Multimarket Contact in the Hospital Industry

Matt Schmitt (2018, *AEJ: Economic Policy)*

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Motivation

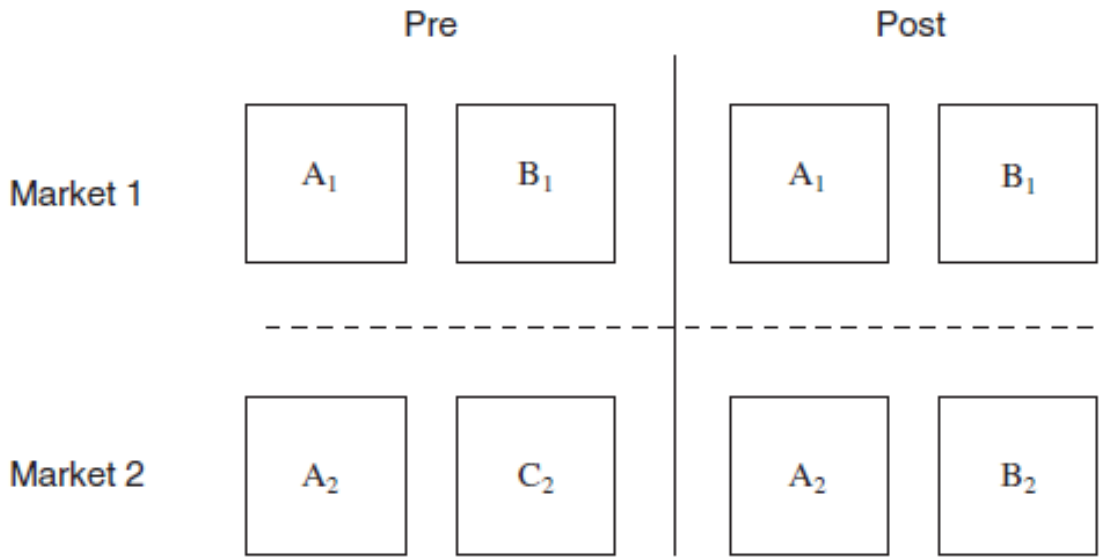

FIGURE 1. TWO MARKET, TWO HOSPITAL EXAMPLE

Notes: The left panel (pre) depicts hospital ownership prior to the acquisition of hospital C_2. The right panel (post) depicts hospital ownership after hospital C_2 is acquired by system B. After the acquisition, systems A and B compete with one another in both markets.

