

Is More Better?

The Impact on Student Success Due to a Policy Change for Placement in Developmental Mathematics Courses at a Community College

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Dissertation Committee

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Goals

- Community Colleges
- Placement Policies
- Primary Research Question
- Methodology
- Study Institution
- Preliminary Results
- Questions/Comments

Community Colleges

- Serve approximately forty percent of all undergraduate students enrolled in postsecondary education.
- Community colleges provide access to higher education for many nontraditional students, minority students, first-generation students, and students of low SES.

Open Admissions Policy

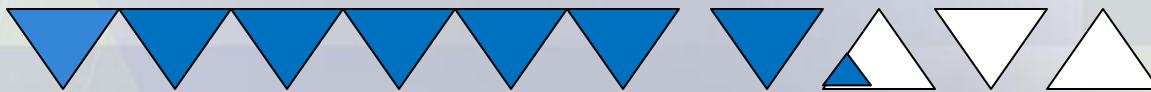
Students neither need to compete for admissions at a set time of year nor demonstrate a level of academic proficiency to enroll.

Note: Almost all community colleges practice open admissions.

- Many students arrive underprepared for college-level work.



Bettinger and Long (2009) as high as 6 out of 10
Achieving the Dream \approx 59% (Bailey, et al., 2010)



Study Institution \approx 72%

- Central mission of community colleges includes providing developmental coursework.

Developmental Courses

aim to prepare the underprepared student with the skills needed to succeed in college-level classes (English, Reading, and Math).

In other words: developmental courses seek to make students 'college-ready'.

...What is college-ready????

**Assessing Preparedness
Institutional Policy?
State Agreement?**

*The placement exam has become “the key academic gatekeeper to postsecondary study.” **

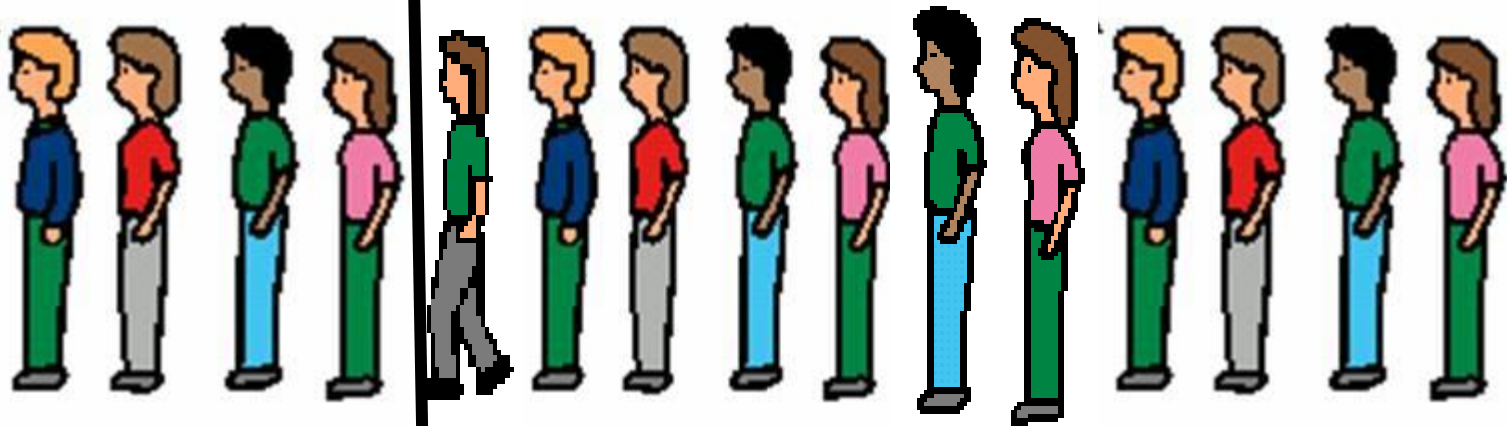
Access and Opportunity



*Bettinger and Long, 2009

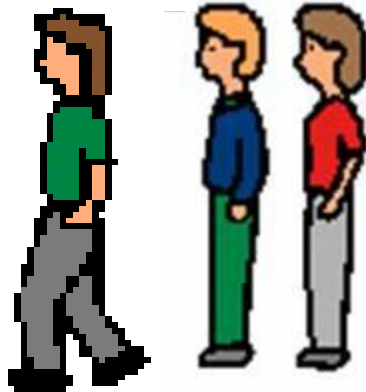
Credit

Developmental

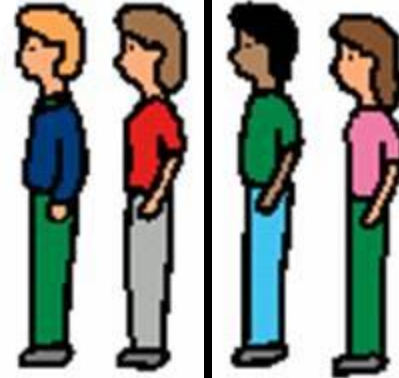
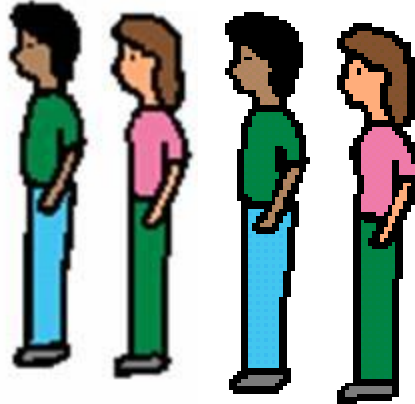


Placement Cutoff Scores

Two Levels



Three or More Levels



Prior Research on Effectiveness of Developmental Courses

- Surprisingly sparse.
- Methodological flaws (selection bias issues) small samples.
- Large scale studies in Ohio, Florida, and Texas*
Focus: Majority focus on credit/non-credit divide
Research did not conclude that completing developmental coursework led to an increase in success in the college-level math course.

*(Bettinger and Long, 2009) (Martorell and McFarlin, 2008) (Calcagno, 2007)

Recent Study: Boatman and Long (2011)

- Tennessee Data
- Examined multiple cutoff points
- Impact of developmental courses differed by level of student preparation

Study Institution

- Community College -suburban, multi-campus.
- Provides postsecondary education to more than half of college-bound high school graduates in the county.
- Majority female students.
- Minority enrollment approximately 40%.

Instrument - ACCUPLACER

Placement

The background features a large, central, light-colored oval shape that is semi-transparent, revealing the underlying colors. This oval is surrounded by various other translucent shapes, including a large green shape on the left, a purple shape at the top, and a blue shape at the bottom. The overall effect is a layered, geometric composition with soft, blended colors.

