Ranking Up by Moving Out: The Effect of the Texas Top 10% Plan on Property Values

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Overview - The Texas Top 10% Plan

Top 10% Plan was introduced as a way to proxy for affirmative action policies in college admissions

- Passed May 20th 1997

Hopwood v. Texas Law School (1996)

- Banned race as an admissions criterion in Texas universities
- Minority enrollment plummeted: UT-Austin and Texas A&M

Overview - The Texas Top 10% Plan

If you are in the top 10% of your graduating class you get:

STATE OF TEXAS
OFFICE OF THE GOVERNOR

GEORGE W. BUSH
GOVERNOR

October 14, 1999

Dear **Kristin Klopfenstein,**

Congratulations on being in the top 10 percent of your class! I join your parents, teachers, school district and friends in commending you for this accomplishment.

I hope that the next step in your educational journey is to attend college, and I hope you consider a Texas institution. Because of legislation I signed in 1997, you are guaranteed admission to any public college or university in the State because you are graduating in the top 10 percent of your class.

You can become familiar with Texas' outstanding public four-year colleges and universities by using the enclosed card to let them know of your interest. Or, you can apply electronically to any four-year school by going to www.applytexas.org on your Internet server.

My hope is that you will pursue your higher education in the Lone Star State. Outstanding students like you will find many fine educational opportunities in Texas.

Sincerely,

GEORGE W. BUSH

GWB:smg

Enclosures

POST OFFICE BOX 12428 AUSTIN, TEXAS 78711 (512) 463-2000 (VOICE)/(512) 475-3165 (TDD)

Overview - The Texas Top 10% Plan

If you are in the top 10% of your graduating class you get:

- Automatic admission to Texas State Universities
- Choice over which university
- Includes UT-Austin and Texas A&M

Overview - The Texas Top 10% Plan

Cullen, Long and Reback (2009)

- Analyze student mobility patterns between the 8th & 10th grades before & after the policy change
- Students improved their chances of enrollment in top colleges by switching high schools

This Paper …

Analyze effect of the Top 10% Plan on property Values

- Poor-performing schools gained a valuable amenity: *Improved access*
- Households maximum willingness to pay for housing services

This Paper …

Analyze effect of the Top 10% Plan on property Values

- Poor-performing schools gained a valuable amenity: *Improved access*
- Households maximum willingness to pay for housing services

Our approach makes use of difference-in-differences to put a percentage on this relative change in property values:

- Preview of results: 4.9% change

This Paper …

Also look at which places are driving this result

- Local schooling competition
  - More options, stronger the policy's effect

Presentation Outline

1) Why the Top 10% Plan should influence property values

2) Previous Work

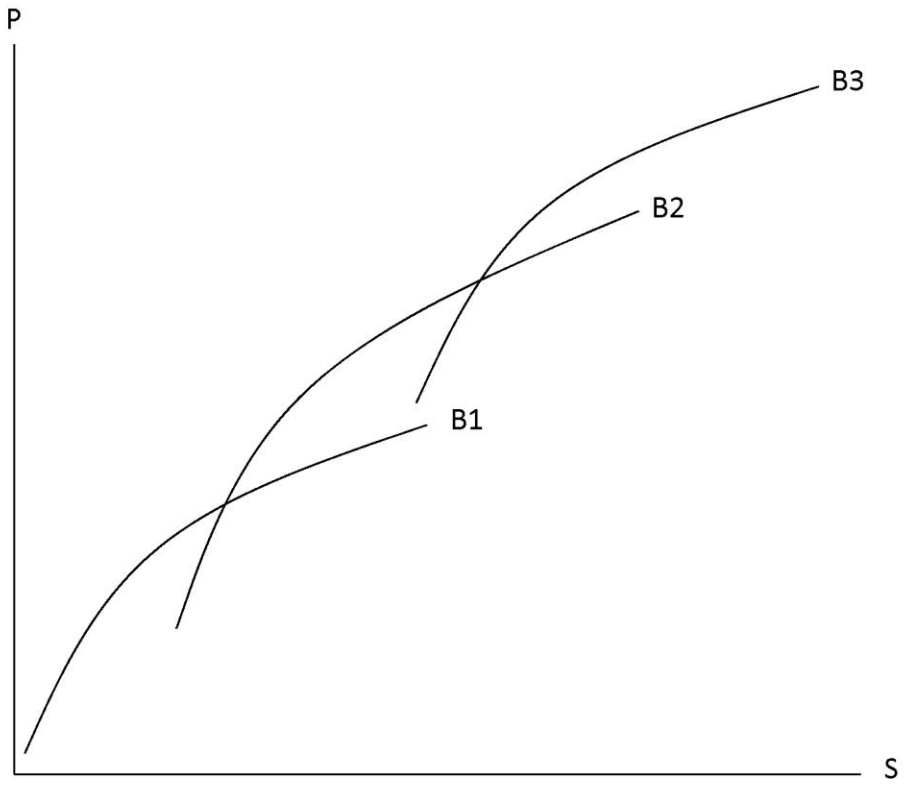
3) Empirical Strategy

4) Data

5) Results

6) Conclusion

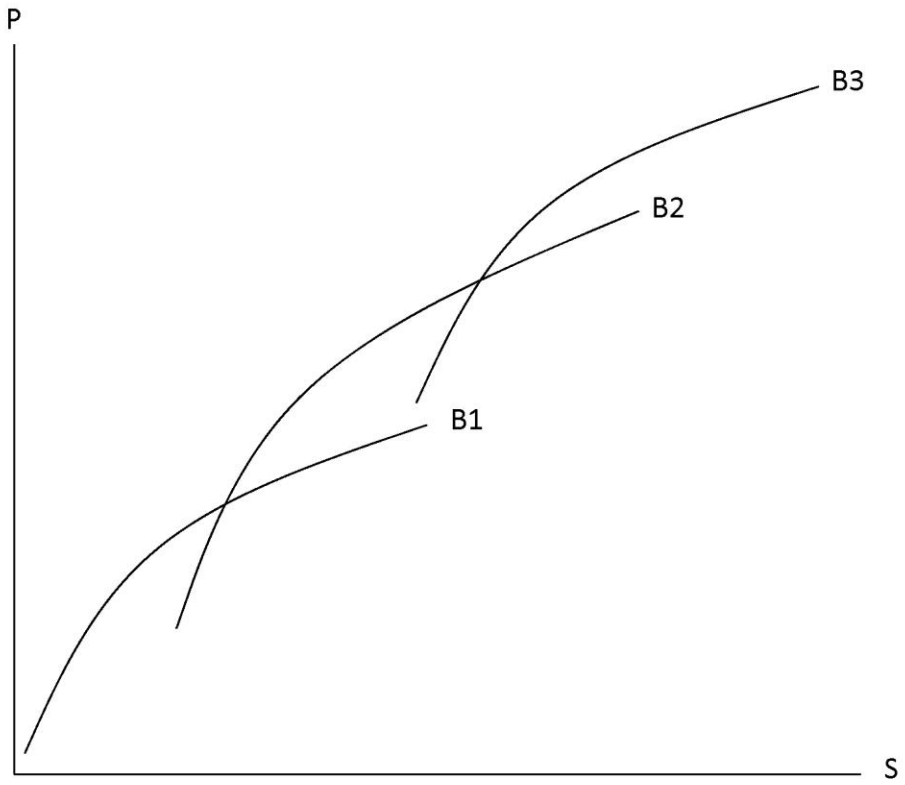
Top 10% Plan and Property Values



P - Price per quality adjusted unit of housing

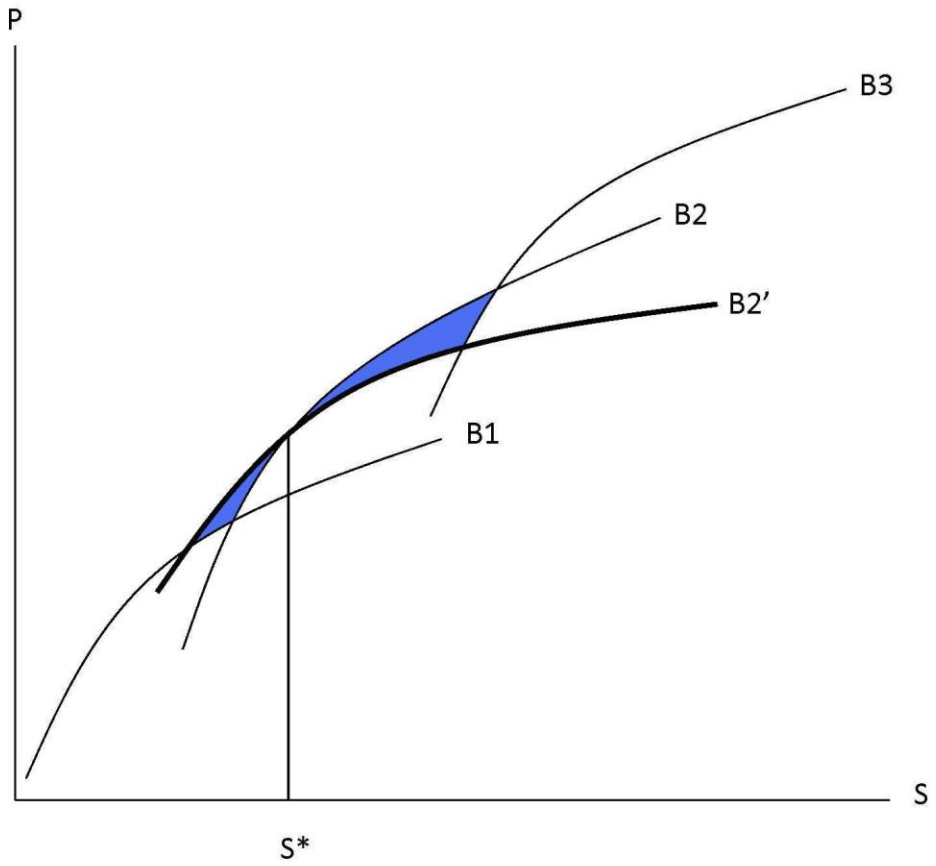
S - Units of school quality per quality adjusted unit of housing

