−0.0197(0.0423)	3.528
	−0.0112(0.0340)	4.851

Stigma or Acclaim? 10th grade



Conclusion

	Just Fail	Just Pass
9th Grade	-5%	+0%
10th Grade	-0%	+5% (weak)

- A bad result from a high-stakes exam may serve as a demotivator for younger students with less information on their ability.
- A good result from a high-stakes exam may serve as a motivator for older students who were under the impression that they were of low-ability.
- An exam that discourages a ‘random’ set of students to forgo (or pursue) post-secondary education may be a ‘good’ thing.