Placement

- Continuing education



Placement

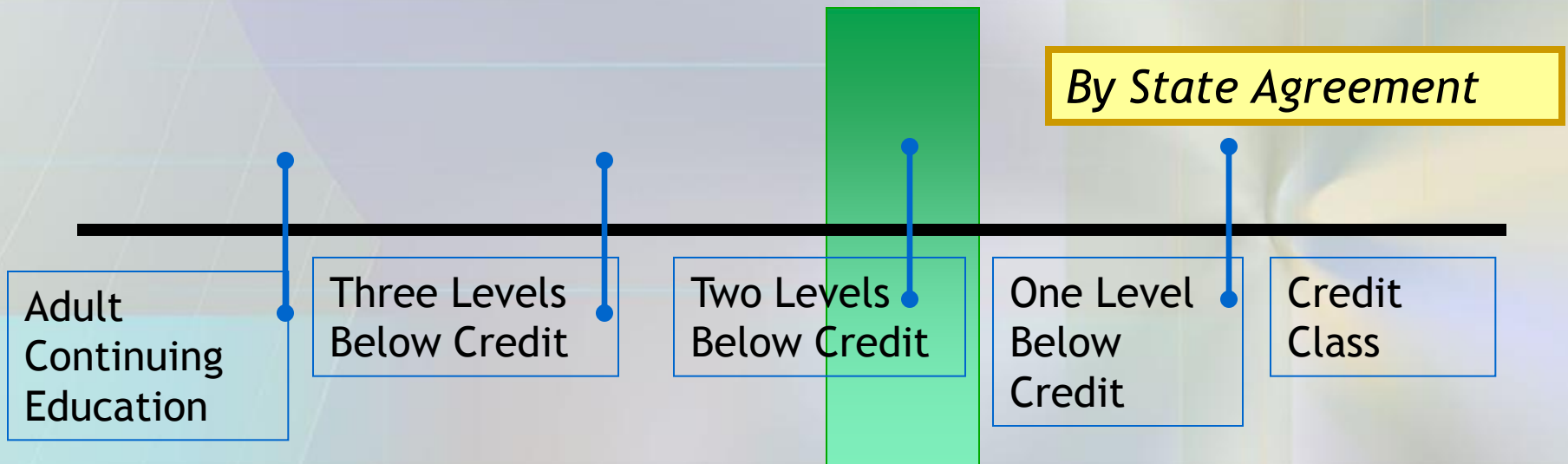
- Continuing education
- 3 Levels Below Credit
- 2 Levels Below Credit
- 1 Level Below Credit

Placement

- Continuing education
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Placement

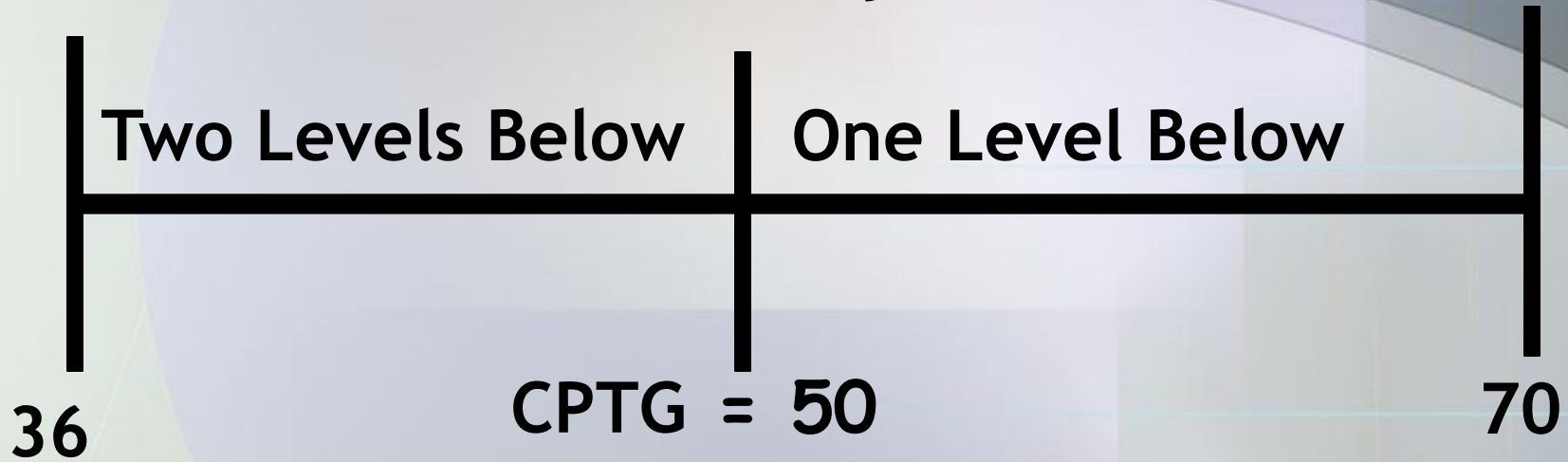
- Continuing education
- 3 Levels Below Credit
- 2 Levels Below Credit
- 1 Level Below Credit
- Credit



ACCUPLACER CUTOFF SCORES

Cont. Ed.	Three Levels Below	Two Levels Below	One Level Below	Credit
	CPTG: Below 36	CPTG: 36 - 49	CPTG: 50 - 69	CPTG: 70 - 120
	<p>Post-Policy: Scores upwardly adjusted.</p>		OR CPTG \geq 70	AND
			AND CPTM $<$ 45	CPTM: 45 - 69
CPTG: 20 - 43	CPTG: 20 - 43	CPTG: 44 - 64	CPTG: 65 - 69	CPTG: 70 - 120
AND	AND		OR	AND
CPTA: 20 - 31	CPTA: 32 - 120		CPTG \geq 70 AND CPTM $<$ 45	CPTM: 45 - 69