Top 10% Plan and Property Values



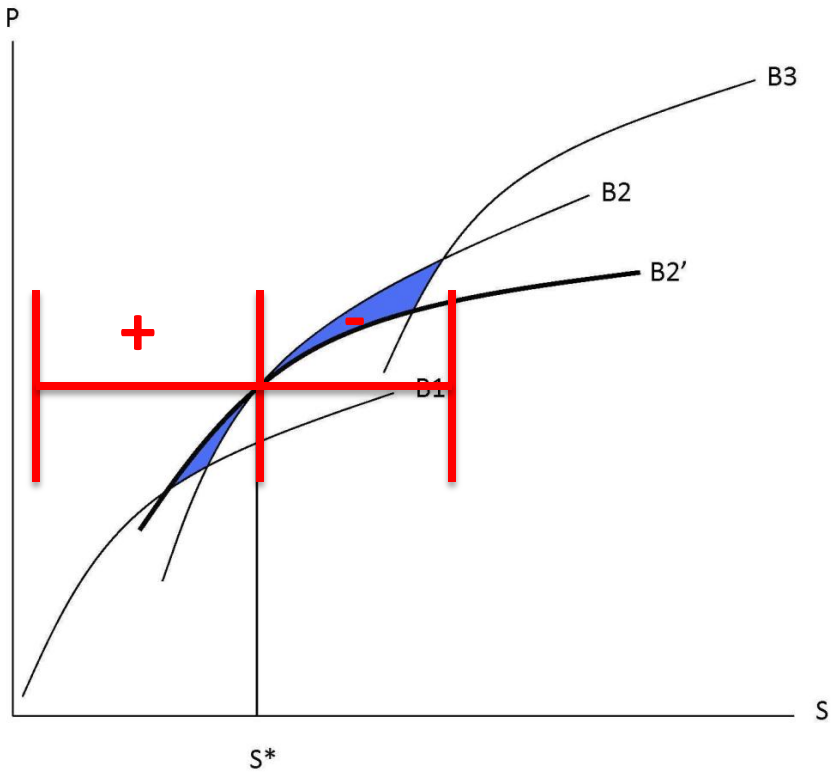
Suppose **B2** is the bid for people whose children would benefit from the Top 10% Plan if they lived in a different district

Top 10% Plan and Property Values



B2' is B2 post policy:
parents value S less relative to other goods

Top 10% Plan and Property Values



- School districts with *higher quality* than S* the affected income/taste class will have a smaller bid after the policy is enacted

-School districts with *lower quality* than S* the affected income/taste class will have a larger bid after the policy is enacted

Previous Work

Value of school quality is difficult to disentangle from neighborhood characteristics & taxes

- may be measuring unobservables

Border methodology

- Bogart and Cromwell (1997)
- Black (1999)
- Weimer and Wolkoff (2001)

Previous Work

Fixed effects (differencing)

- Barrow and Rouse (2004), district level
- Clapp, Nanda, and Ross (2008), census tract level
- Figlio and Lucas (2004), property level

Previous Work

We tackle neighborhood & tax effects by differencing over time as part of our difference-in-differences estimator

- Not interested in the level of public service capitalization into property values; but interested in how the values change in response to policy shift

Look at relative changes from a policy shift

- Reback (2005), school choice program

Empirical Strategies

Difference-in-Differences

- Pre and post policy

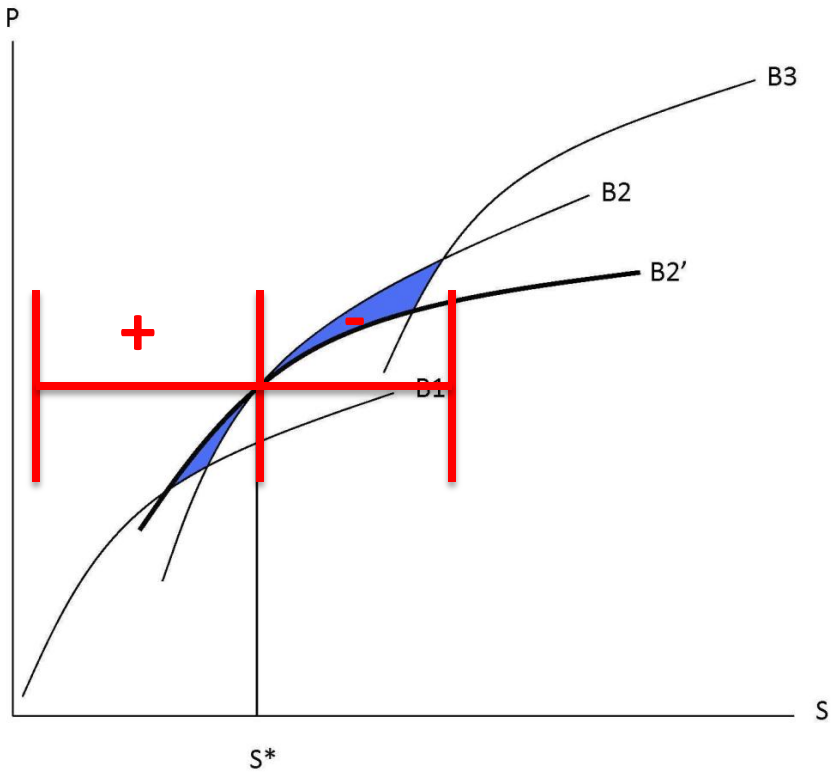
- Bottom and second from the bottom quintile of school quality
(pre policy high school ACT scores)
  - Treatment (bottom quintile)
  - Control (2nd quintile)

Empirical Strategies

Why the bottom two quintiles?

- Top schools place more than their top 10% in top colleges
- Bottom quintiles are where **access** is most improved (where we expect the action to be)
- Second from the bottom quintile (control) looks most like the bottom quintile (treatment) in ACT scores

Empirical Strategies



- Choosing treatment and control incorrectly biases estimates downward

- Allows flexibility for how the relative change is occurring
  - Higher quality losing value
  - Lower quality gaining value
  - Both

Data

Panel from 1994-95 to 2005-06 school years (constructed from several sources)

Dependent variables:

- Texas Comptroller Property Tax Division
  - *(1) Aggregate school district appraised value*
    (2) Total housing units
    (3) Average price
  - *Assessments done annually*

Property Assessments in Texas

- Assessments done annually
- *Property sold:* new price is used
- *Property not sold:* value assigned based on characteristics of properties that were sold
- Limits on how much an appraisal can increase
  - Appraisal may not increase to more than the lesser of:

    (a) sale price (if property sold that year), or

    (b) 110% of previous year's appraisal (plus market value of any new improvements)

Data

High school controls

- Texas Education Agency (TEA)
  - *% Minority students*
  - *% Economically disadvantaged students* (school lunch)
  - *% Students in a gifted program*
  - *Average teacher experience*
  - *Teacher/student ratio*
  - *High school ACT scores for graduating class* (to generate school quintiles)

Data

Urbanization of the surrounding area

- National Center for Educational Statistics (NCES)
  - *Large city* (CMSA > 250,000 people)
  - *Small city* (CMSA < 250,000 people)
  - *Large fringe* (not in central city of large city)
  - *Small fringe* (not in central city of small city)
  - *Town* (none of the above >2,500 people)
  - *Rural* (none of the above) – omitted

Data

County level controls

- U.S. Census
  - *% Black*
  - *% Hispanic*
  - *% Owner occupied*
  - *Persons per housing unit*

- FBI Uniform Crime Reporting (UCR)
  - *Violent crime rate*
    (murder, rape, robbery and assault)

Figure 3: Trends in Mean Total Appraised Value (millions)

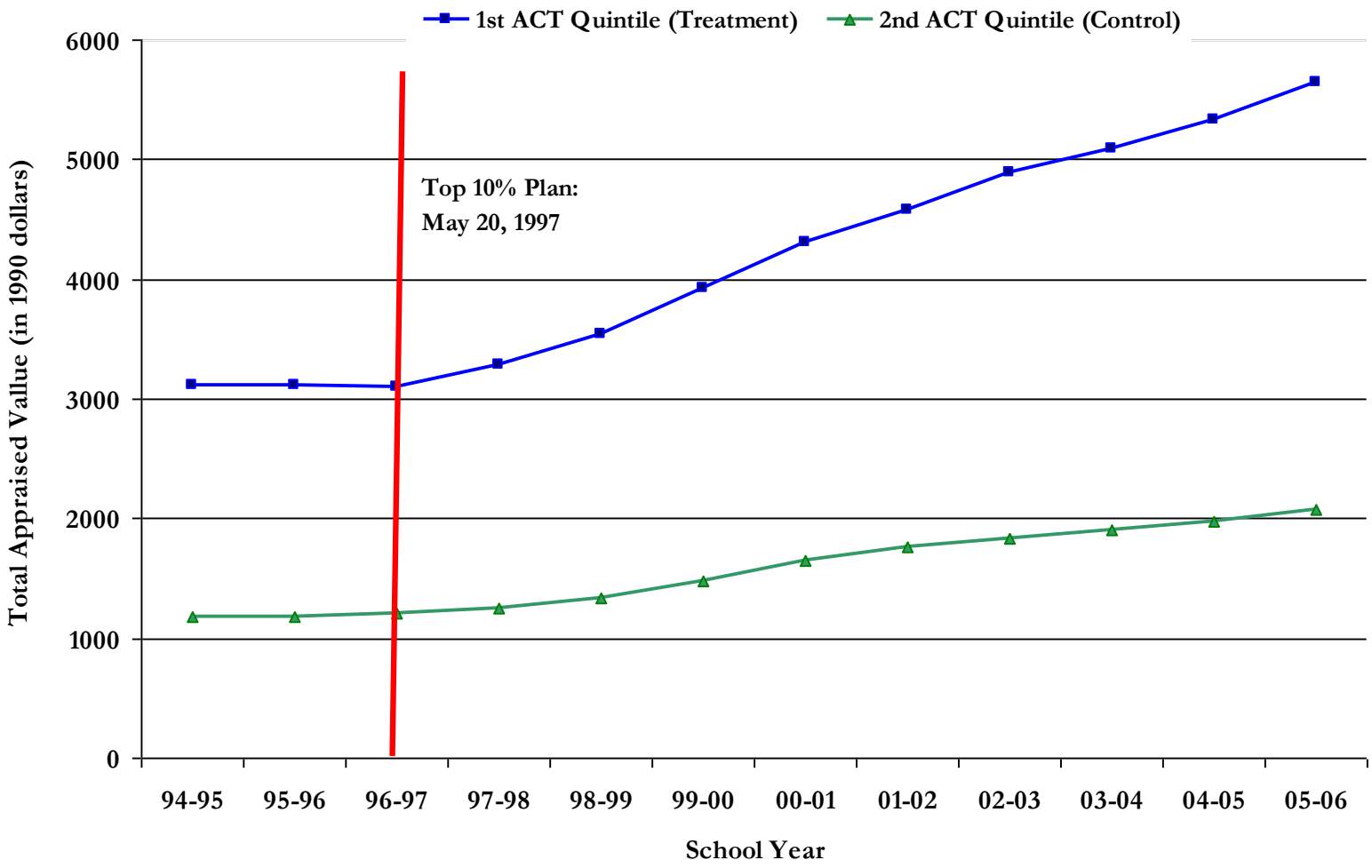
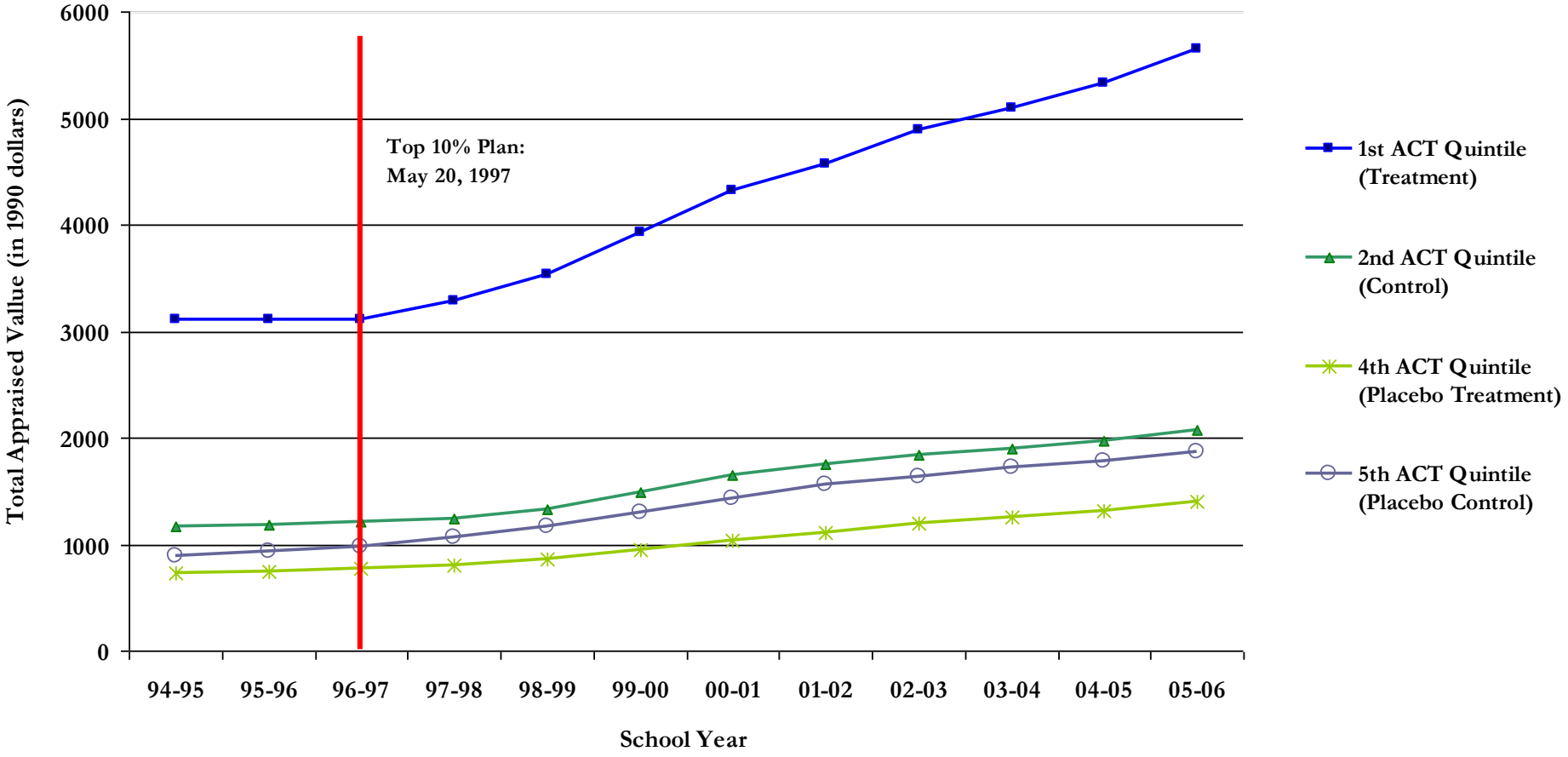


