9) Fuzzy Regression Discontinuity Design

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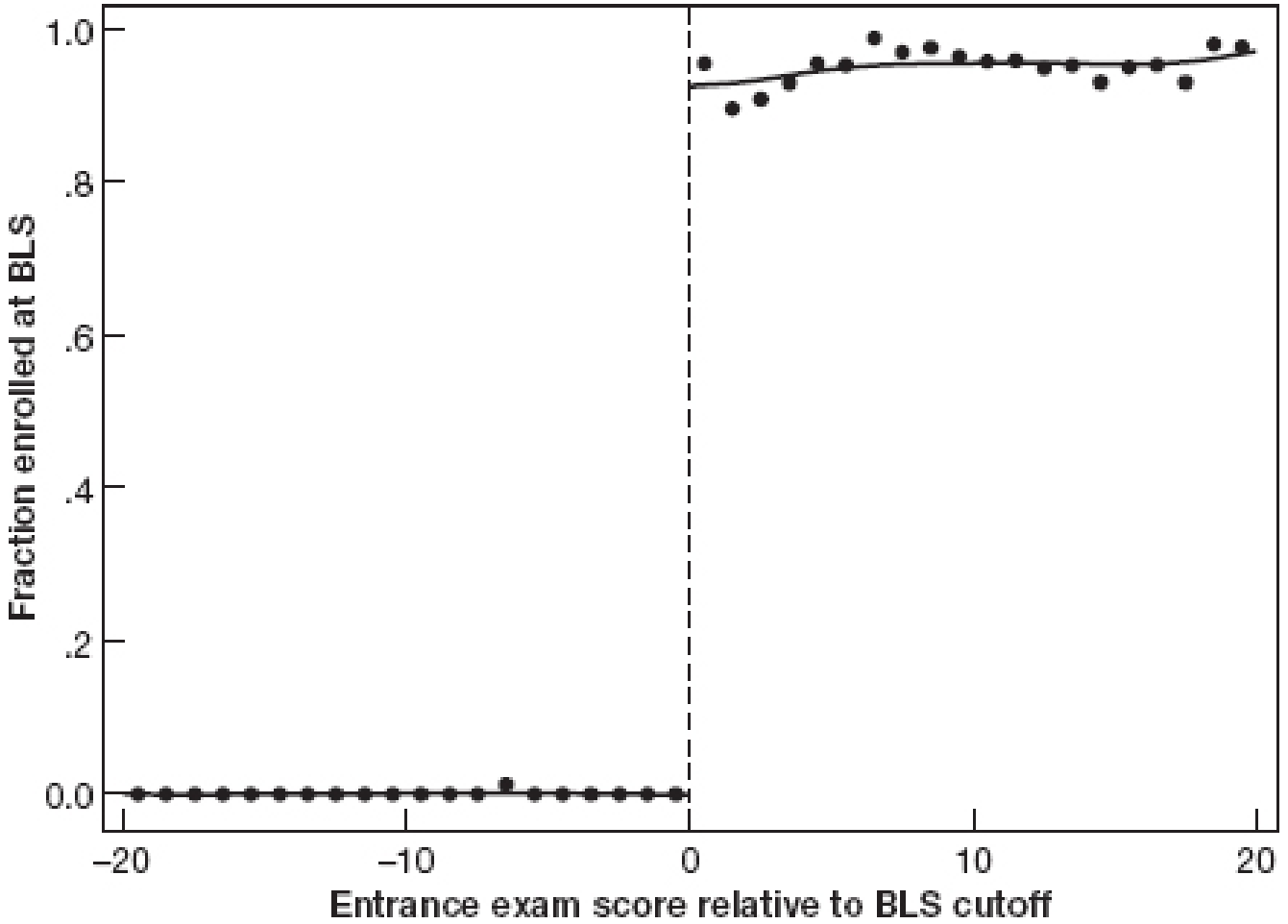
Reference