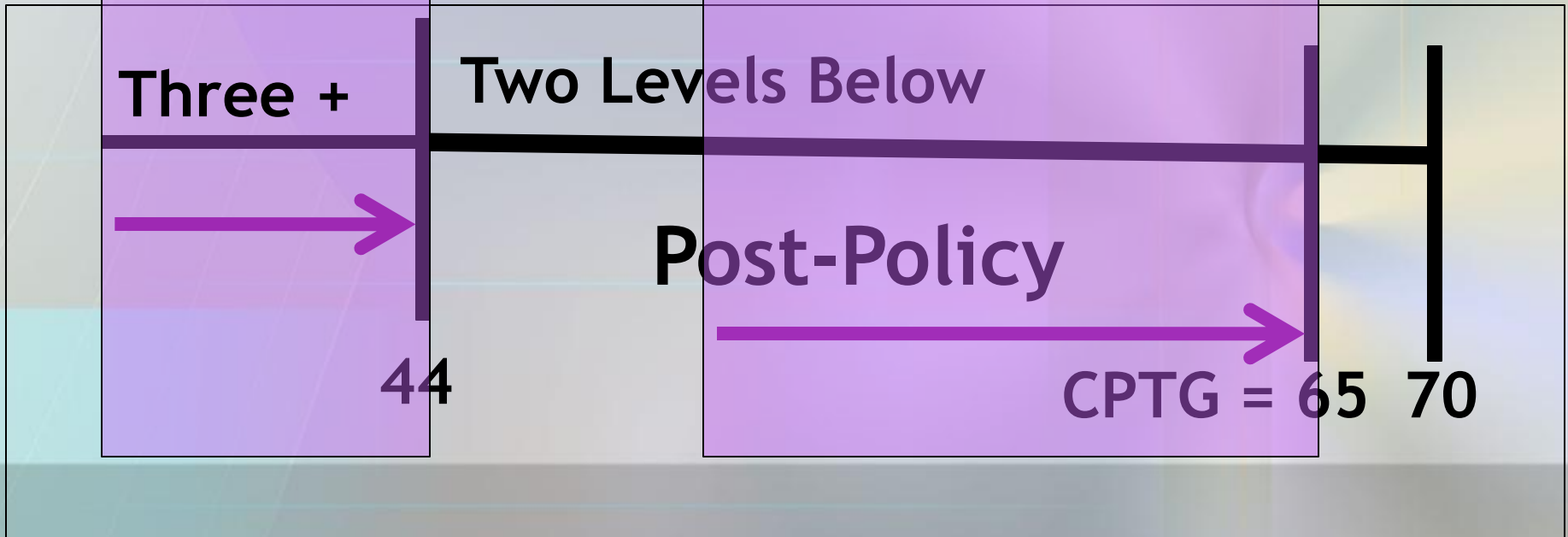
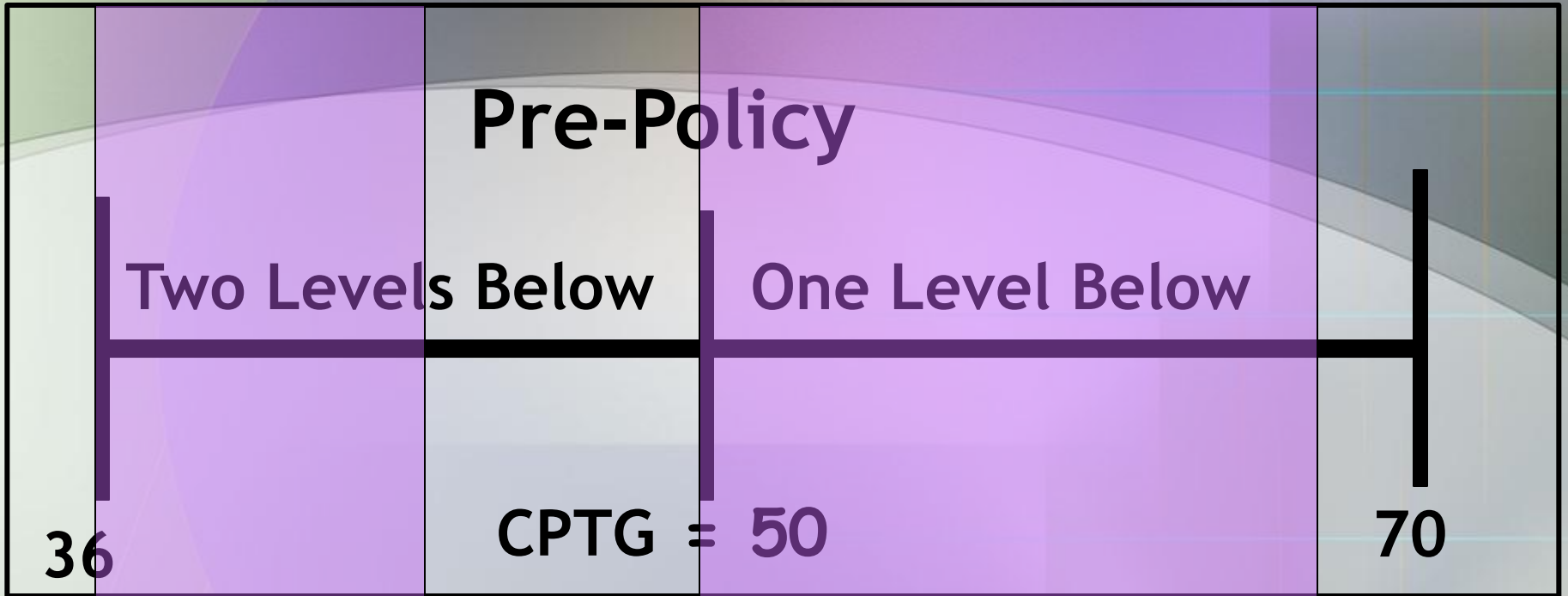
Pre-Policy



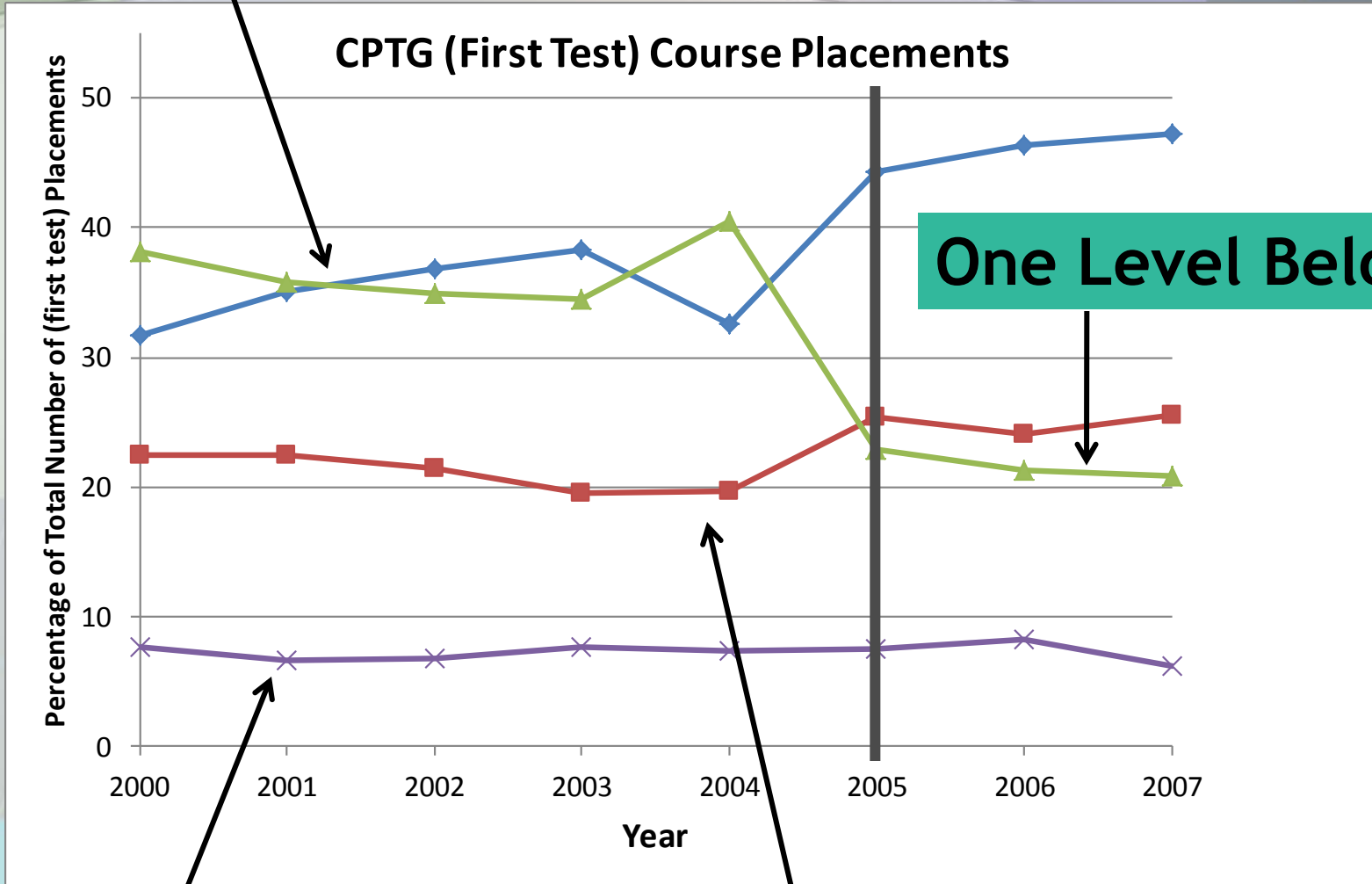
Two Levels Below

Post-Policy





Three Levels Below



Credit Class

Two Levels Below

Placement	Pre-Policy	Post-Policy
Three or More Levels Below	34.9%	↑ 46.7%
Two Levels Below	21.0%	↑ 25.0%
One Level Below	36.8%	↓ 21.0%
Credit	7.3%	7.3%

<u>Placement</u>	<u>Pre-Policy</u>	<u>Post-Policy</u>
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Credit	7.3%	7.3%

Primary Research Question: *What was the impact on student success due to the change in the institutional placement policy for developmental math courses ?*

- Entered college in time period:
Fall 2000 to Fall 2007

- ACCUPLACER

- New or Transfer
Student

- Placed two-levels below
or one level college-level
math

- 18 to 23 years of age

- Graduated from High School (*45 day window*)

- At time of registration provided
an in-State address

The analysis tracks cohorts of students for a period of three years or 15 terms including summer and winter terms.

