Online Appendix A for "Buy the Book? Evidence on the Effect of Textbook Funding on School-level Achievement"

Kristian L. Holden

Falsification Tests for Individual Characteristics

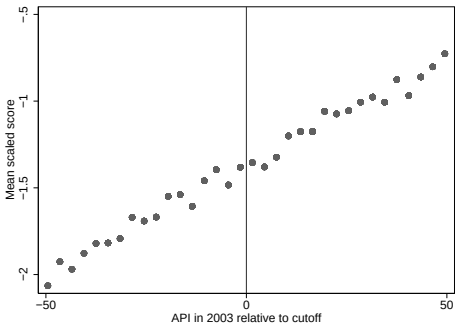
In this Appendix, I report falsification tests for individual characteristics to complement the analysis in Section 4.1. I begin by presenting Figure A.1, which shows average test scores in the three years prior to IMWC funding. These figures show school average test scores as a function of API in 2003 and the solid vertical line indicates the cutoff for IMWC funding. Each figure suggests that test scores are smooth through the cutoff prior to treatment. The corresponding estimates are shown in Table 4, row 1, Columns (2), (3), and (4); these estimates suggest no statistically significant differences prior to treatment.

Next, I present school-level student characteristics in Figure A.2. This figure shows enrollment, ethnicity, and free and reduced lunch eligibility in 2004 as a function of API in 2003. Visual inspection again suggests that pretreatment student characteristics are smooth through the cutoff. Table A.1 provides estimates of the discontinuity in student characteristics, and only free and reduced lunch is marginally significant.

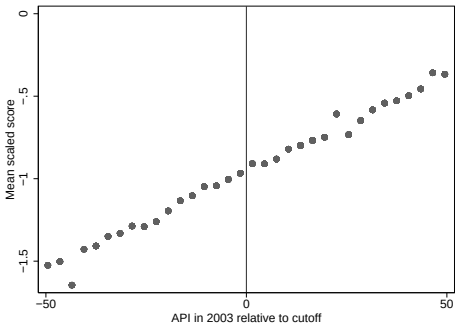
While the smoothness of characteristics before the settlement speak to validity, effects after the settlement may speak to potential mechanisms. For example, the literature on school choice programs suggest that students are attracted to schools with high academic achievement (Hastings and Weinstein, 2003). Thus, elementary schools with higher student achievement may eventually have higher enrollment and changes in student characteristics. Estimated effects in Columns (4) - (8) suggest that elementary schools did not attract additional students or experience changes in student composition.

Figure A.1

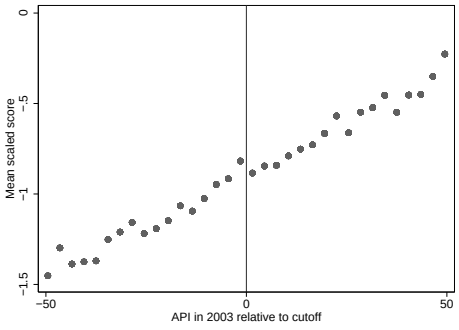
Smoothness of Average Test Scores Before Disbursal of Textbook Funding in Elementary Schools



(a) 2002



(b) 2003

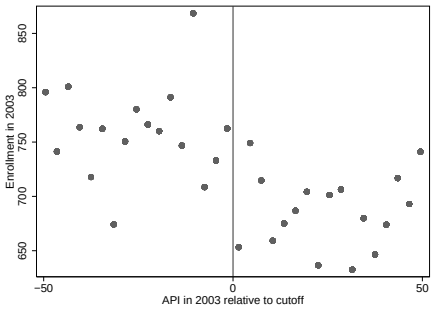


(c) 2004

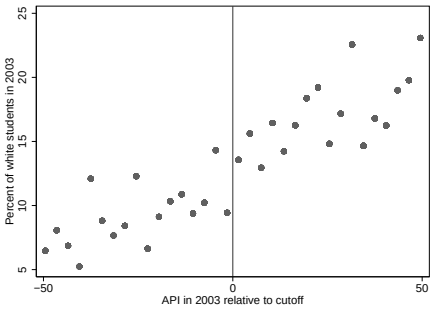
Notes: Each panel shows school average test scores as a function of API score in 2003 normalized to zero at the threshold. The vertical line shows the threshold for eligibility. Each dot shows an average over 3 API scores. None of the estimated effects are significant, supporting the validity of the RD design in this setting.

