Peer Effects from Students with Limited English Proficiency: How Does Sharing a Classroom with LEP Students Affect Native English Speakers?

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January 2011

Research Question

- What is the effect of limited English proficient (LEP) students on their English proficient (non-LEP) classmates?

Motivation

- 1 in 5 children in the U.S. is a child of an immigrant, and most come from homes where English is not spoken.

- Public schools are required to help LEP students (1974 *Lau vs. Nichols* Supreme Court decision). Most schools do this by providing LEP students bilingual education (BE) or English as a Second Language (ESL) programs.
  - BE programs typically involve placing LEP students into separate classrooms
  - ESL programs typically involve pulling out LEP students from mainstream classes for parts of the school day for English instruction.

- In 2007-08 Texas had 775,000 LEP students with limited English proficiency, which is 17% of all primary and secondary students (28% of first graders).
  - Spending on English language services in Texas amounts to $1.2 billion - more than 3% of operating expenditures.
  - While 55% of LEP students in Texas enroll in bilingual education, 40% participate in ESL.

- We want to estimate the effects of exposure to LEP students on native students' achievement (test scores) and behavior (attendance and disciplinary infractions).
  - Better understand the nature of peer effects in K-12 schooling
  - Contribute to a more complete cost-benefit analysis of educational programs for LEP students

Related Literature

- Literature on effects of school programs for LEP students
  - Baker and de Kanter (1981), Willig (1985), Rossell and Baker (1996) and Greene (1998) offer reviews
  - Matsudaira (2005); Gronberg, Jansen and Taylor (this session); Angrist, Chin, and Godoy (2008)

- Literature on peer effects in K-12
  - Angrist and Lang (2004); Hanushek, Kain, Markman and Rivkin (2003); Hoxby and Weingarth (2006); Lavy, Paserman, and Schlosser (2008); Imberman, Kugler, and Sacerdote (2009)
  - Figlio (2005); Aizer (2008); Carrell and Hoekstra (2009)

- Literature on effects of immigrants on native students' outcomes
  - Betts (1998); Hoxby (1998); Borjas (2007); Liu (2000a, 2000b); Neymotin (2009)

Empirical Framework

- We want to estimate the effect of exposure to LEP students ($\%LEP\_Classmates$) on native English speakers' outcomes (y):

$$y = \alpha + \beta \%LEP\_Classmates + X\Gamma + \varepsilon$$

- Standard OLS estimates of β are likely to be biased

- We exploit variation in $\%LEP\_Classmates$ that arises from an administrative rule in Texas determining when bilingual education programs must be offered

Identification Strategy

- Texas Administrative Code, Chapter 89, Subchapter BB, Rule §89.1205:
  - School districts must provide access to bilingual education in a given language if the population of LEP students who speak that language in an elementary grade is greater than or equal to 20
- A regression-discontinuity approach:
  - ≥ 20 LEP students: LEP students get BE → non-LEP students get less exposure to LEP students
  - < 20 LEP students: LEP students get ESL → non-LEP students get more exposure to LEP students
  - Thus, we will compare non-LEP students in district cohorts that have slightly less than 20 LEP students to those with slightly more

Regression Estimation

- Reduced-form estimation:

$$y = \alpha + \beta_{rf} AboveCutoff + \delta LEP + \gamma(LEP - 20) * AboveCutoff + X\Gamma + \varepsilon$$

β_{rf} has the interpretation of effect of less exposure to LEP classmates (because LEP students are moved from ESL to BE)

- Instrumental-variables estimation: We instrument for *%LEP_Classmates (measured as percent of grade 1 cohort in ESL)* with *AboveCutoff*:

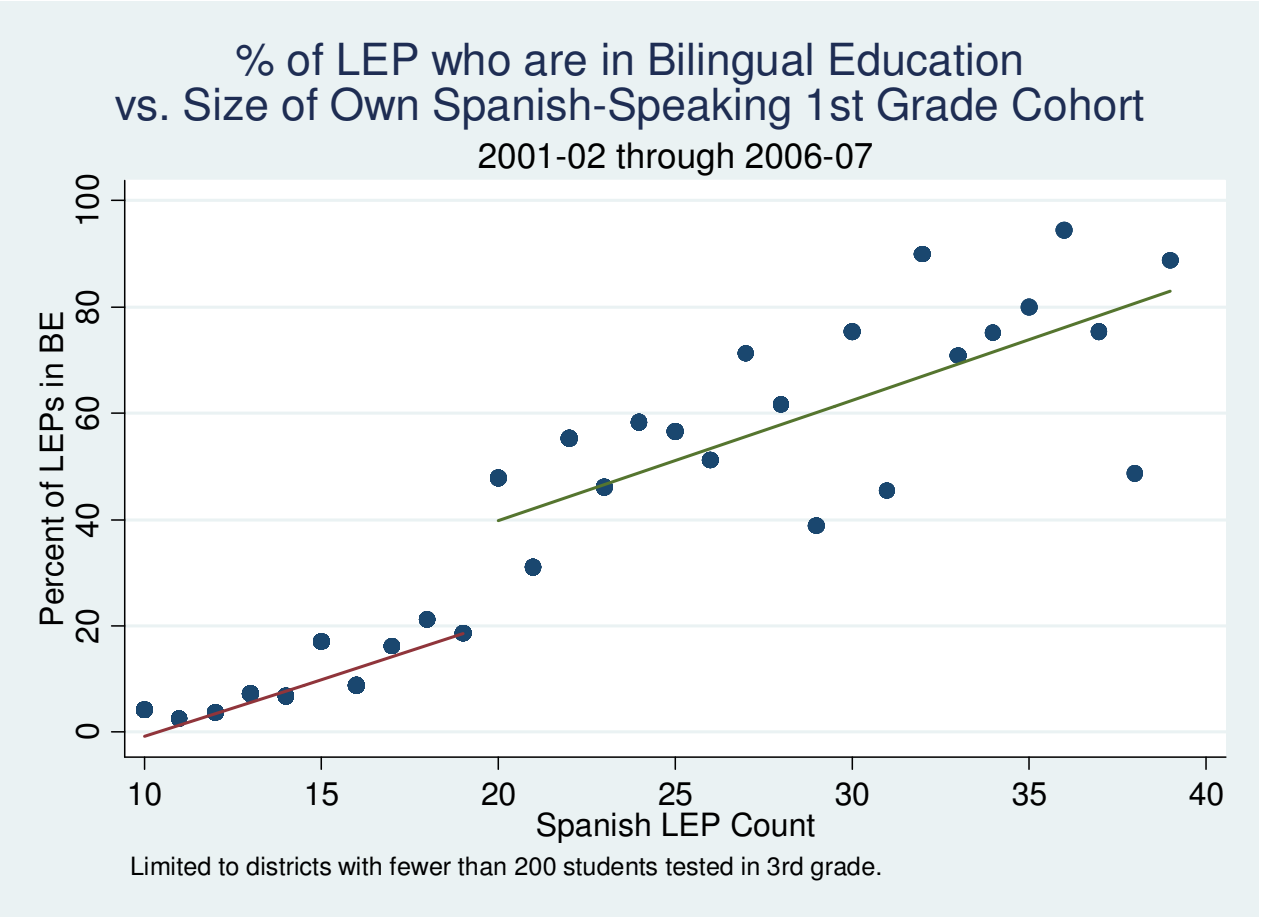
$$y = \alpha + \beta \%LEP\_Classmates + \delta LEP$$
$$+ \gamma(LEP - 20) * AboveCutoff + X\Gamma + \varepsilon$$