Outcomes

- Eligible to enroll in a Credit Class
- Enrolled in a Credit Class
- Successfully complete a Credit Class

	Full Sample	Full Pre-Policy	Full Post-Policy
Age (years)	19.32	19.3	19.32
std	1.41	1.86	1.86
HH_inc (Md per 10,000)	5.01	5.03	4.98
std	1.86	1.86	1.86
Minority	0.41	0.37	0.46
Female	0.54	0.55	0.53
New	0.92	0.92	0.84
Retester	0.34	0.30	0.41
N	16,932	10,899	6,033

The Control Group for Analysis

Simple comparison of developmental to non-developmental students is biased.

Comparison of completers to non-completers of developmental sequence is biased.

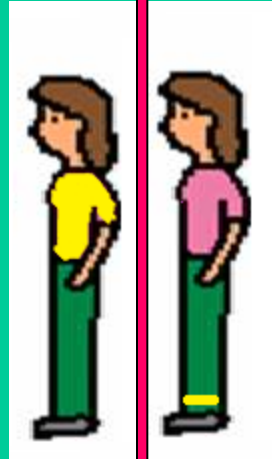
Life Has Arrived...

Regression Discontinuity Design

(Cook, 2007)

Treatment Group

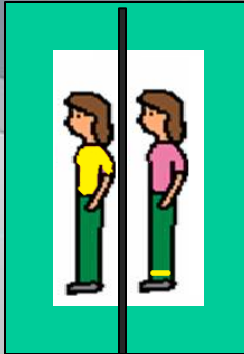
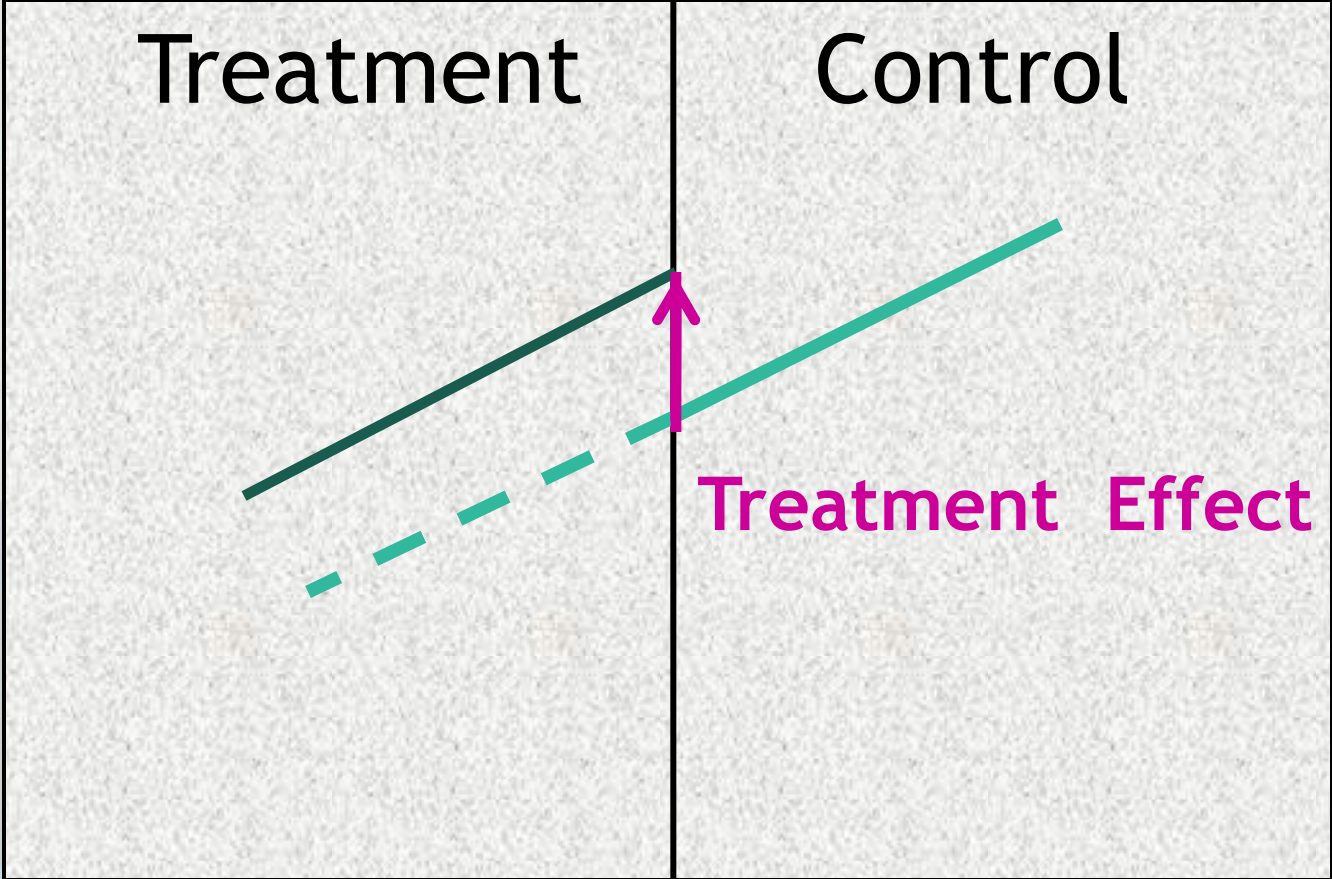
Control Group



Students who score
just above the
placement cutoff
characteristics.

just below the
are similar in ability and

Running (Forcing) Variable



Cutoff Score

Sharp RD (Perfect Compliance)