Figure A.2

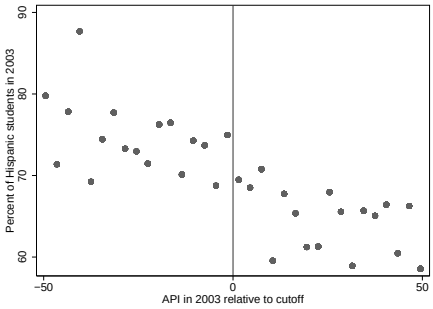
Smoothness of Student Characteristics Before Disbursal of Textbook Funding in Elementary Schools



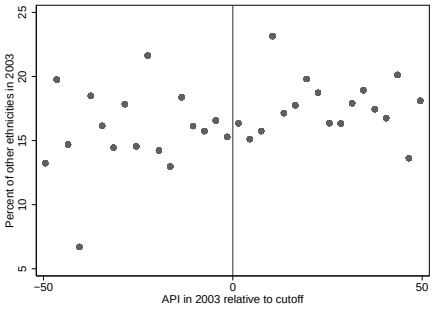
(a) Enrollment



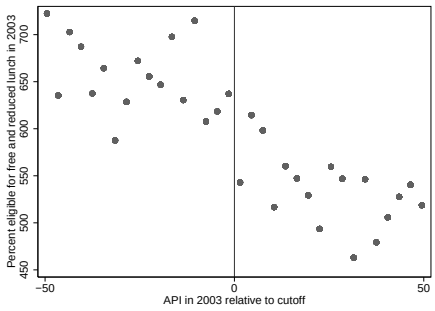
(b) Percent White



(c) Percent Hispanic



(d) Percent Other Ethn.

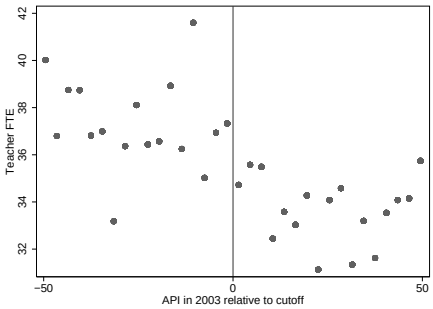


(e) Percent Free and Reduced Lunch.

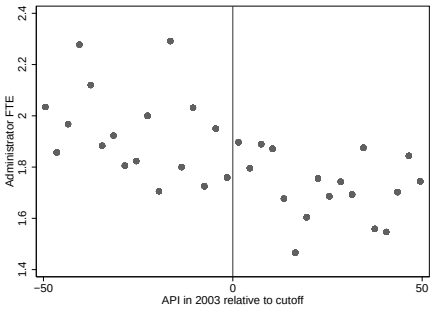
Notes: Each panel shows an observable school characteristic in 2004 as a function of API score in 2003 normalized to zero at the threshold. The vertical line shows the threshold for eligibility. Each dot shows an average over 3 API scores.

Figure A.3

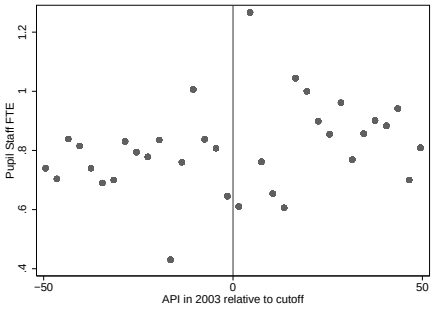
Smoothness of Staff Characteristics Before Disbursal of Textbook Funding in Elementary Schools