Data

- We will use confidential administrative data on all students in Texas public schools from the Education Research Center at Texas A&M.
  - Has basic student demographics such as race, gender, and free/reduced-price lunch status.
  - Has rich information on standardized exam scores (Texas Assessment of Knowledge and Skills exam scores in 2003 and later and Texas Assessment of Academic Skills scores prior to 2003), attendance rates, disciplinary infractions, as well as LEP, bilingual education, ESL, and whether the student is an identified immigrant.

- We will have access to the data beginning Spring 2011. Today, we will present results using publicly available district-level data.
  - Recall the policy is at the level of the district (i.e., whether to offer BE depends on the # LEP students in a given grade and year and language in the entire district).
  - We use district-level data on 3rd and 4th graders' TAKS test scores for the 2003-04 to 2008-09 school years.
    - 3rd graders would have been first graders in 2001-02 to 2006-07 (we use *first grade* LEP count to define forcing variable, avoiding potential endogeneity in mainstreaming of students initially classified as LEP students).
    - Note comparable data on mean test scores are only to 2008-09. Comparable data on meeting state standard are to 2009-10.

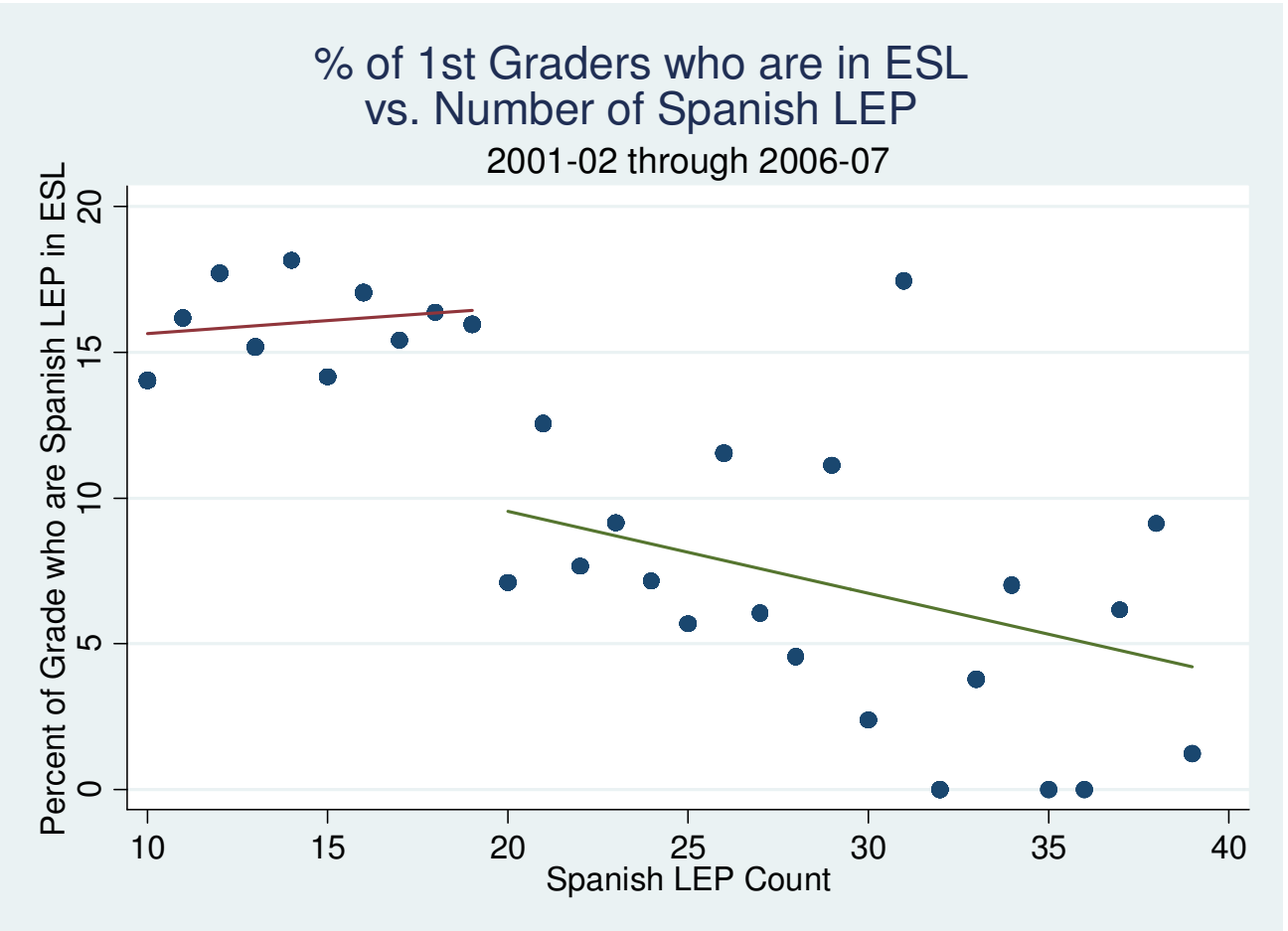
Policy does appear to be binding: At cutoff, bilingual education significantly more prevalent…