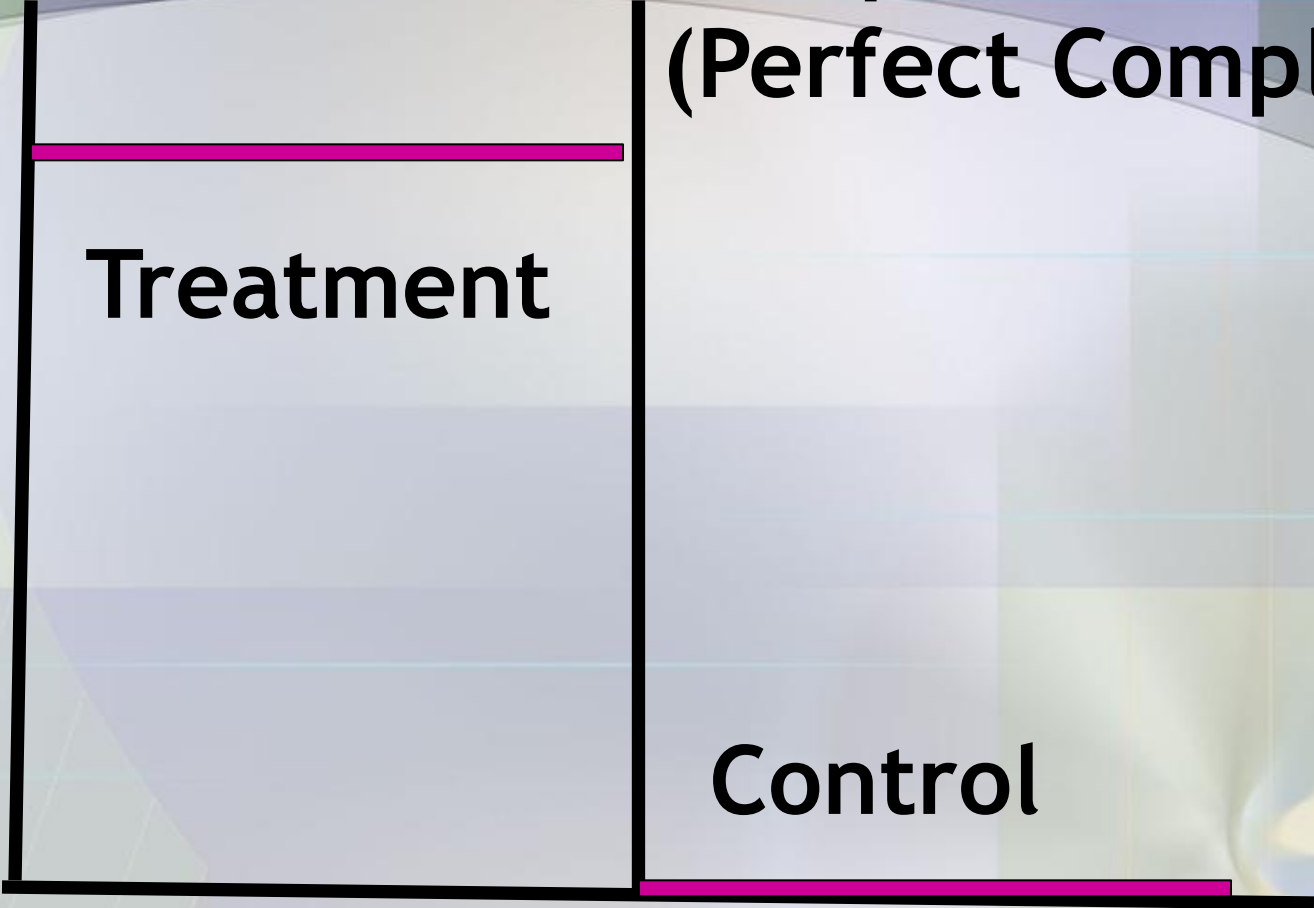
1.00

Treatment

0.00

Control

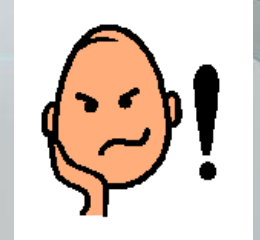
Cutoff Score for Placement



Fuzzy RD

Non-Compliance: Not everyone follows the rules.

Do not receive treatment when assigned to treatment.



Receive treatment when assigned to the control group.

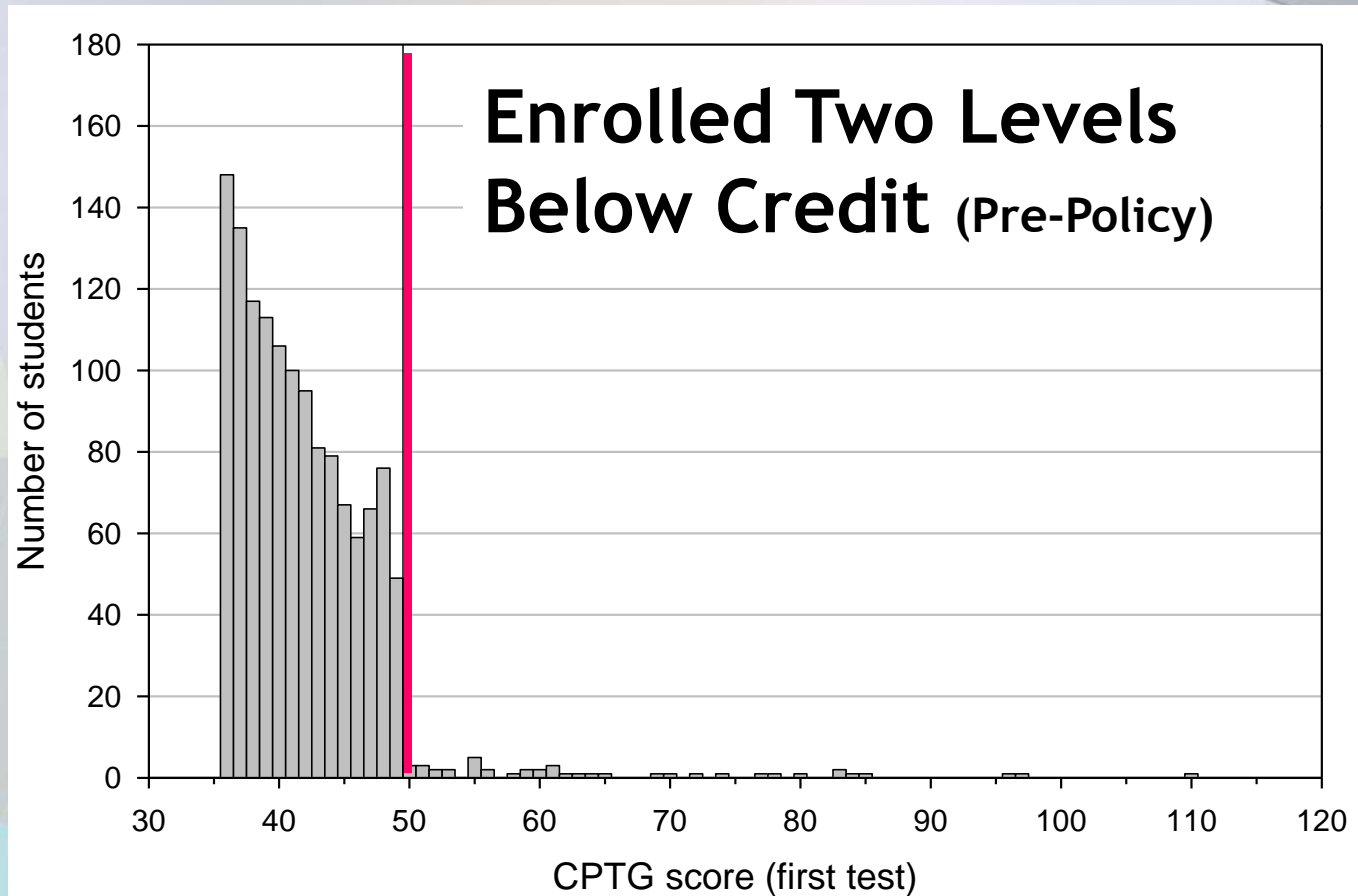
A Fuzzy RD no longer has an individual's probability of treatment and control of 100% and 0% to the right and left of the cutoff.

Employ 2SLS

Estimate of RD is a LATE for compliers- students who enrolled in developmental class.