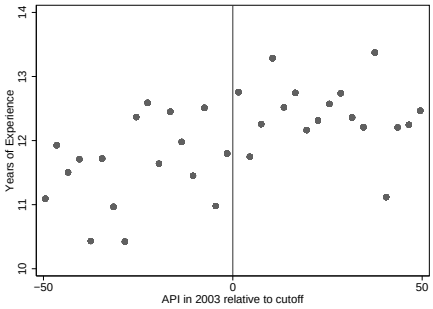
(a) Teacher FTE



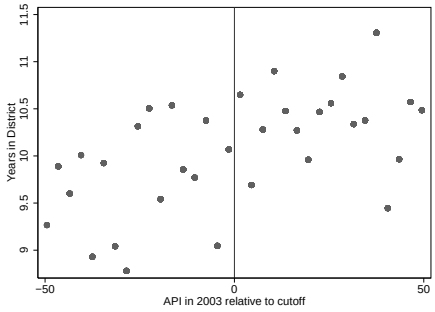
(b) Admin. FTE



(c) Pupil Staff FTE



(d) Experience



(e) Years in District

Notes: Each panel shows an observable school characteristic in 2004 as a function of API score in 2003 normalized to zero at the threshold. The vertical line shows the threshold for eligibility. Each dot shows an average over 3 API scores.

Table A.1

Regression Discontinuity Estimates of Effect of Textbook Funding on Student Characteristics for Elementary Schools

	Pre-treatment			Post-treatment				
	2002	2003	2004	2005	2006	2007	2008	2009
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Potential Effects on Student Characteristics								
Enrollment	44.17	51.01	57.91	33.77	39.46	39.57	41.00	40.77
	(52.39)	(52.37)	(52.01)	(48.33)	(43.01)	(40.15)	(37.94)	(36.07)
Fraction White	-2.42	-2.50	-2.49	-2.71	-2.25	-2.78	-2.40	-2.33
	(2.66)	(2.57)	(2.44)	(2.31)	(2.19)	(2.13)	(2.09)	(2.06)
Fraction Hispanic	2.46	2.51	2.65	2.73	2.71	2.96	2.72	3.31
	(3.97)	(3.92)	(3.86)	(3.78)	(3.68)	(3.65)	(3.61)	(3.64)
Fraction other	-0.02	0.33	0.96	0.70	0.52	0.41	0.27	-0.35
	(3.03)	(2.99)	(2.94)	(2.85)	(2.75)	(2.64)	(2.60)	(2.59)
Free or Reduced Lunch	-0.00	-0.00	-0.04	-0.03	-0.02	-0.02	-0.01	-0.01
	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.02)	(0.02)	(0.02)

Notes: Each entry is an estimated effect from a linear regression with flexible slopes, rectangular kernel weights and a bandwidth of 19.099. Robust standard errors are displayed in parentheses. Columns (1) - (8) show estimated effects for individual years, with 536 observations each. Average score is school average of math and reading scores.

***Significant at the 1 percent level

**Significant at the 5 percent level

*Significant at the 10 percent level

Online Appendix B for "Buy the Book? Evidence on the Effect of Textbook Funding on School-level Achievement"

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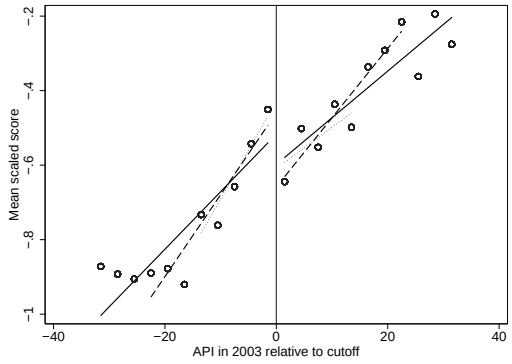
Alternate Specifications

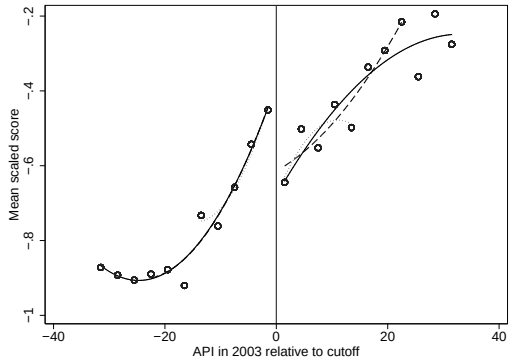
Figure B.1

Visual Inspection of Linear and Quadratic Specifications for Effects in Elementary Schools