$$\widehat{\%LEP\ in\ BE} = -18.7 + 22.2\,AboveCutoff + 1.9\,LEP + 0.6(LEP - 20) * AboveCutoff$$

(se clustered by district) (6.0) (7.2) (0.5) (0.8)

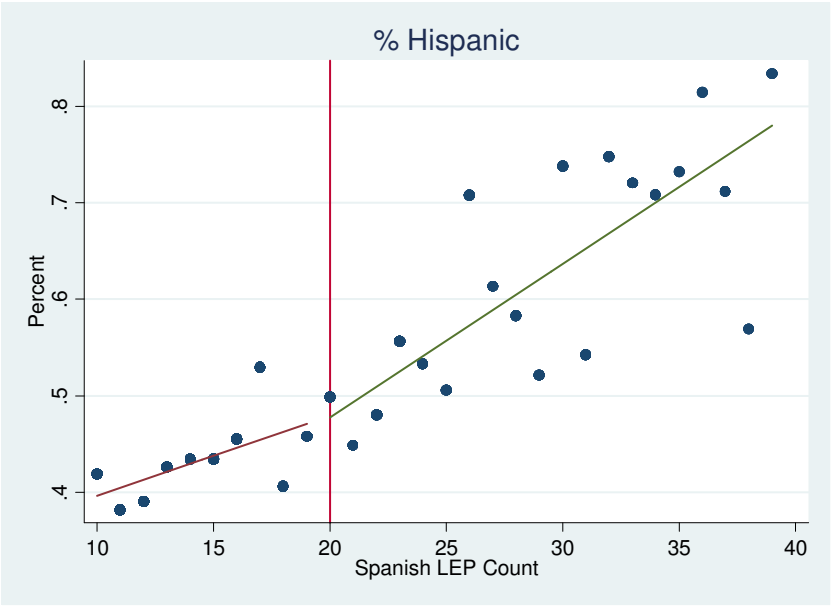
…leading to variation in exposure to LEP classmates

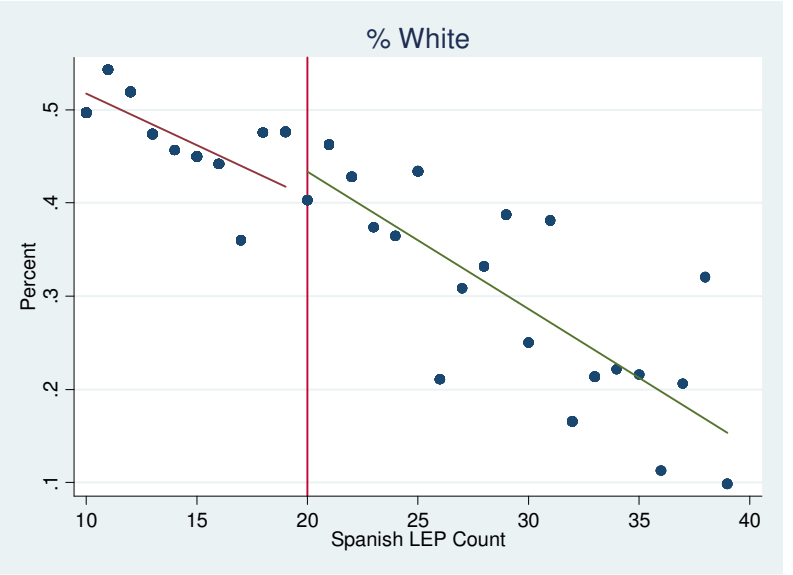


$$\widehat{\%Grade\ 1\ in\ ESL} = 13.2 - 7.1 AboveCutoff + 0.2 LEP - 0.6(LEP - 20) * AboveCutoff$$

(se clustered by district) (3.1) (2.2) (0.2) (0.3)