Figure 4: Trends in Mean Total Appraised Value (millions)



Estimating Equation

$$\ln(Y)_{jt} = \alpha + \gamma \cdot Post_t + \beta \cdot Treatment_i + \delta \cdot Post_t \cdot Treatment_i + \tau \cdot Ltrend_t$$

$$+ X_{it} \cdot \theta + C_{kt} \cdot \lambda + \varphi + \varepsilon_{jt}$$

Main Results – Bottom of Quality Distribution

Difference-in-Differences Regressions

Panel A: Log Average Price (1990 Dollars)

	(1)	(2)	(3)	(4)	(5)
Post x Treatment	0.032 **	0.065 ***	0.047 ***	0.051 ***	0.049 ***
	(0.015)	(0.213)	(0.017)	(0.016)	(0.016)
Treatment (1st quintile)	0.153 ***	-0.082	-0.087 *	-0.044	-0.060
	(0.052)	(0.057)	(0.047)	(0.044)	(0.046)
Post (yr after 1996-97)	-0.036 ***	-0.044 ***	-0.040 ***	-0.031 ***	-0.031 ***
	(0.009)	(0.015)	(0.011)	(0.011)	(0.010)
Linear Trend	0.027 ***	0.043 ***	0.038 ***	0.035 ***	0.034 ***
	(0.001)	(0.122)	(0.002)	(0.002)	(0.002)
Constant	10.122 ***	8.841 ***	9.616 ***	8.545 ***	8.439 ***
	(0.035)	(0.132)	(0.129)	(0.257)	(0.297)
Controls:					
High School Demog.	No	Yes	Yes	Yes	Yes
Urbanization	No	No	Yes	Yes	Yes
County Level	No	No	No	Yes	Yes
MSA Fixed Effects	No	No	No	No	Yes
Obs (school-by-year)	5,650	5,650	5,650	5,650	5,650
R^2	0.04	0.06	0.71	0.77	0.78

Main Results – Bottom of Quality Distribution (cont'd)

