Lecture 11:
Paper overview

PPHA 34600
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Recap

TL;DR:

1. We can leverage time series data for identification

2. This is more powerful when combined with cross-section

3. The resulting diff-in-diff is one of the better quasi-experiments

An example: Cancer risks and housing prices

Policy issue:

- Risk can affect market outcomes
- But how much are we willing to pay to avoid issues?

Approach:

- A cancer cluster was discovered in Nevada in 2000
- We want to know the effect of this cancer on welfare
- Nobody ran an RCT to impact cancer over space...
- ...but this cancer cluster was discovered in one county and not elsewhere
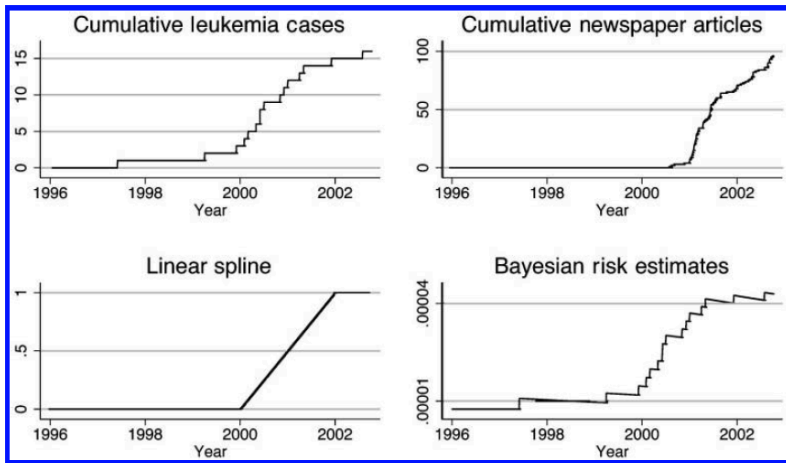
Motivating evidence

FIGURE 1. INCIDENCE RATES INCREASE AFTER 1999:
ALTERNATIVE MEASUREMENTS OF PEDIATRIC LEUKEMIA RISK FOR CHURCHILL COUNTY, NEVADA

Estimating the effects of the cancer cluster

The author will run a (simplified) version of:

$$\hat{\tau} = (\bar{Y}(treat, post) - \bar{Y}(treat, pre)) - (\bar{Y}(untreat, post) - \bar{Y}(untreat, pre))$$

Where:
$\bar{Y}$ is the average of the outcome

Balance

TABLE 1—COMPARING THE TREATMENT AND CONTROL COUNTIES

	Churchill ($n = 2495$)	Lyon ($n = 3683$)
Housing characteristics:		
Mean sales price	$116,060	$119,723
	(52,791)	(55,060)
Mean lot size (acres)	1.42	1.16
	(3.97)	(6.21)
Mean interior floor space (square feet)	1493	1480
	(461)	(438)
Mean building age (years)	16.9	10.8
	(20.8)	(15.6)
Mean class (range 1–5)	1.75	2.16
	(.59)	(.76)
Demographic characteristics:		
Population	23,982	34,501
Persons per square mile	4.9	17.3
Percentage under 18	28.9	27.1
Percentage over 65	11.9	13.7
Percentage white	84.2	88.6
Percentage high-school graduates	85.1	81.5
Percentage college graduates	16.7	11.3
Homeownership rate	65.8	75.8
Percentage multi-unit	11.7	8.1
Percentage below poverty	8.7	10.4
Median household income	$40,808	$40,699

Balance

Labor market characteristics:

Percentage employed in services	28.6	25.8
Percentage employed in government	23.8	12.1
Percentage employed in trade	18.6	18.0
Percentage employed in F.I.R.E.*	8.6	7.2
Percentage employed in agriculture	6.3	8.2
Percentage employed in construction	5.8	9.6
Percentage employed in manufacturing	5.6	14.1
Percentage employed in utilities	2.2	3.3
Percentage employed in mining	0.5	1.7
Percentage of labor force unemployed	6.2	7.4