We do not observe jumps in other district characteristics at the cutoff

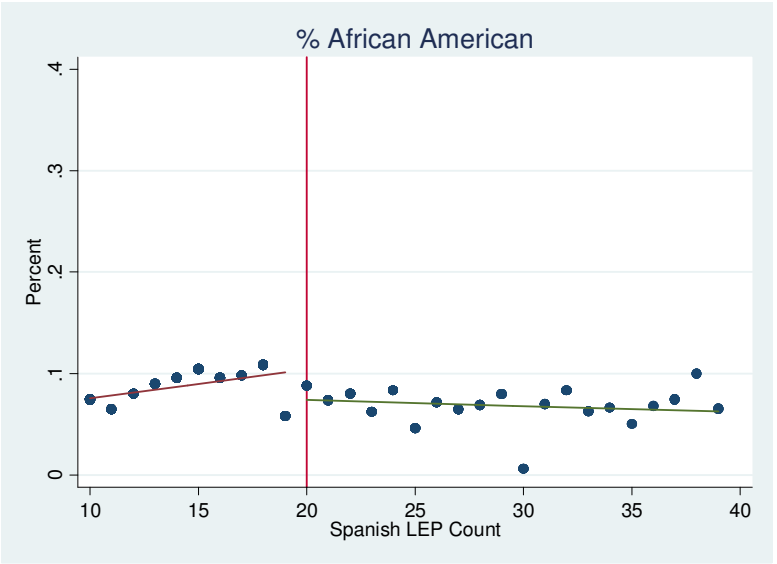


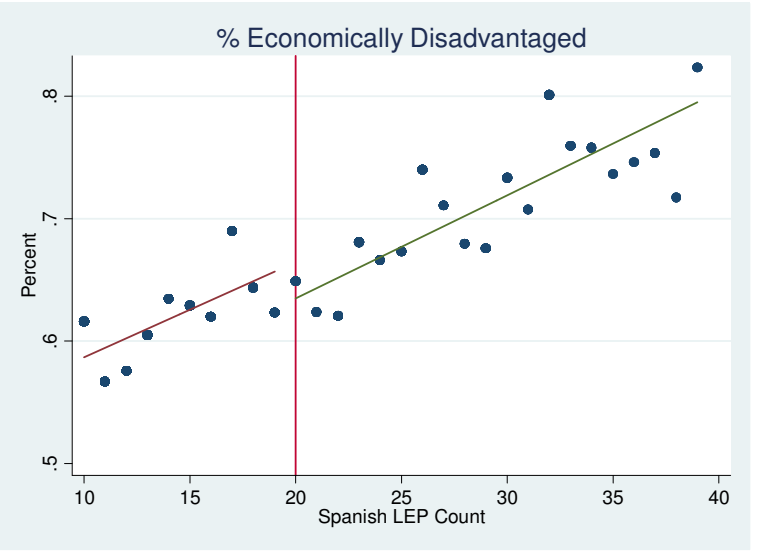


Coeff (se) for *AboveCutoff*:
-0.007 (0.048)

Coeff (se) for *AboveCutoff*:
0.031 (0.045)

We do not observe jumps in other district characteristics at the cutoff

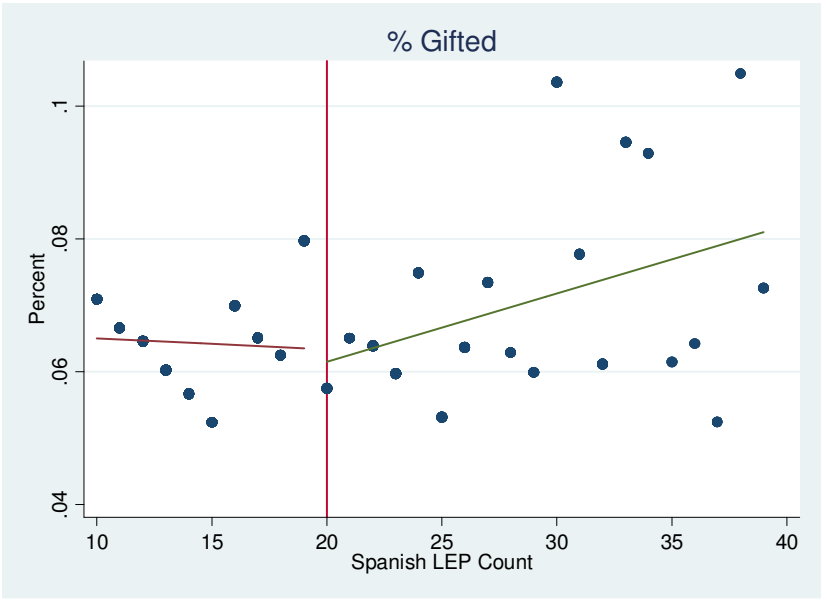


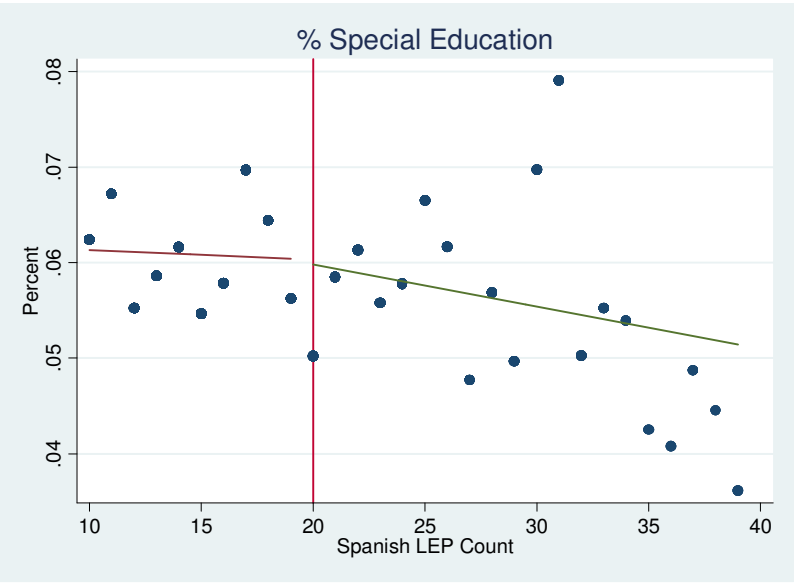


Coeff (se) for *AboveCutoff*:
-0.028 (0.022)

Coeff (se) for *AboveCutoff*:
-0.029 (0.030)