Tables, Graphics, and Figures from

Mastering 'Metrics: The Path from Cause to Effect

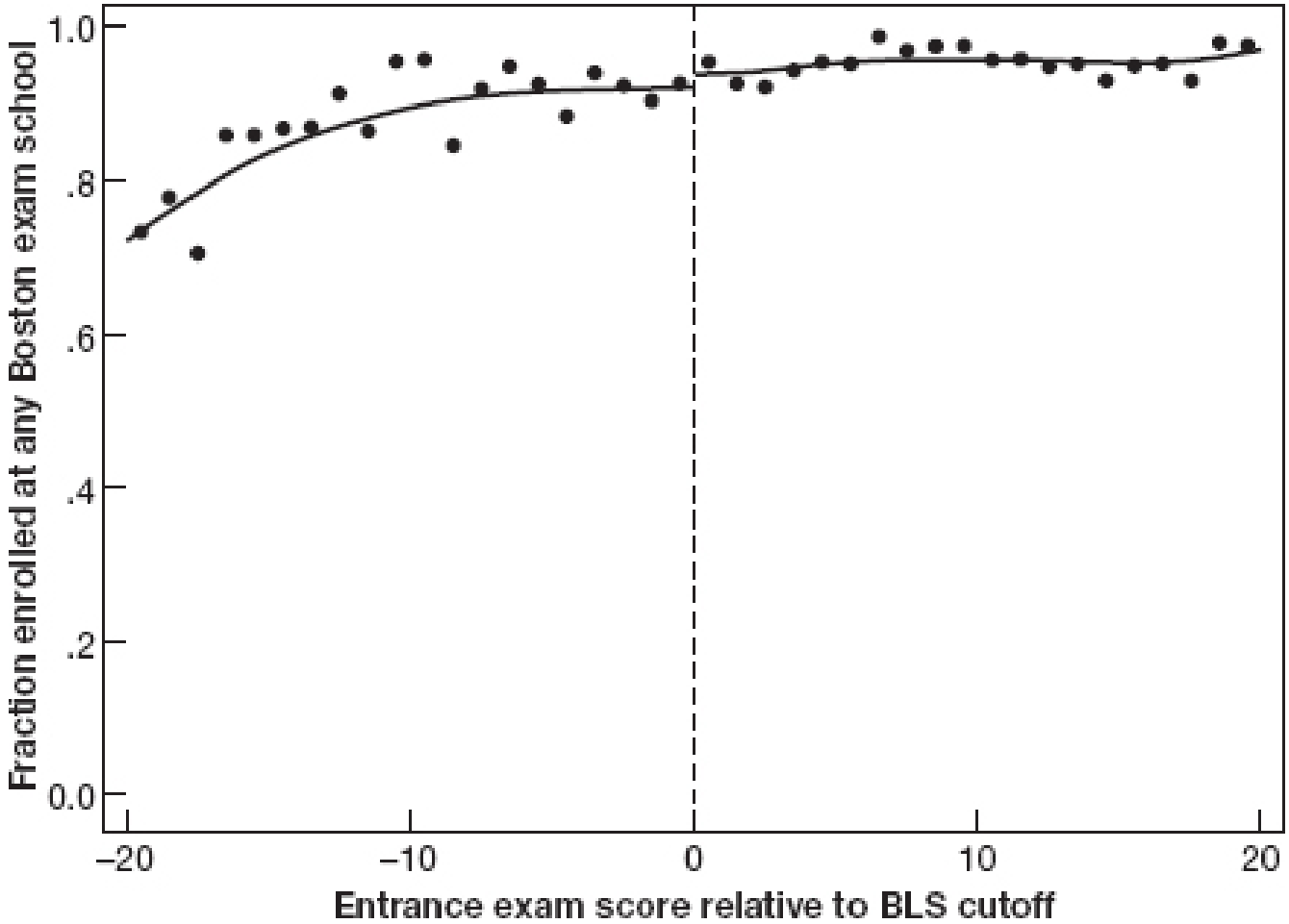
Angrist & Pischke (2014): Chapter 4

Fuzzy RD: Enrollment at BLS (Boston Latin School)