Supporting evidence: Housing prices

Results

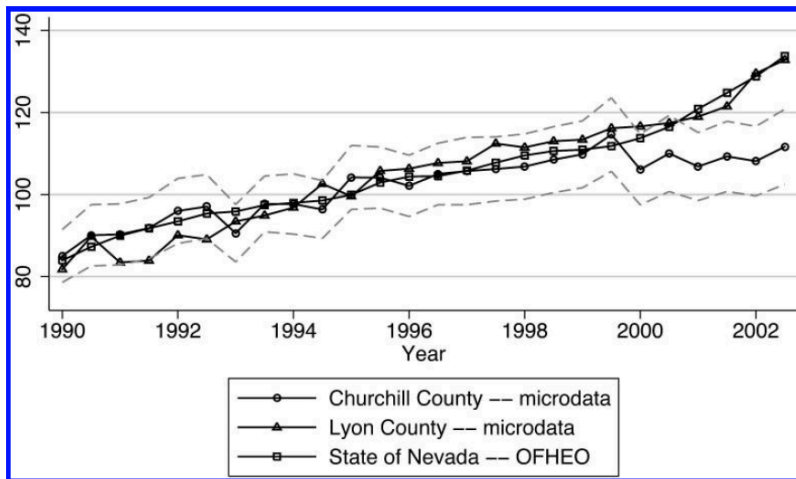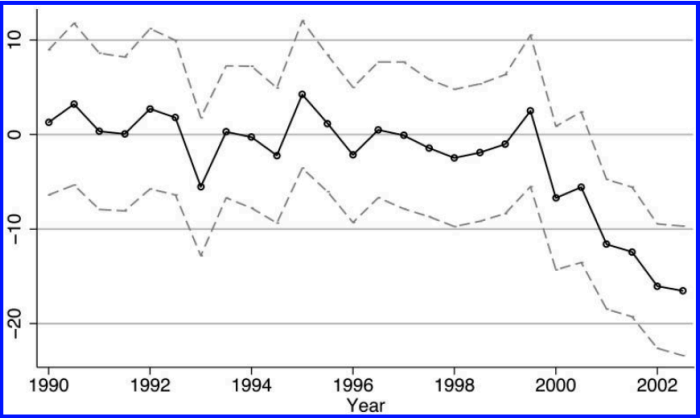TABLE 2—DIFFERENCE-IN-DIFFERENCE ESTIMATOR: MEAN LOG SALES PRICE BEFORE AND DURING LEUKEMIA INCREASE

	1990–1999	2000–2002	Difference
Churchill County	11.587 (0.408) $n = 2800$	11.550 (0.407) $n = 796$	−0.037
Lyon County	11.627 (0.403) $n = 4323$	11.667 (0.342) $n = 2285$	0.040
Relative difference			−0.077 (0.019)

Results

Results

	OLS (1)	OLS (2)	FE
Leukemia risk (linear spline)	−0.123	−0.156	−0.140
	(0.013)	(0.017)	(0.015)
Lot size (acres)	0.011	0.012	—
	(0.002)	(0.002)	
Lot size squared	−1.88E-05	−2.02E-05	—
	(3.20E-06)	(3.18E-06)	
Floor space (square feet, 100s)	0.054	0.044	—
	(0.001)	(0.001)	
Building age (years)	−0.009	−0.006	—
	(0.001)	(0.001)	
Building age squared	3.57E-05	1.20E-05	—
	(8.61E-06)	(8.42E-06)	
Churchill County dummy	—	0.068	—
		(0.009)	
Class dummies	no	yes	—
Year dummies	no	yes	yes
Month dummies	no	yes	yes
n	10204	10204	4922
R^2	0.60	0.63	0.05

Results

	Standard Prior	Low Mean Prior	High Mean Prior	Low Variance Prior	High Variance Prior
Risk estimate 1997	2.59	1.29	5.18	2.59	2.59
	(1.71)	(1.21)	(2.42)	(1.25)	(2.53)
Risk estimate 2002	14.5	13.6	16.4	9.82	22.6
	(3.48)	(3.37)	(3.71)	(2.23)	(5.64)
VPL-least squares	$5.55	$5.39	$5.88	$9.20	$3.28
	(0.60)	(0.58)	(0.64)	(0.99)	(0.36)
VPL-fixed effects	$5.00	$4.88	$5.26	$8.29	$2.97
	(0.46)	(0.44)	(0.48)	(0.75)	(0.28)