Results interpreted for students at the cutoff not all students.

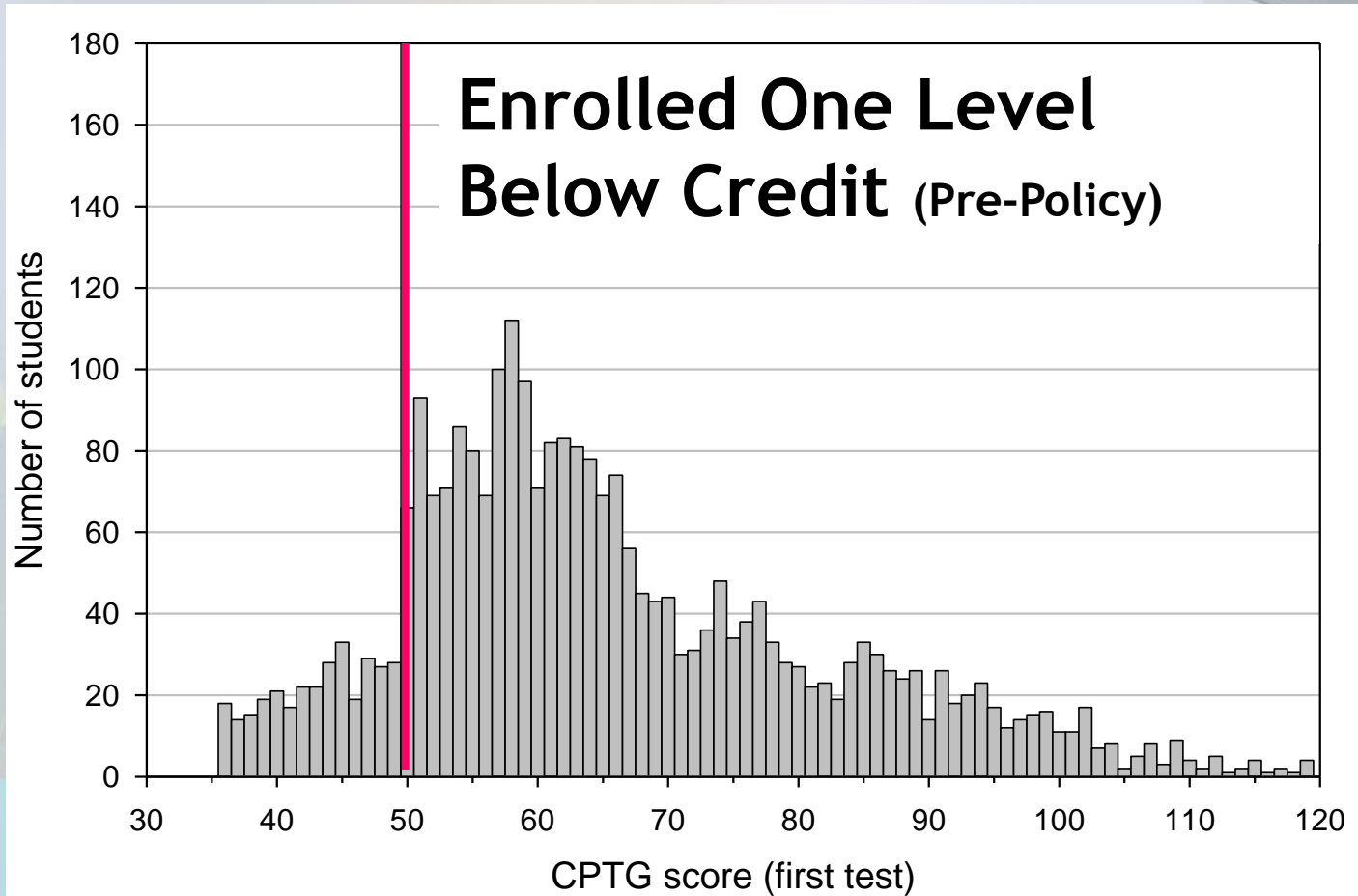
Raw Distribution of CPTG Scores



Treatment

Control

Raw Distribution of CPTG Scores



Precise or Imprecise Control?

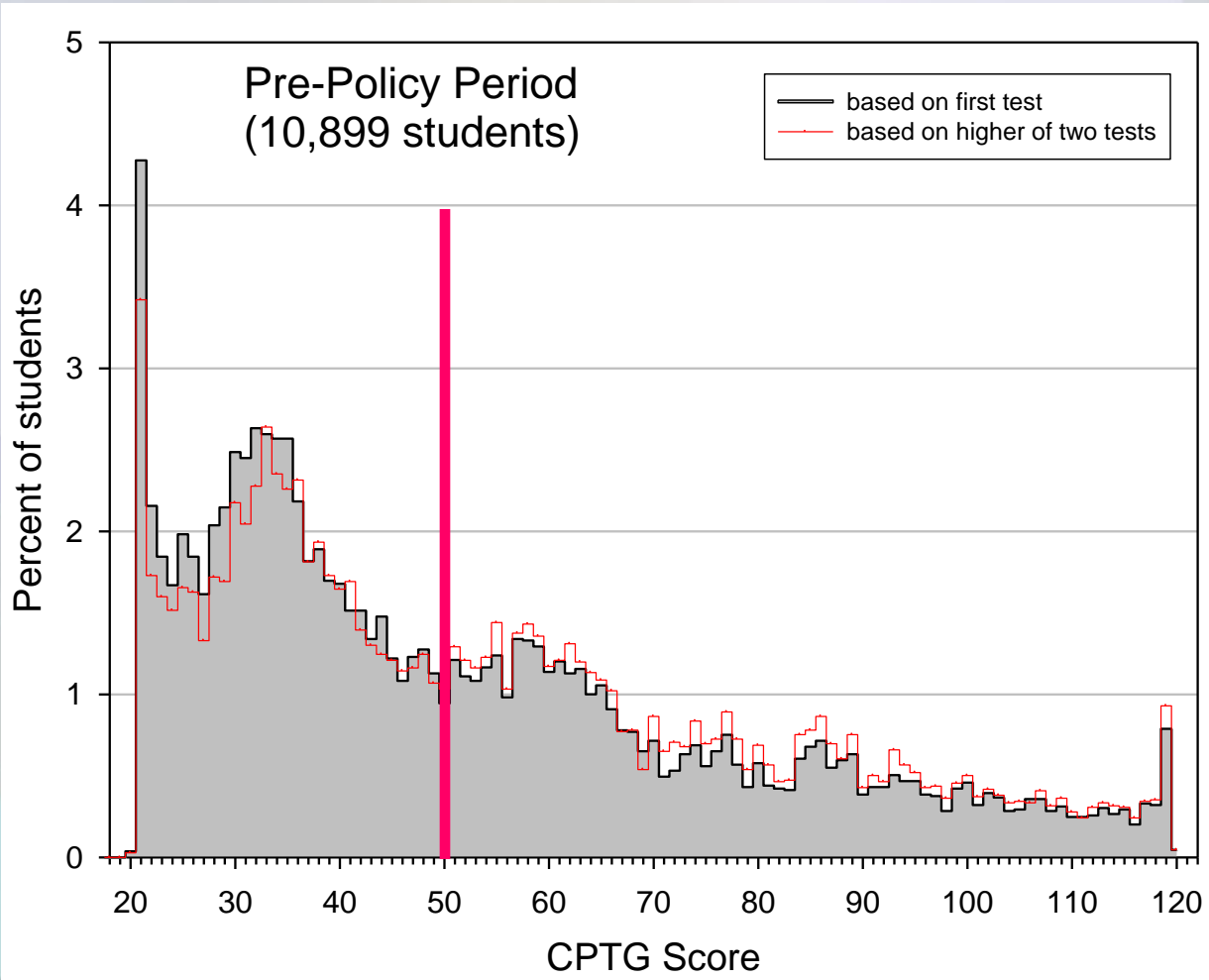
	Pre-Policy	Post-Policy
Placed Higher	0.31	0.30
No Change	0.60	0.62
Placed Lower	0.09	0.08
Retest	0.31	0.40
n	3384	2680

Precise or Imprecise Control?