Panel A: Linear fit for bandwidths of 15, 25, and 33



Panel B: Quadratic fit for bandwidths of 15, 25, and 33

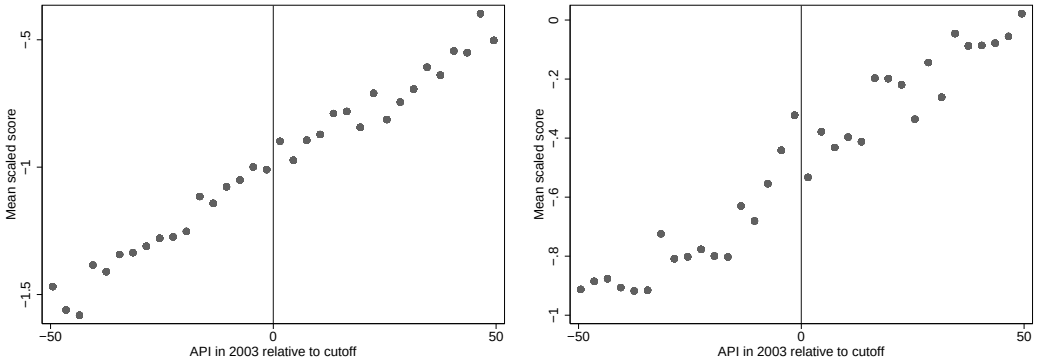


Notes: Each panel shows school-average test scores in 2005 as a function of API score in 2003 normalized to zero at the threshold. The vertical line shows the threshold for eligibility. Each dot shows an average over 3 API scores. Panel A shows several predicted lines constructed using local linear regressions for various bandwidths. Panel B shows several predicted lines constructed using local quadratic regressions for various bandwidths. Notably, smaller bandwidths of 15 and 25 provide similar estimates of the discontinuity while the larger bandwidth provides a smaller estimate as the curvature is ignored. In contrast, the quadratic fit is very similar across each bandwidth.

Figure B.2

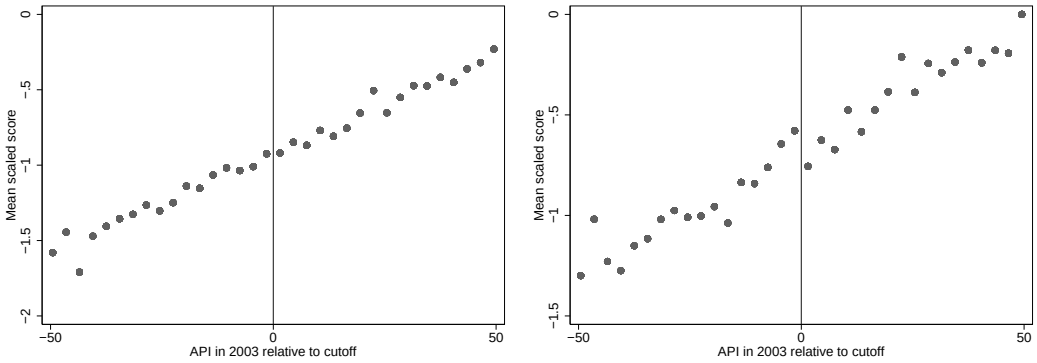
Math and Reading Scores Before and After Treatment in Elementary Schools

Panel A: Math Scores



(a) 2003 (b) 2005

Panel B: Reading Scores



(a) 2003 (b) 2005

Notes: Each panel shows school-average test scores in 2005 as a function of API score in 2003 normalized to zero at the threshold. The vertical line shows the threshold for eligibility. Each dot shows an average over 3 API scores. Panel A shows several predicted lines constructed using local linear regressions for various bandwidths. Panel B shows several predicted lines constructed using local quadratic regressions for various bandwidths. Notably, smaller bandwidths of 15 and 25 provide similar estimates of the discontinuity while the larger bandwidth provides a smaller estimate as the curvature is ignored. In contrast, the quadratic fit is very similar across each bandwidth.