We do not observe jumps in other district characteristics at the cutoff

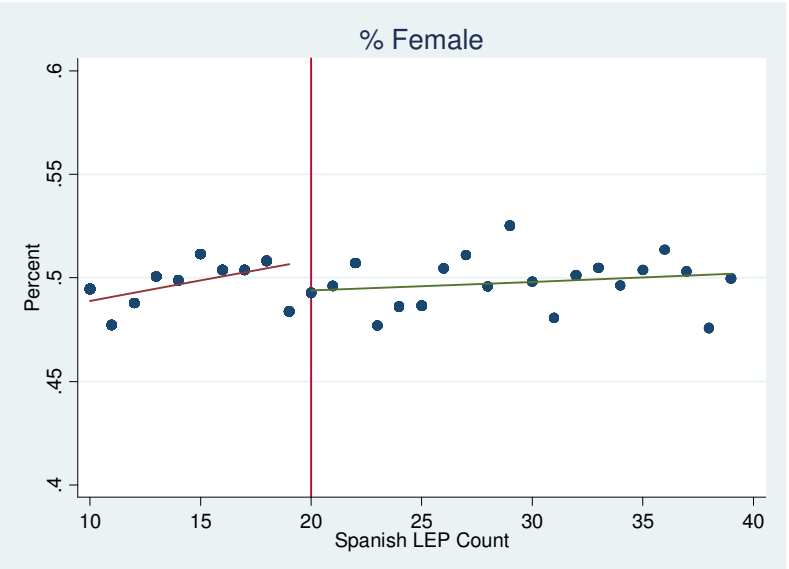


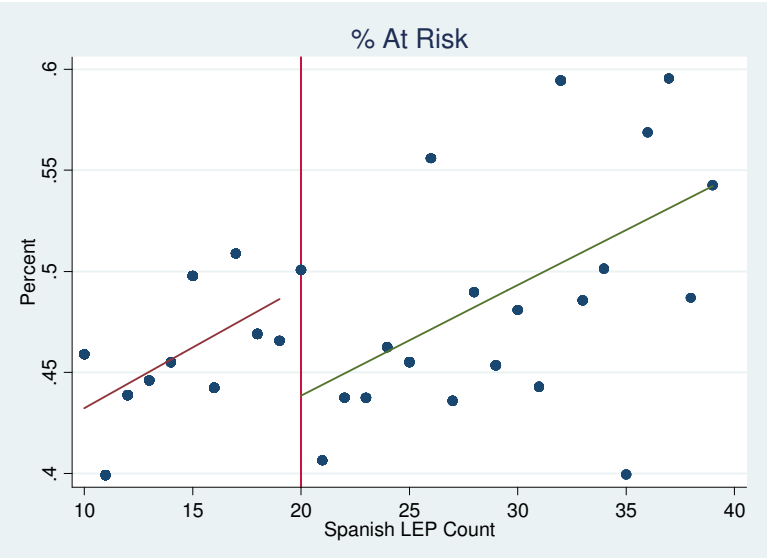


Coeff (se) for *AboveCutoff*:
-0.003 (0.007)

Coeff (se) for *AboveCutoff*:
0.0007 (0.005)