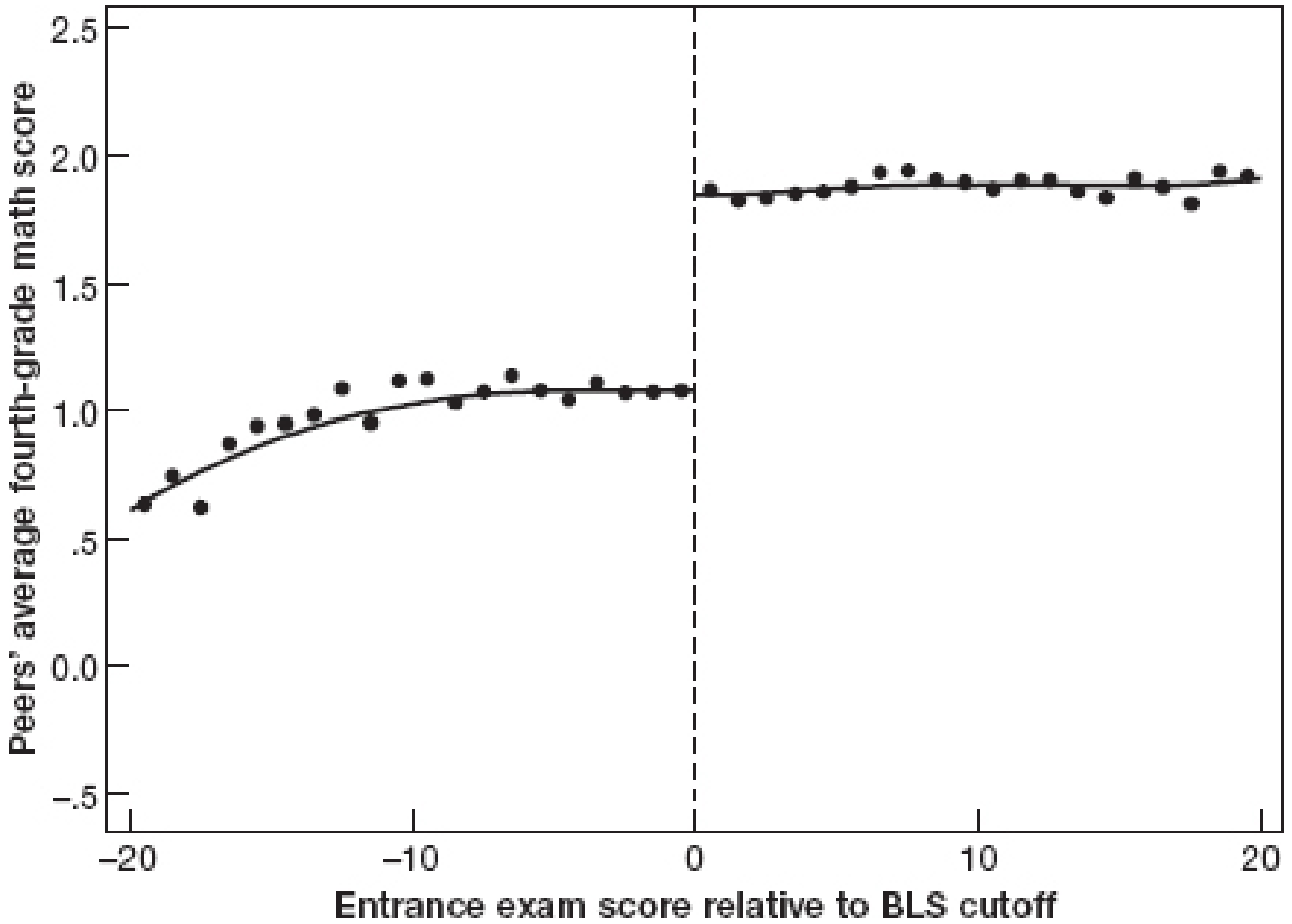
Angrist & Pischke (2014)

Enrollment at any Boston Exam School



Angrist & Pischke (2014)

Peer Quality around the BLS Cutoff



Angrist & Pischke (2014)