Table B.1

Effects in Elementary Schools Controlling for District Fixed Effects

	Pretreatment 2002-2004	Post-Treatment: 2005
	(1)	(2)
Average score	0.02	0.15
	(0.04)	(0.09)
Math	-0.01	0.14
	(0.06)	(0.11)
Reading	0.06	0.16
	(0.05)	(0.10)

Notes: Each entry is an estimated effect from a local linear regression with flexible slopes and a bandwidth of 19.099. Columns (1) and (2) include 1608 and 536 observations respectively. Robust standard errors are displayed in parentheses.
***Significant at the 1 percent level
**Significant at the 5 percent level
*Significant at the 10 percent level

Table B.2

Effects for Elementary Schools with Clustering Standard Errors on the Running Variable and School ID

	All Post Years	Pre-treatment			Post-treatment				
		2002	2003	2004	2005	2006	2007	2008	2009
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Average score	0.15	0.05	0.01	0.10	0.20	0.16	0.18	0.12	0.14
	(0.07)**	(0.04)	(0.03)	(0.06)	(0.07)***	(0.10)*	(0.08)**	(0.07)	(0.10)
	(0.08)*	(0.05)	(0.03)	(0.05)*	(0.07)***	(0.09)*	(0.09)**	(0.10)	(0.11)**
Math	0.12	0.01	-0.04	0.09	0.22	0.18	0.16	0.09	0.11
	(0.08)	(0.06)	(0.06)	(0.07)	(0.08)***	(0.10)*	(0.07)**	(0.09)	(0.12)
	(0.09)	(0.06)	(0.05)	(0.07)	(0.09)**	(0.10)*	(0.11)	(0.11)	(0.12)
Reading	0.17	0.09	0.02	0.10	0.19	0.15	0.20	0.15	0.18
	(0.08)**	(0.05)	(0.04)	(0.07)	(0.09)**	(0.11)	(0.09)**	(0.08)*	(0.11)*
	(0.08)**	(0.07)	(0.05)	(0.06)	(0.08)**	(0.09)*	(0.09)**	(0.10)	(0.11)*

Notes: Each entry is an estimated effect from a linear regression with flexible slopes, rectangular kernel weights and a bandwidth of 19.099. The first set of parentheses displays standard errors clustered on the running variable and the second set displays standard errors clustered on school id. Estimates in All Post Years pool all observations from 2005 to 2009 for a total of 3750 observations. Columns (2) - (9) show estimated effects for individual years, with 536 observations each. Average score is school average of math and reading scores.

***Significant at the 1 percent level

**Significant at the 5 percent level

*Significant at the 10 percent level

Online Appendix C for "Buy the Book? Evidence on the Effect of Textbook Funding on School-level Achievement"

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School District Spending by Spending Type

While textbook allocation data is available, data on school-level spending is not; therefore, I examine patterns in spending for textbooks, equipment, instructional aids, services provided through subagreements, operation and housekeeping expenses, and travel and conferences.

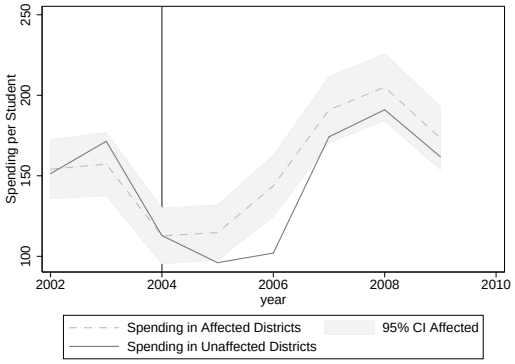
I compare spending in each category for districts that have at least one school that qualifies for IMWC textbook funding relative to districts with no schools that qualify. The vertical line represents the timing of IMWC funding, and the grey shaded area shows the 95 percent confidence interval for "affected" districts; the confidence interval for "unaffected" districts is omitted to simplify the presentation.

I follow a difference-in-differences style approach by comparing the trends in spending prior to the release of IMWC funding between affected and unaffected districts to spending after the IMWC funding is provided. Figure C.1, presents average spending by type, for "affected" and "unaffected" districts. Panel a) reproduces Figure 3 panel B for comparison to other types of spending. Visual inspection of spending in 2002-2004 suggests that districts have fairly similar trends in all types of spending; while spending on instructional aids is lower and statistically significant, the identifying assumption that the trends in spending are similar appear to hold.