We do not observe jumps in other district characteristics at the cutoff

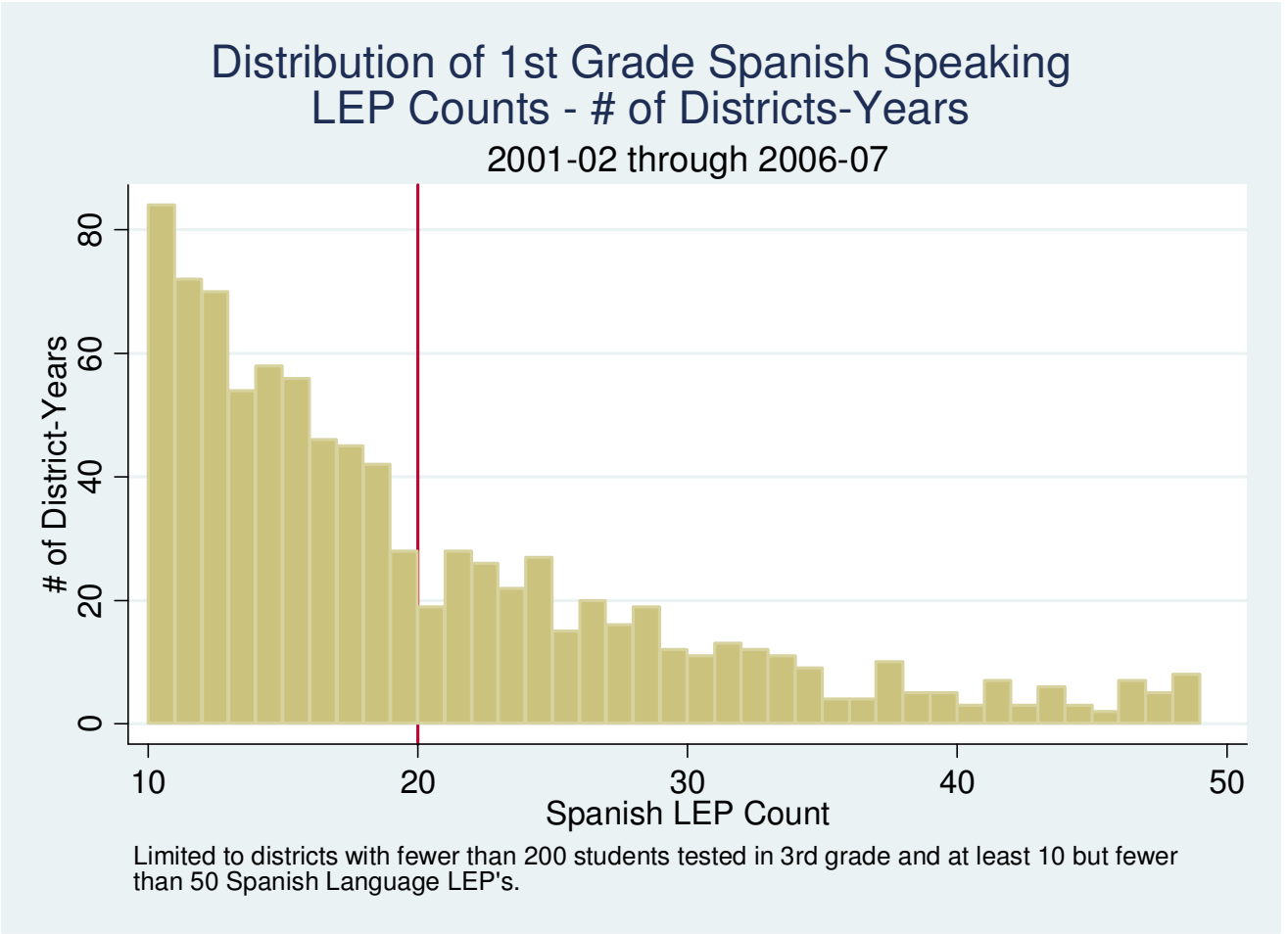




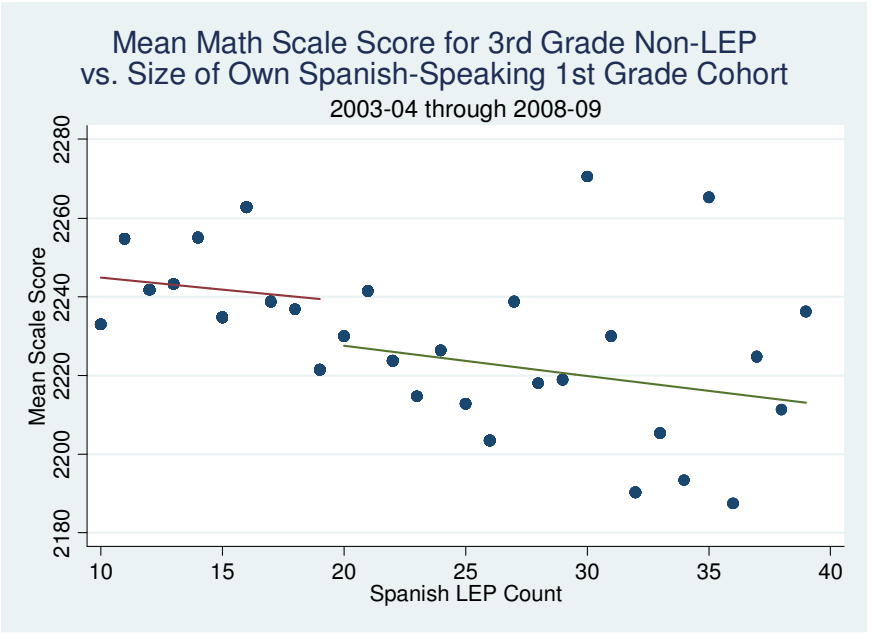
Coeff (se) for *AboveCutoff*:
-0.013 (0.009)

Coeff (se) for *AboveCutoff*:
0.050 (0.028)
CAVEAT: "At Risk" in part determined by past test scores, LEP status

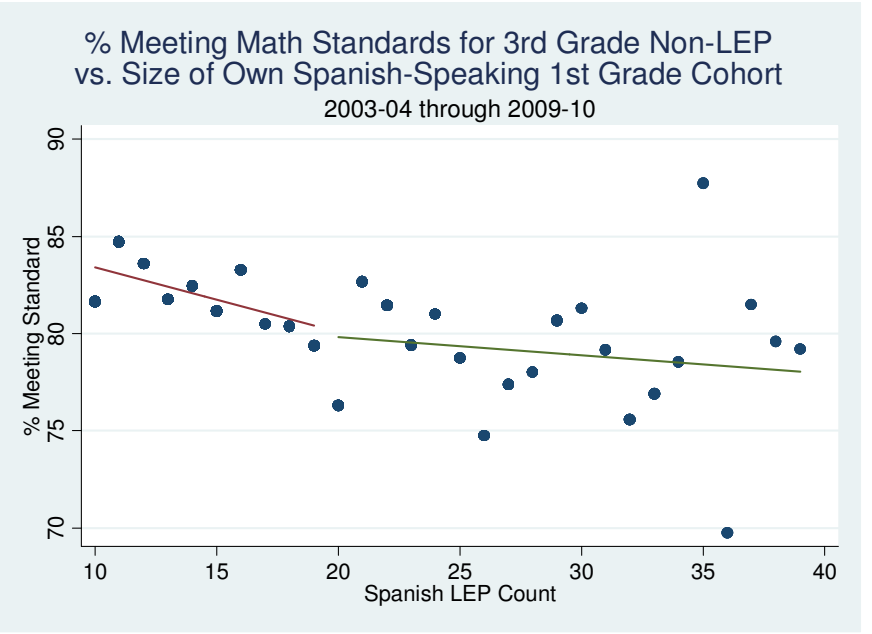
Histogram of districts by Spanish LEP Count does not suggest endogenous stacking



So on to outcomes: 3rd Grade Math Test Performance of non-LEP Students

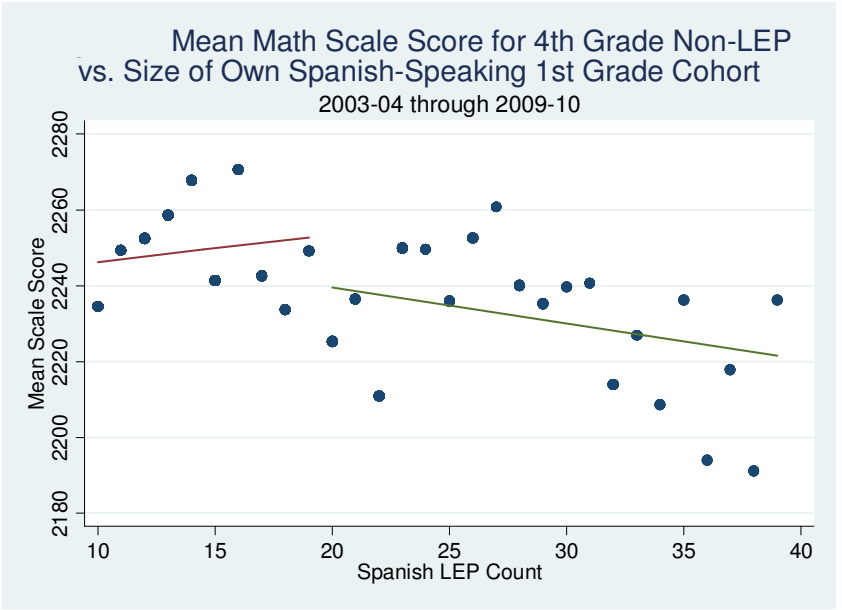


Coeff (se) for *AboveCutoff*:
-10.3 (11.7)