OLS - Peer Effect

$$Y_i = \theta_0 + \theta_1 \bar{X}_{(i)} + \theta_2 X_i + u$$

Y_i: student i's seventh-grade math score

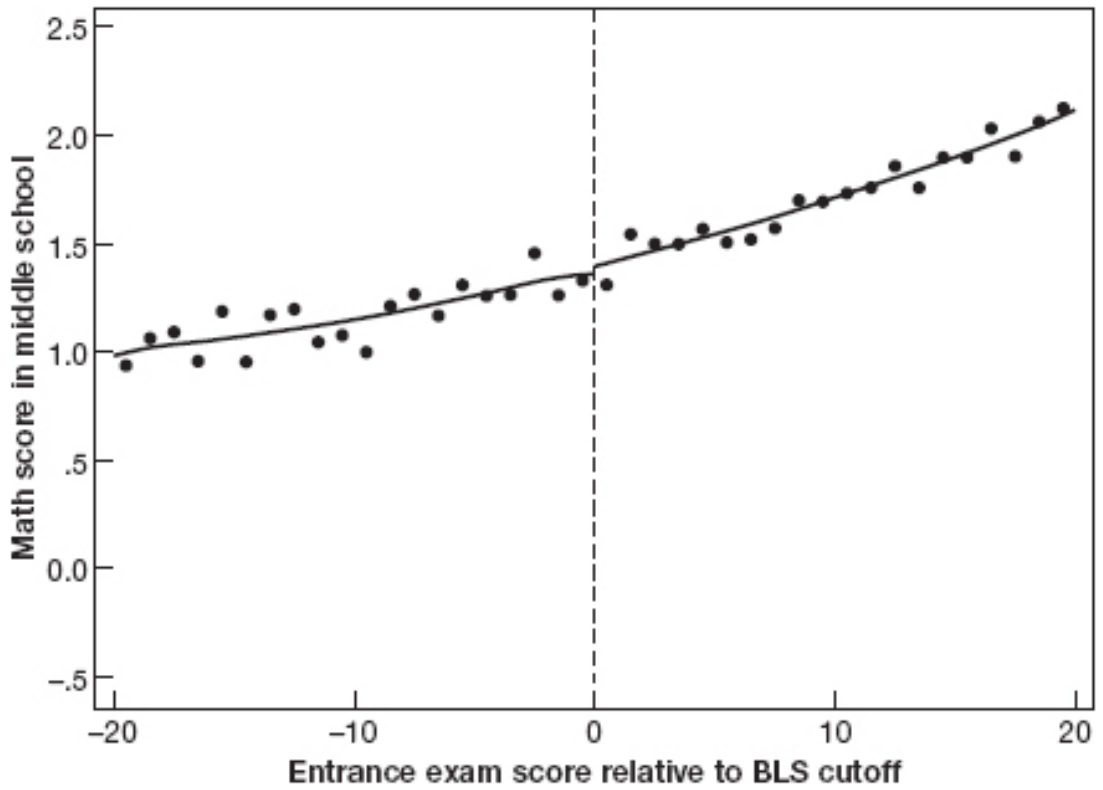
X_i: i's fourth-grade math score

$\bar{X}_{(i)}$: average fourth-grade math score of i's seventh-grade classmates

$$\hat{\theta}_1 = .25$$

Math Scores around the BLS cutoff

$$Y_i = \alpha_0 + \rho D_i + \beta_0 R_i + e_{0i}$$



Angrist & Pischke (2014)

$$\hat{\rho} = -.02 \text{ and } se = .1$$

Fuzzy RD is IV

$$\bar{X}_{(i)} = \alpha_1 + \phi D_i + \beta_1 R_i + e_{1i}$$

$$\hat{\phi} = .8\sigma$$

$$Y_i = \alpha_2 + \lambda \hat{\bar{X}}_{(i)} + \beta_2 R_i + e_{2i}$$

$$\hat{\lambda}_{2SLS} = -.023 \text{ and } se = .132$$

Angrist and Lavy (1999)

$$Y_{isc} = \alpha_0 + \alpha_1 d_s + \beta_1 e_s + \beta_2 e_s^2 + ... + \beta_p e_s^p + \rho n_{sc} + \eta_{isc}$$