Difference-in-Differences Regressions

Panel B: Log Number of Housing Units

	(1)	(2)	(3)	(4)	(5)
Post x Treatment	0.097 ***	0.166 ***	0.108 ***	0.123 ***	0.116 ***
	(0.035)	(0.060)	(0.035)	(0.035)	(0.035)
Treatment (1st quintile)	1.401 ***	-0.143	-0.199 *	-0.227 *	-0.265 **
	(0.205)	(0.159)	(0.117)	(0.118)	(0.119)
Post (yr after 1996-97)	-0.035 ***	-0.082 *	-0.063 **	-0.066 **	-0.066 ***
	(0.013)	(0.046)	(0.024)	(0.026)	(0.025)
Linear Trend	0.011 ***	0.050 ***	0.033 ***	0.026 ***	0.020 ***
	(0.002)	(0.007)	(0.004)	(0.340)	(0.006)
Constant	7.670 ***	0.178	3.036 ***	1.178	0.104
	(0.137)	(0.339)	(0.338)	(0.823)	(0.908)
Controls:					
High School Demog.	No	Yes	Yes	Yes	Yes
Urbanization	No	No	Yes	Yes	Yes
County Level	No	No	No	Yes	Yes
MSA Fixed Effects	No	No	No	No	Yes
Obs (school-by-year)	5,662	5,662	5,662	5,662	5,662
R^2	0.10	0.75	0.87	0.88	0.89

Robustness Checks

Parallel trends assumption

- Diff-in-Diff unbiased estimate:
  if absent of the policy change, the average change
  in property values would have been the same for treatment & controls

Robustness Checks

Parallel trends assumption

- Diff-in-Diff unbiased estimate:
  if absent of the policy change, the average change in property values would have been the same for treatment & controls

Open enrollment Laws

- Enacted in 1995
- Both *intra* and *inter* school choice
  - Intra/within: schools *required* to take transfers
  - Inter/across: schools ***not*** *required* to take transfers

Check #1 (Pre Data) – Parallel Trends Assumption

Pre-policy Difference-in-Differences Regressions

	Panel A: Log Average Price (1990 Dollars)					Panel B: Log Number of Housing Units				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Fake Post x Treatment	-0.002	0.009	0.003	0.002	0.002	0.016	0.032	0.014	0.010	0.008
	(0.005)	(0.011)	(0.007)	(0.007)	(0.007)	(0.013)	(0.039)	(0.021)	(0.020)	(0.019)
Treatment (1st quintile)	0.154 ***	0.032	-0.021	0.013	-0.006	1.395 ***	0.192	-0.031	-0.117	-0.174
	(0.052)	(0.060)	(0.050)	(0.048)	(0.050)	(0.205)	(0.182)	(0.130)	(0.131)	(0.132)
Fake Post (yr is 1995-96)	-0.004	-0.007	-0.006	-0.005	-0.005	-0.003	-0.004	-0.001	0.001	0.002
	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.009)	(0.025)	(0.014)	(0.013)	(0.013)
Linear Trend	-0.003	0.009 **	0.006 **	0.005	0.003	0.013 **	0.034 **	0.027 ***	0.024 **	0.017
	(0.002)	(0.004)	(0.003)	(0.003)	(0.004)	(0.006)	(0.016)	(0.009)	(0.011)	(0.012)
Constant	10.184 ***	9.098 ***	9.691 ***	8.585 ***	8.596** ***	7.668 ***	0.699	3.098 ***	1.039	0.001
	(0.036)	(0.153)	(0.155)	(0.319)	(0.371)	(0.138)	(0.437)	(0.418)	(0.976)	(1.100)
Controls:										
High School Demog.	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Urbanization	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
County Level	No	No	No	Yes	Yes	No	No	No	Yes	Yes
MSA Fixed Effects	No	No	No	No	Yes	No	No	No	No	Yes
Obs (school-by-year)	1,416	1,416	1,416	1,416	1,416	1,416	1,416	1,416	1,416	1,416
R^2	0.02	0.59	0.72	0.76	0.77	0.09	0.77	0.87	0.88	0.89

Placebo/Falsification Check

- Do the analysis on the top two quintiles (where the effect should be the smallest)

- If "lower quality" districts (4th quintile) are gaining value *relative* to higher quality districts in the top end (5th quintile) of the quality distribution then we have a problem

Check #2 (Placebo) – Top of Quality Distribution

Placebo Difference-in-Differences Regressions

Panel A: Log Average Price (1990 Dollars)

	(1)	(2)	(3)	(4)	(5)
Treatment	-0.028 **	0.011	0.005	0.007	0.005
	(0.013)	(0.016)	(0.015)	(0.014)	(0.014)
Placebo Treatment	-0.443 ***	-0.146 ***	-0.134 ***	-0.087 ***	-0.095 ***
	(0.047)	(0.037)	(0.036)	(0.032)	(0.032)
Post (yr after 1996-97)	0.001	-0.054 ***	-0.057 ***	-0.051 ***	-0.050 ***
	(0.009)	(0.015)	(0.014)	(0.013)	(0.013)
Linear Trend	0.037 ***	0.061 ***	0.061 ***	0.049 ***	0.050 ***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	10.696 ***	10.268 ***	10.471 ***	9.838 ***	9.945 ***
	(0.035)	(0.114)	(0.117)	(0.325)	(0.325)
Controls:					
High School Demog.	No	Yes	Yes	Yes	Yes
Urbanization	No	No	Yes	Yes	Yes
County Level	No	No	No	Yes	Yes
MSA Fixed Effects	No	No	No	No	Yes
Obs (school-by-year)	5,491	5,491	5,491	5,491	5,491
R^2	0.19	0.64	0.66	0.73	0.74