	Pre-Policy	Post-Policy
Placed Higher	0.31	0.30
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Retesting Opportunity

Retesting



Econometric Model

Stage 1

$$\text{Enrolled}_i = \alpha + \beta(\text{Assigned}_i) + \delta_1(\text{Centered_Score}_i) + \delta_2(X_i) + \varepsilon_i$$

Enrolled = enrolled in developmental class

Assigned = placement

Centered_Score = CPTG-cuttoff

X = covariates

Median_HH_inc Age

Female Minority

Full-time New/Transfer

Stage 2

$$Y_i = \varphi + \tau(\widehat{\text{Enrolled}}_i) + \beta_1(\text{Centered_Score})_i + \delta_2(X_i) + u_i$$

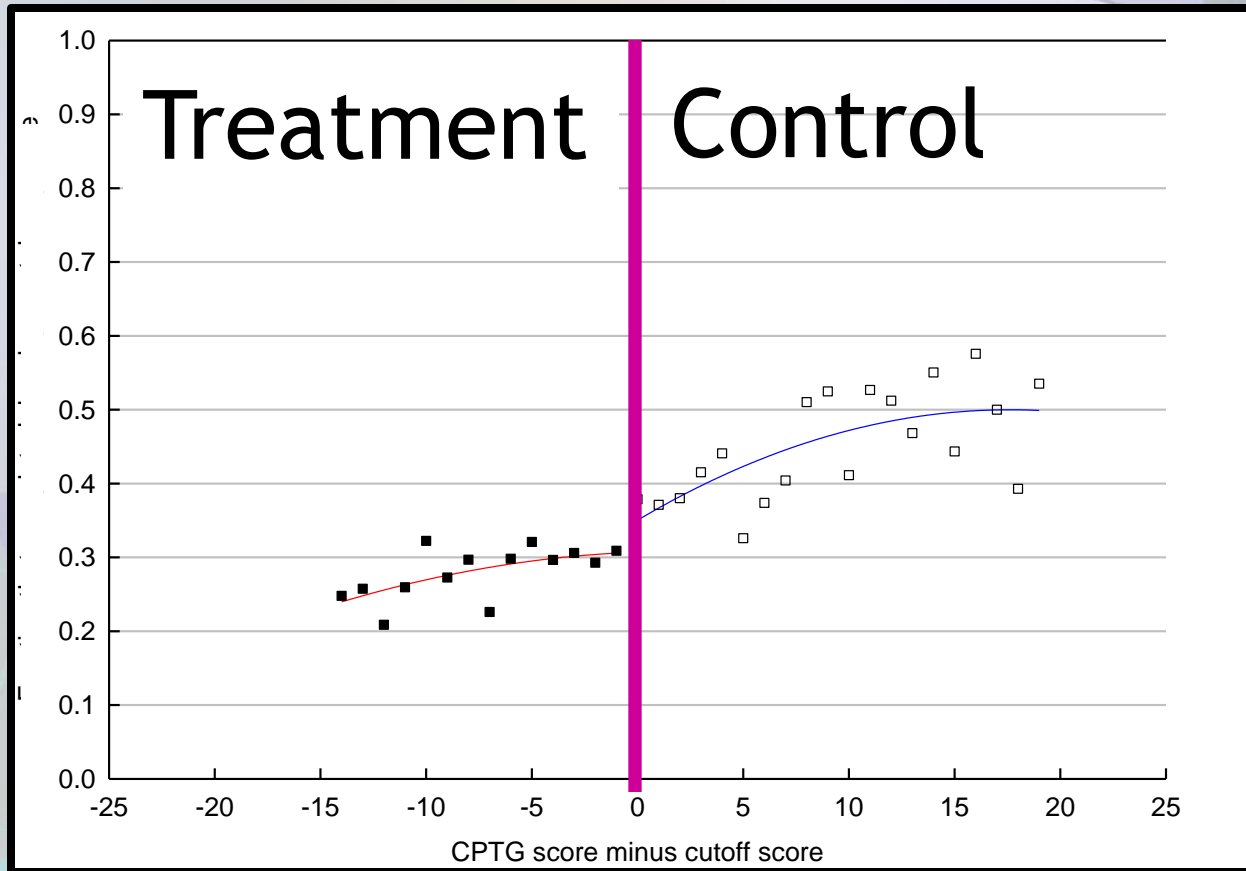
Y = Outcome

Enrolled = Predicted Probability from Stage 1

τ = Local Average Treatment Effect from RD-IV

A Picture Speaks a 1000 Words...