Y_{isc}: student i's test score in school s and class c

n_{sc}: size of class

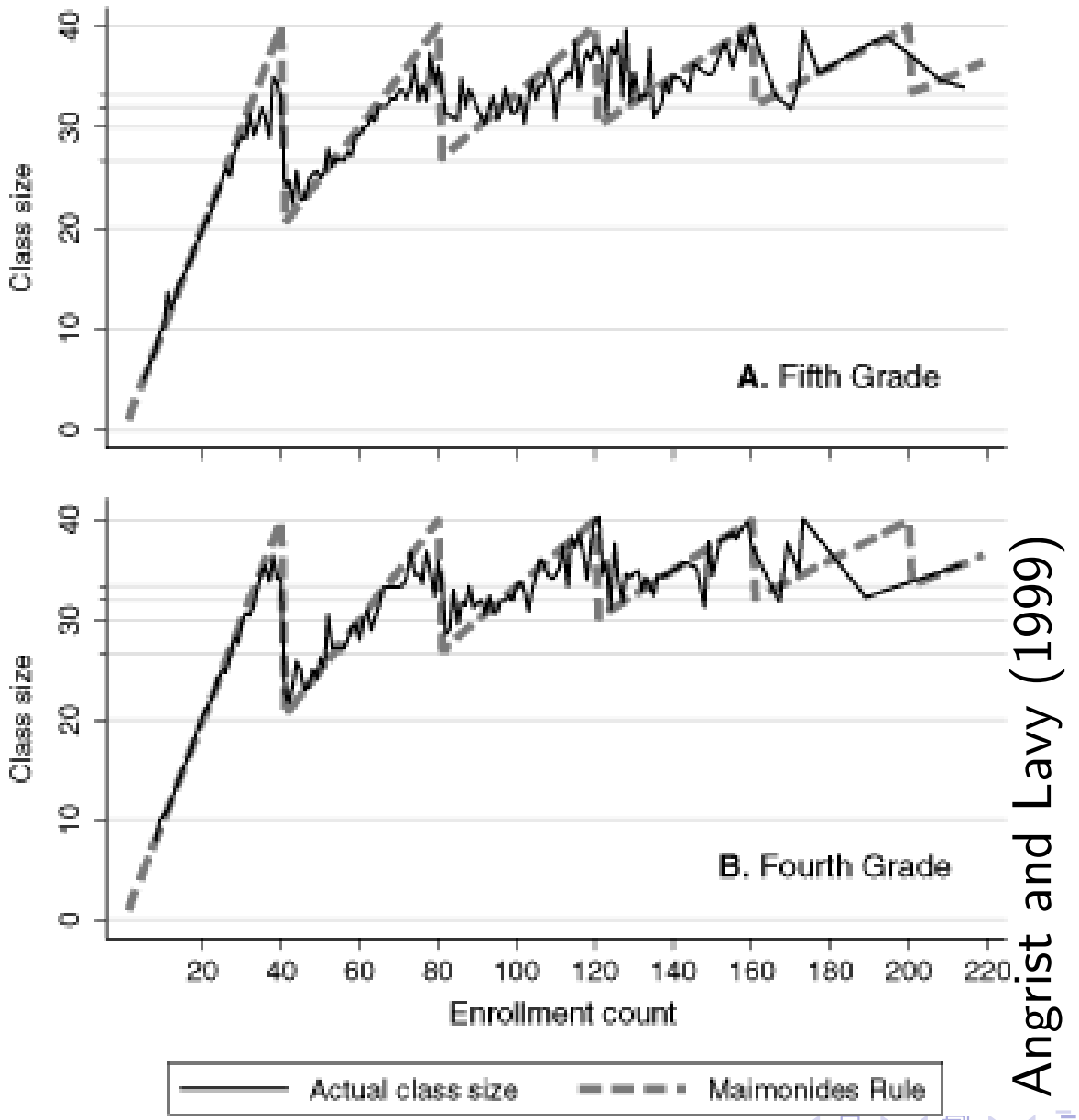
e_s: enrollment

d_s : proportion of disadvantaged students

m_{sc}: Maimonides' rule

$$m_{sc} = \frac{e_s}{int[\frac{(e_s - 1)}{40}] + 1}$$

Maimonides' Rule



Angrist and Lavy (1999)

OLS and Fuzzy RD Estimates of the Effect of Class Size on Fifth-Grade Math Scores

	OLS			2SLS				
				Full Sample		Discontinuity Samples		
						±5		±3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean score		67.3		67.3		67.0		67.0
(SD)		(9.6)		(9.6)		(10.2)		(10.6)
Regressors								
Class size	.322	.076	.019	−.230	−.261	−.185	−.443	−.270
	(.039)	(.036)	(.044)	(.092)	(.113)	(.151)	(.236)	(.281)
Percent disadvantaged		−.340	−.332	−.350	−.350	−.459	−.435	
		(.018)	(.018)	(.019)	(.019)	(.049)	(.049)	
Enrollment			.017	.041	.062		.079	
			(.009)	(.012)	(.037)		(.036)	
Enrollment squared/100					−.010			
					(.016)			
Segment 1 (enrollment 38–43)								−12.6
								(3.80)
Segment 2 (enrollment 78–83)								−2.89
								(2.41)
R^2	.048	.249	.252					
Number of classes		2,018		2,018		471		302

Angrist and Lavy (1999)