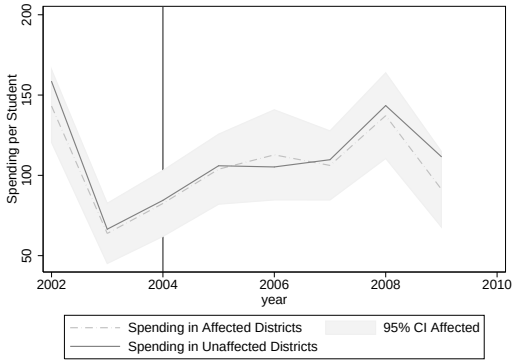
Next, I examine spending after the IMWC funding is provided to schools; if this spending is used on textbooks, we would expect to see higher textbook spending for districts with schools that received IMWC funding relative to those with no qualifying schools. Additionally, we would not expect other types of spending to be affected in the post-period. Panel A) suggests that textbook spending in affected districts appears to increase, and Panels B-F) suggest that affected and unaffected districts have similar differences in other types of spending in the post-period. Together, this suggests that IMWC funding was used for textbooks, and did lead to an increase in textbook spending.

Figure C.1

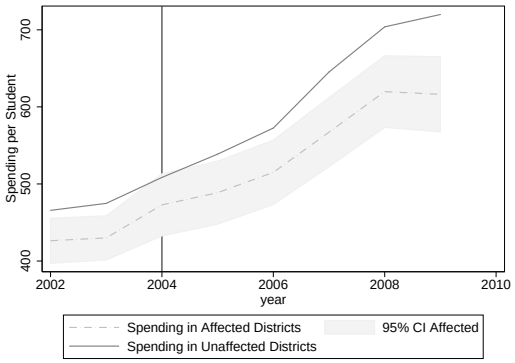
Various Types of District-Level Spending Over Time



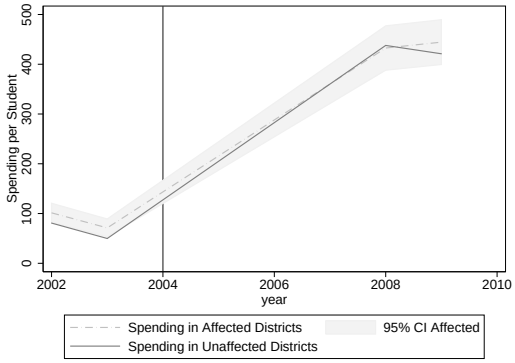
(a) Textbooks



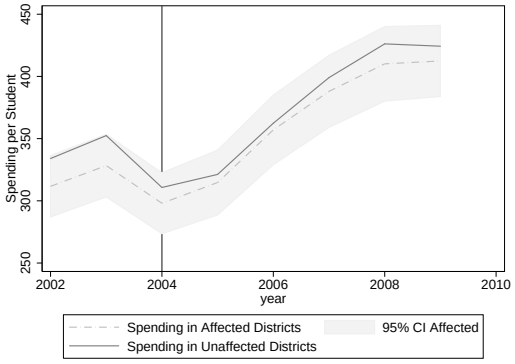
(b) Equipment



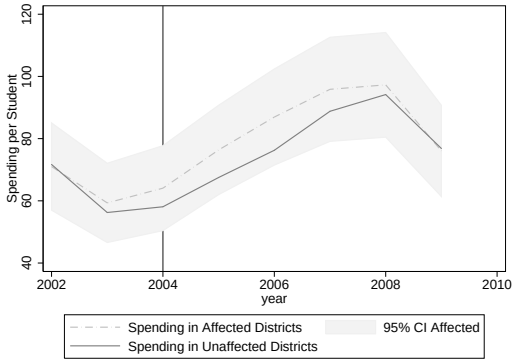
(c) Instructional Aids



(d) Services (through subagreements)



(e) Operations and housekeeping



(f) Travel and Conferences