Check #2 (Placebo) – Top of Quality Distribution

Placebo Difference-in-Differences Regressions

	Panel B: Log Number of Housing Units				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Treatment	-0.102 ***	-0.007	-0.026	-0.031	-0.036
	(0.026)	(0.042)	(0.033)	(0.033)	(0.032)
Placebo Treatment	-0.514 ***	-0.129	-0.055	0.000	0.002
	(0.155)	(0.091)	(0.083)	(0.082)	(0.082)
Post (yr after 1996-97)	0.074 ***	0.152 ***	0.133 ***	0.139 ***	0.149 ***
	(0.019)	(0.035)	(0.029)	(0.030)	(0.028)
Linear Trend	0.024 ***	0.019 ***	0.023 ***	0.014 *	0.021 ***
	(0.002)	(0.007)	(0.006)	(0.007)	(0.008)
Constant	8.216 ***	2.862 ***	3.721 ***	4.250 ***	4.530 ***
	(0.101)	(0.306)	(0.306)	(0.775)	(0.794)
Controls:					
High School Demog.	No	Yes	Yes	Yes	Yes
Urbanization	No	No	Yes	Yes	Yes
County Level	No	No	No	Yes	Yes
MSA Fixed Effects	No	No	No	No	Yes
Obs (school-by-year)	5,491	5,491	5,491	5,491	5,491
R^2	0.03	0.73	0.77	0.79	0.81

Empirical Strategies (II)

School competition

- Property value changes driven by moving
- More local schooling options imply shorter, less costly moves

Empirical Strategies (II)

School competition at the county level:

- Counties into quintiles based on their pre policy Hirfendahl-Hirshman Index (HHI) for schooling:

$$HHI = \sum_j s_j^2$$

where s_j is the market share of each high school *j* in the county

Empirical Strategies (II)

School competition at the county level:

- Counties into quintiles based on their pre policy Hirfendahl-Hirshman Index (HHI) for schooling:

$$HHI = \sum_j s_j^2$$

where s_j is the market share of each high school *j* in the county

(market share: number of students at the high school divided by the total number of students in the county)

Empirical Strategies (II)

School competition at the county level:

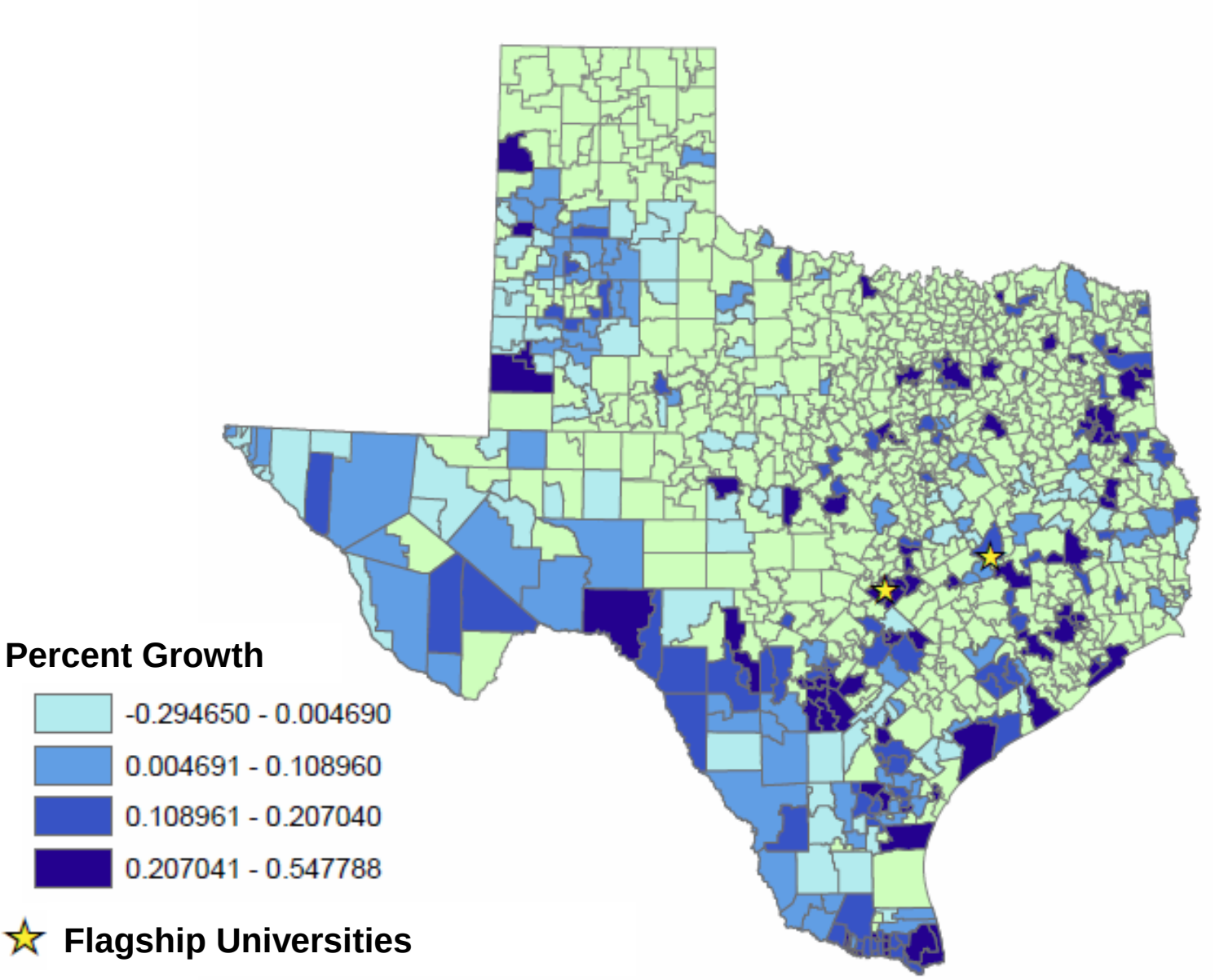
- Run a separate difference in differences for each quintile
  - Expect counties with lower HHI values to have larger reactions