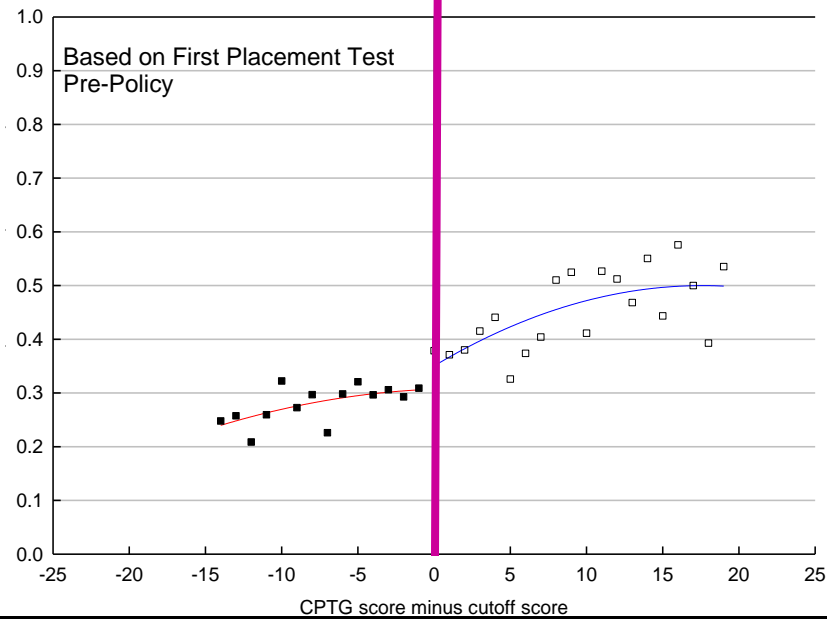
TRANSPARENCY



Challenge: Functional Form

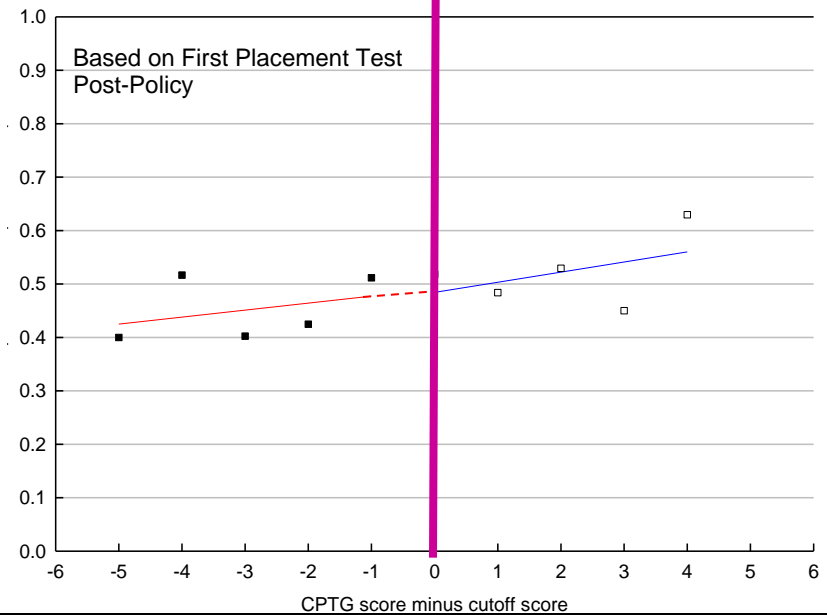
Sensitivity Testing, Covariates, Limited Range, Cluster SE.

Outcome: Eligible for Credit Class by First CPTG Score

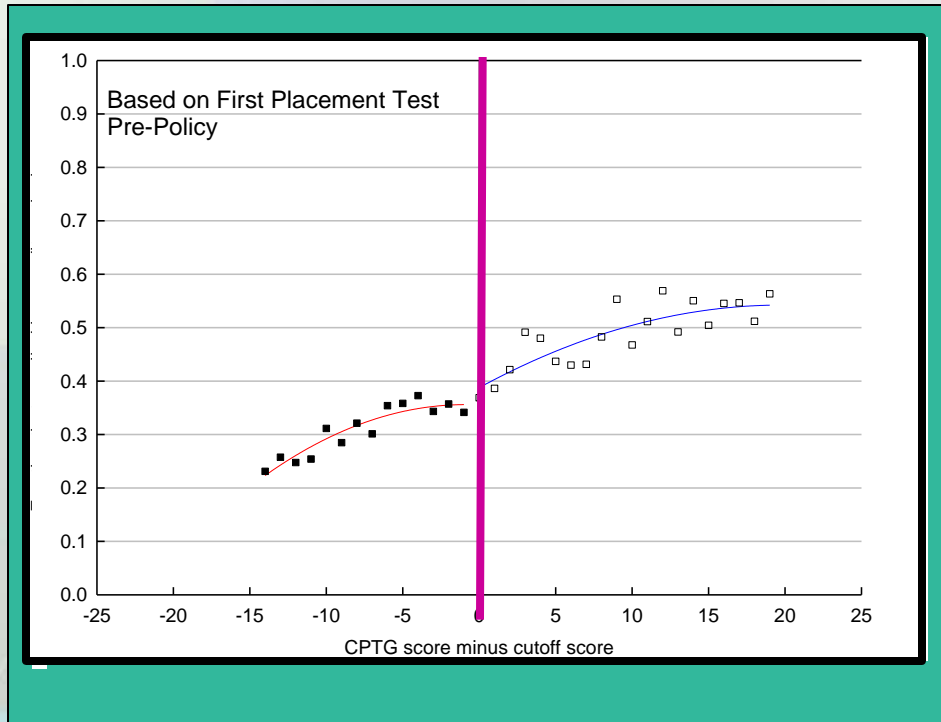


Pre-Policy

Post-Policy



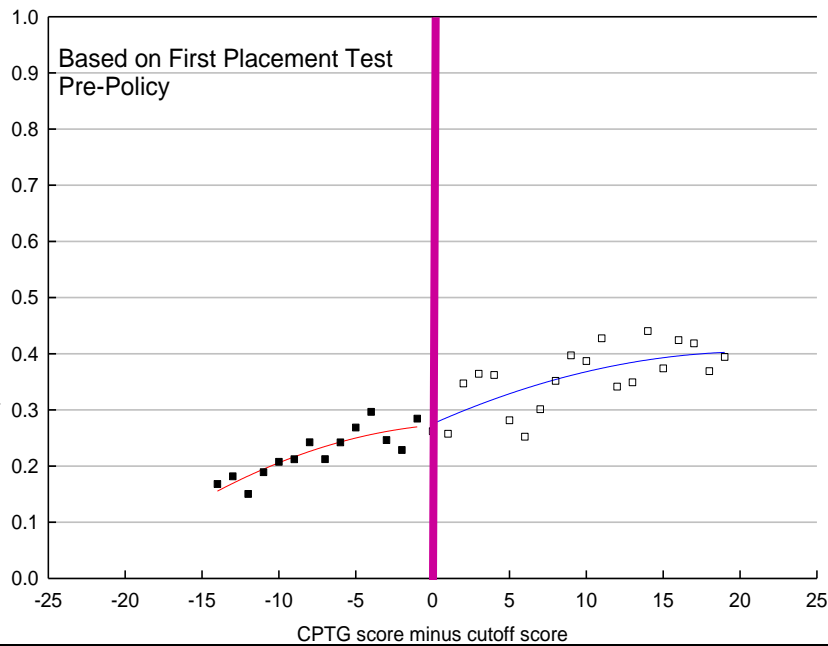
Outcome: Enrollment in Credit Class by CPTG



Pre-Policy

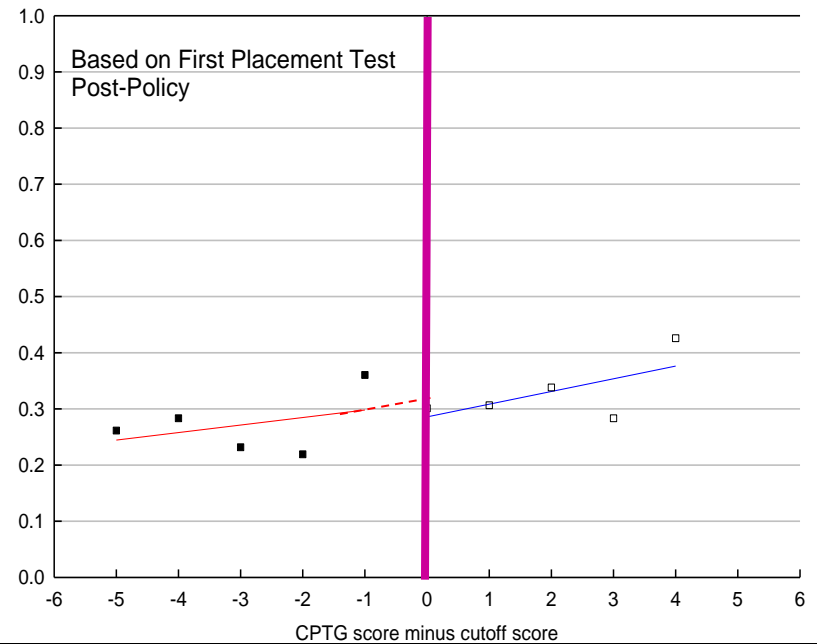


Outcome: Successful Completion of Credit Class by CPTG



Pre-Policy

Post-Policy



- All models will be run with the initial score and high score.
- Retesters will be analyzed in a separate model.
- Final Results in Fall, 2011.

Acknowledgement
Association Institutional Research
2010 Dissertation Grant

Questions...Comments
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