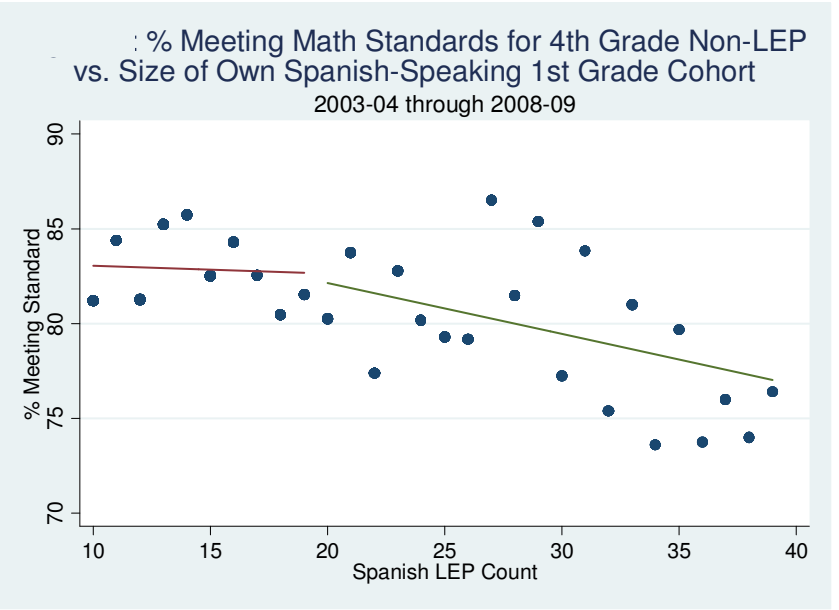


Coeff (se) for *AboveCutoff*:
0.1 (2.1)

4th Grade Math Test Performance of non-LEP Students

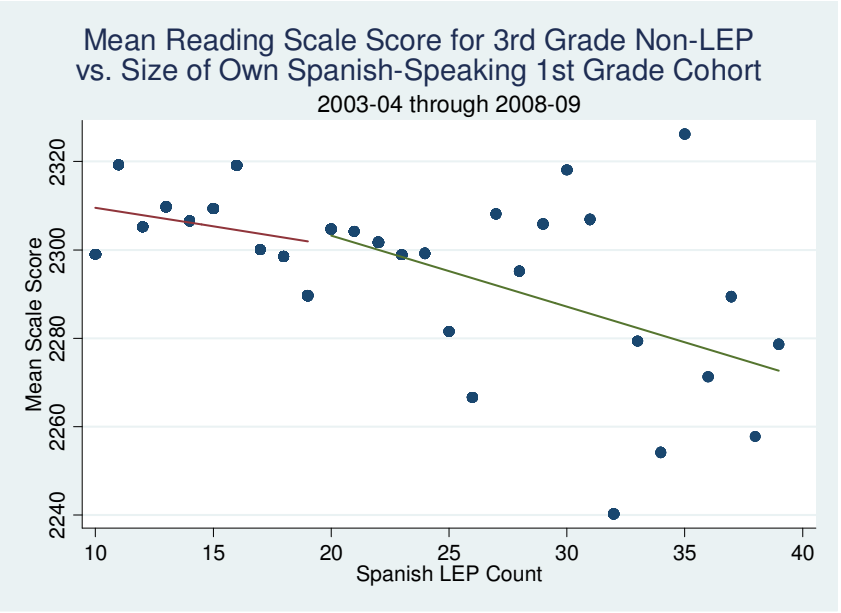


Coeff (se) for *AboveCutoff*:
-12.7 (11.1)

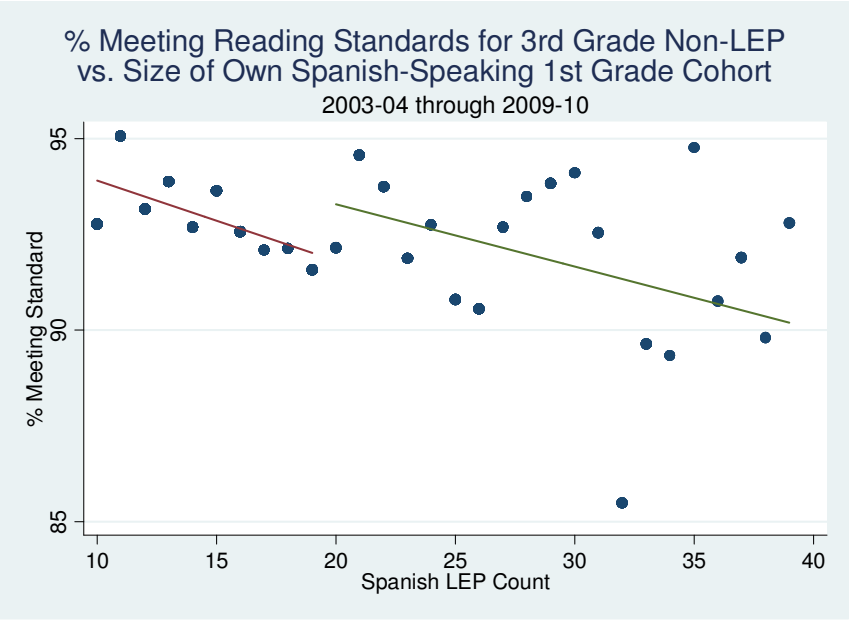


Coeff (se) for *AboveCutoff*:
-0.2 (1.9)