Results – Schooling Competition

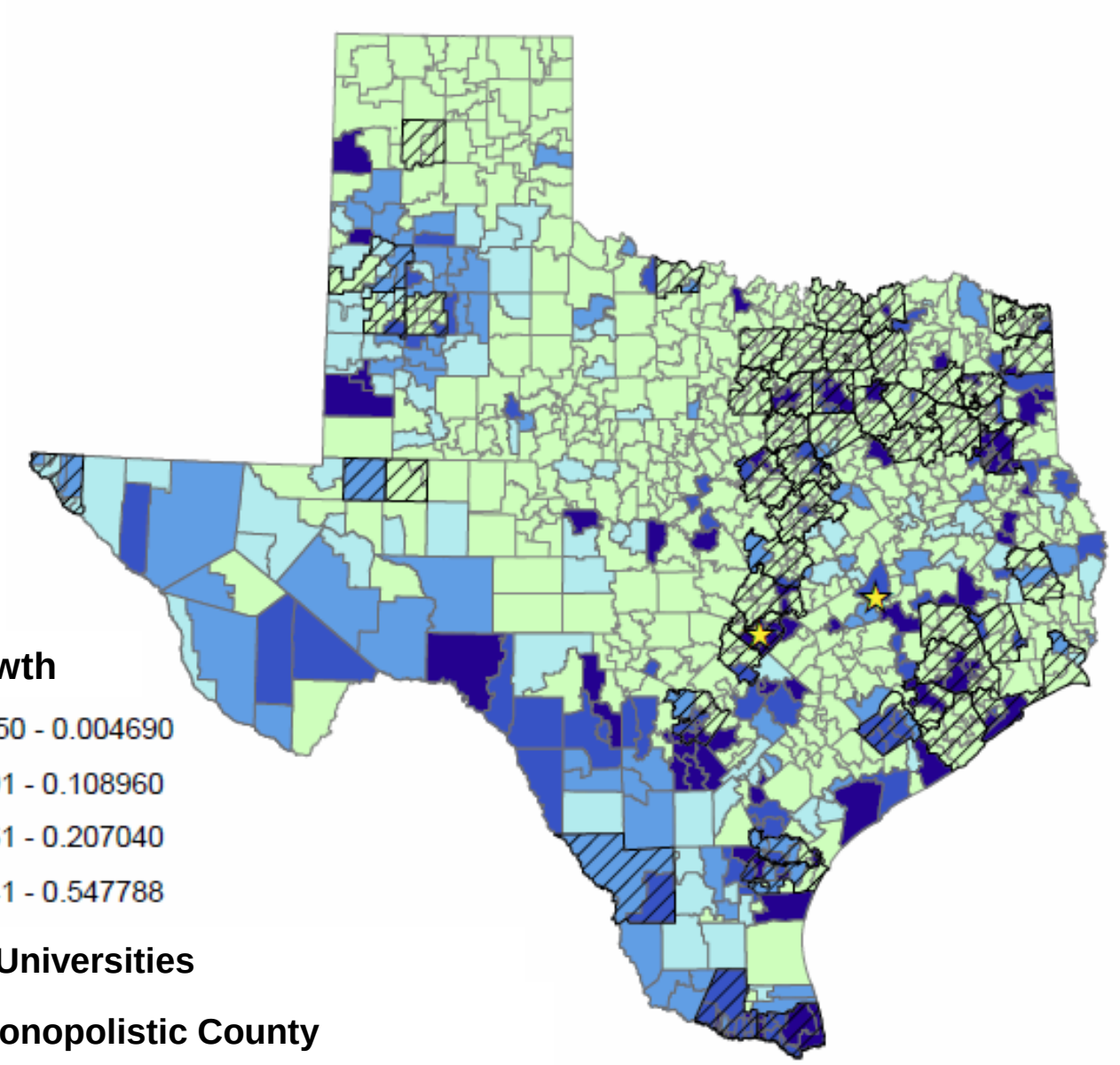
Differences-in-Differences Regressions
Subsamples by County Schooling Market Power

	Panel A: Log Average Price (1990 Dollars)	Panel B: Log Number of Housing Units
	1st Quintile HHI: *(Least Monopolistic)*	**1st Quintile HHI:** *(Least Monopolistic)*
Post x Treatment	0.034*	0.102**
	(0.019)	(0.045)
	2nd Quintile HHI:	**2nd Quintile HHI:**
Post x Treatment	-0.012	-0.054
	(0.048)	(0.097)
	3rd Quintile HHI:	**3rd Quintile HHI:**
Post x Treatment	-0.043	0.051
	(0.039)	(0.110)
	4th Quintile HHI:	**4th Quintile HHI:**
Post x Treatment	-0.079	0.175
	(0.058)	(0.128)
	5th Quintile HHI: *(Most Monopolistic)*	**5th Quintile HHI:** *(Most Monopolistic)*
Post x Treatment	-0.009	0.042
	(0.070)	(0.128)

% Growth of Average Home Values:
School Districts in the Bottom 2 Quintiles



% Growth of Average Home Values:
Non-Monopolistic School Districts



Conclusion

Top 10% Plan influence property values

- 4.9% relative value gain

Concentrated in specific areas

- Lots of school choices

Thank you!!