3rd Grade Reading Test Performance of non-LEP Students

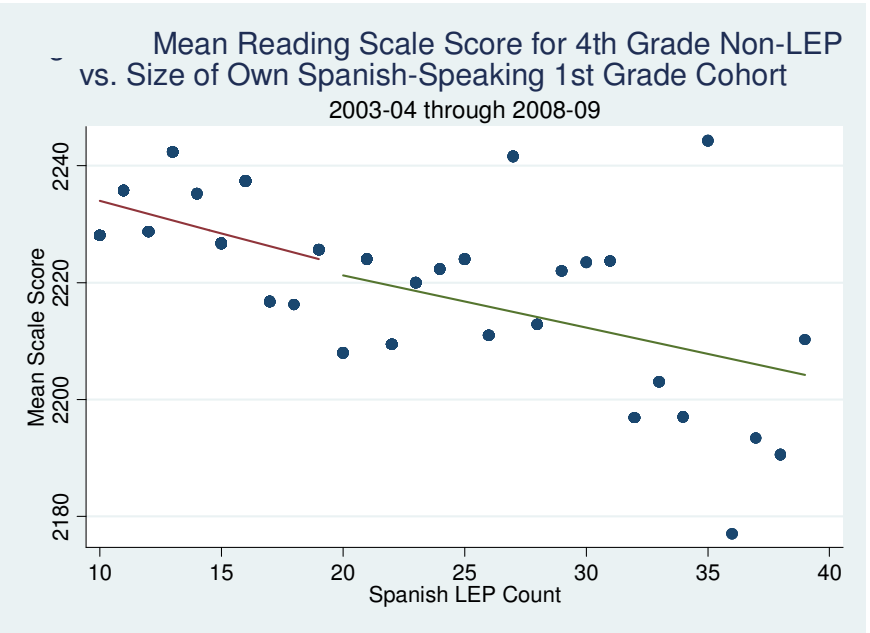


Coeff (se) for *AboveCutoff*:
2.5 (9.2)

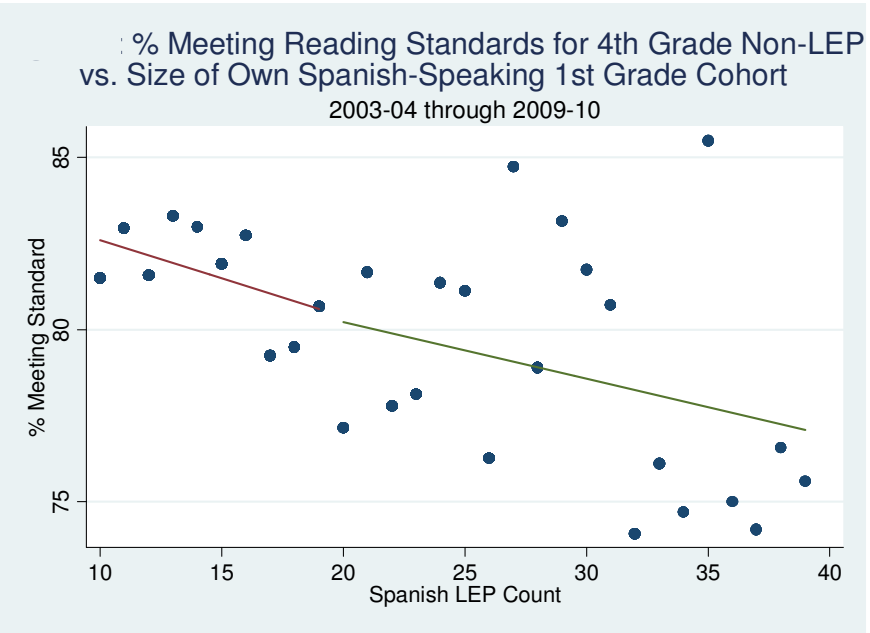


Coeff (se) for *AboveCutoff*:
1.5 (1.2)

4th Grade Reading Test Performance of non-LEP Students



Coeff (se) for *AboveCutoff*:
-1.2 (8.8)



Coeff (se) for *AboveCutoff*:
0.03 (1.8)

3rd Grade Effect of Exposure to LEP Classmates

	Math mean score	Math % meeting standard	Reading mean score	Reading % meeting standard
OLS Estimate	0.55	0.10	0.61	0.06
	(0.27)	(0.05)	(0.23)	(0.02)
2SLS Estimate	1.44	-0.02	-0.34	-0.22
	(1.69)	(0.30)	(1.31)	(0.18)
2SLS Estimate—add	2.14	0.06	0.28	-0.09
demographic controls	(1.65)	(0.25)	(1.00)	(0.15)
Dependent variable	2236	81	2302	93
mean (s.d.)	(62)	(12)	(51)	(7)
N	702	820	702	820

Note: Meeting standard data are for 2003-04 to 2009-10 and mean score data are for 2003-04 to 2008-09 (scores were rescaled in 2009-10, and we drop this year for better comparability).

4th Grade Effect of Exposure to LEP Classmates

	Math mean score	Math % meeting standard	Reading mean score	Reading % meeting standard
2SLS Estimate	1.63	0.03	0.15	-0.004
	(1.45)	(0.26)	(1.13)	(0.24)
2SLS Estimate—add	2.31	0.20	0.97	0.17
demographic controls	(1.32)	(0.22)	(0.86)	(0.17)

Note: Meeting standard data are for 2003-04 to 2009-10 and mean score data are for 2003-04 to 2008-09 (scores were rescaled in 2009-10, and we drop this year for better comparability).

Discussion

- Unique policy rule in Texas provides variation in exposure to LEP students for native English speakers
- Analysis of district-level data suggests that there is a jump down in the %LEP students in ESL at the cutoff
  - There appears to be a jump down at the cutoff in mean math scale score
  - There are no jumps at the cutoff for other test score outcomes
  - These preliminary results suggest that exposure to LEP students does not impair non-LEP students' academic performance, at least as measured by standardized exams
- Moving to confidential student-level data will improve precision, expand the outcomes we can study, and allow us to explore heterogeneity in effects