Motivation

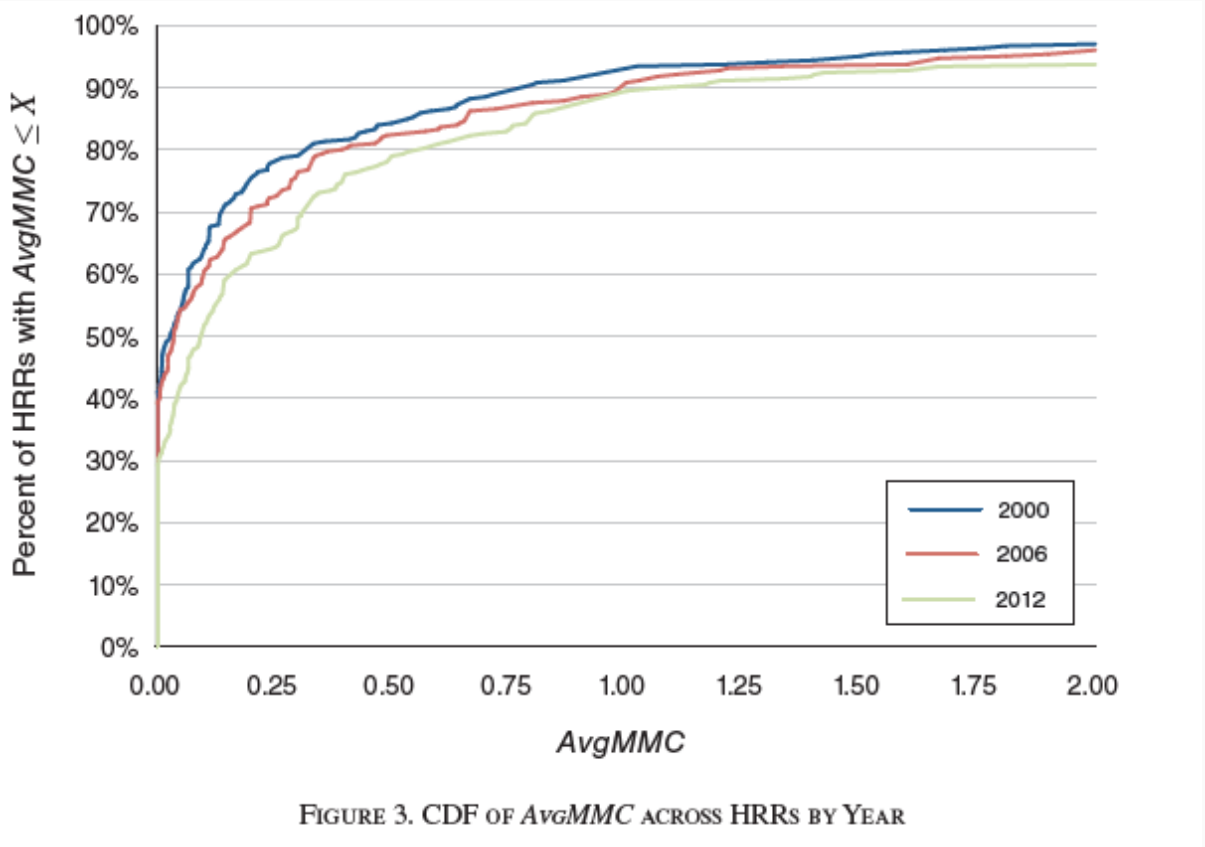

FIGURE 3. CDF OF *AvgMMC* ACROSS HRRS BY YEAR

RQ: Did increased multimarket contact lead to an increase in hospital prices from 2000-2010?

Contribution

- Updates and extends prior work on multimarket contact in the hospital industry (Boeker et al. 1997, Stephan et al. 2003)
- Adds to literature showing that out-of-market mergers can lead to higher prices (Vistnes & Sarafidis 2013, Dafny, Ho & Lee 2016, Lewis & Pflum 2017)
- More generally, adds to the literature on the effects of market structure on hospital performance and behavior

Preview of Findings

- "Following an increase in multimarket contact generated by an out-of-market merger, affected hospitals are estimated to experience price increases of 6-7%."
  - Robust to different sets of controls
  - Robust to choice of control group
- No evidence of indirect effects, only direct
- Greatest effects for medium-concentration HRRs

Data

Data sources:

- AHA's *Annual Survey of Hospitals*
- Irving Levin's *Hospital Acquisition Report*
- Archived news stories and hospital websites

Example of Treated Hospitals:

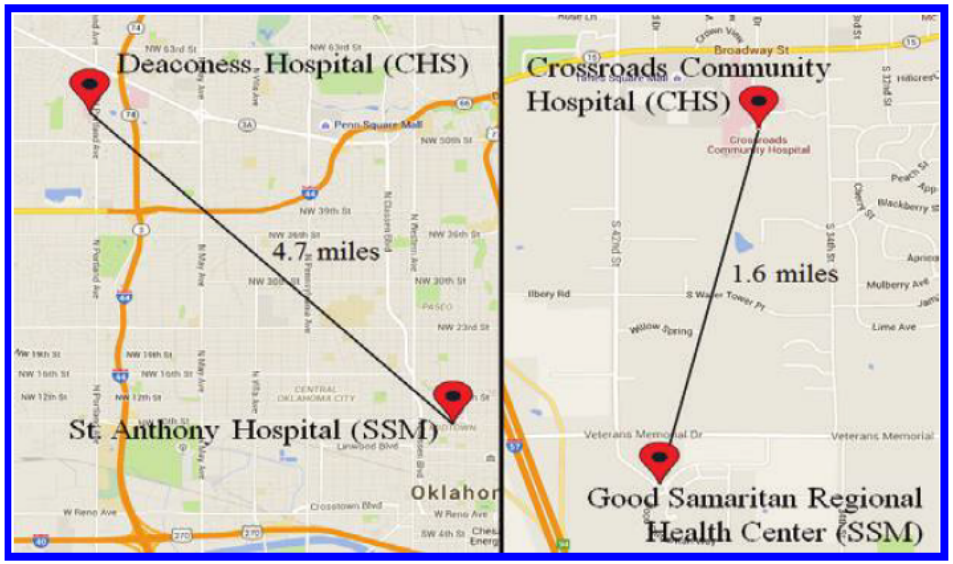

FIGURE 5. EXAMPLE OF OUT-OF-MARKET M&A AND MULTIMARKET CONTACT

Notes: The left panel is Oklahoma City, OK and the right panel is Mount Vernon, IL. In 2006, Community Health

Data

TABLE 1—COMPARING TREATMENT AND CONTROL HOSPITALS

	Treatment	All controls	Matched controls	Absolute standardized difference: All controls	Absolute standardized difference: Matched controls
Hospitals	347	2,603	347	–	–
Price	$7,846	$5,976	$7,483	0.602	0.117
Total discharges	10,702	5,014	8,956	0.773	0.237
Case mix index	1.45	1.22	1.40	0.884	0.220
Percent Medicaid	0.134	0.129	0.138	0.045	0.041
Beds	244.7	125.3	203.1	0.789	0.275
For-profit	41.5%	8.5%	24.2%	1.000	0.525
HHI	0.277	0.587	0.369	0.993	0.295
Other system members	65.0	7.5	28.8	1.468	0.925
Metro (in an MSA)	88.2%	44.9%	88.2%	0.865	0.000
Census division					
East north central	12.4%	15.8%	12.4%	0.093	0.000
East south central	6.6	8.8%	6.6%	0.076	0.000
Middle Atlantic	5.5%	9.7%	5.5%	0.146	0.000
Mountain	6.1%	8.3%	6.1%	0.084	0.000
New England	0.3%	5.7%	0.3%	0.246	0.000
Pacific	23.3%	8.3%	23.3%	0.498	0.000
South Atlantic	28.0%	12.5%	28.0%	0.440	0.000
West north central	4.3%	17.7%	4.3%	0.363	0.000
West south central	13.5%	13.3%	13.5%	0.009	0.000

Notes: All statistics are measured in 1998, or the first year a hospital appears in the data if later than 1998. Price is measured in 2010 dollars. The absolute standardized difference is the absolute value of the difference in means divided by the standard deviation.

Empirical Framework

Schmitt estimates the following model specifications:

$$\ln(price_{ht}) = \alpha_h + \gamma_t + \lambda \cdot \mathbf{1}\left[t \geq \tau_h, h \in \mathcal{M}\right] + X_{ht}\beta + \varepsilon_{ht}$$

$$\ln(price_{ht}) = \alpha_h + \gamma_t + \sum_{k=-4}^{4} \lambda_k \cdot \mathbf{1}\left[t \geq \tau_h + k, h \in \mathcal{M}\right] + X_{ht}\beta + \varepsilon_{ht}$$

where

- τ_h denotes the treatment timing for hospital h
- $\mathcal{M}$ denotes the set of treatment hospitals
- X_{ht} includes log case mix index, % Medicaid discharges, log total beds, for-profit status, HHI (bed shares), and number of system members.

DiD Results

TABLE 2—DIFFERENCE-IN-DIFFERENCES MMC REGRESSIONS

		Control group		
	All	All	Matched	Matched
	(1)	(2)	(3)	(4)
Panel A. Post only (equation (2))				
Post ($t \geq \tau_h$)	0.064	0.070	0.060	0.065
	(0.017)	(0.018)	(0.019)	(0.019)
Control variables		✓		✓
Hospitals	2,950	2,943	694	692
Observations	39,374	39,080	10,645	10,535
R^2	0.766	0.770	0.708	0.713

Event Study Results

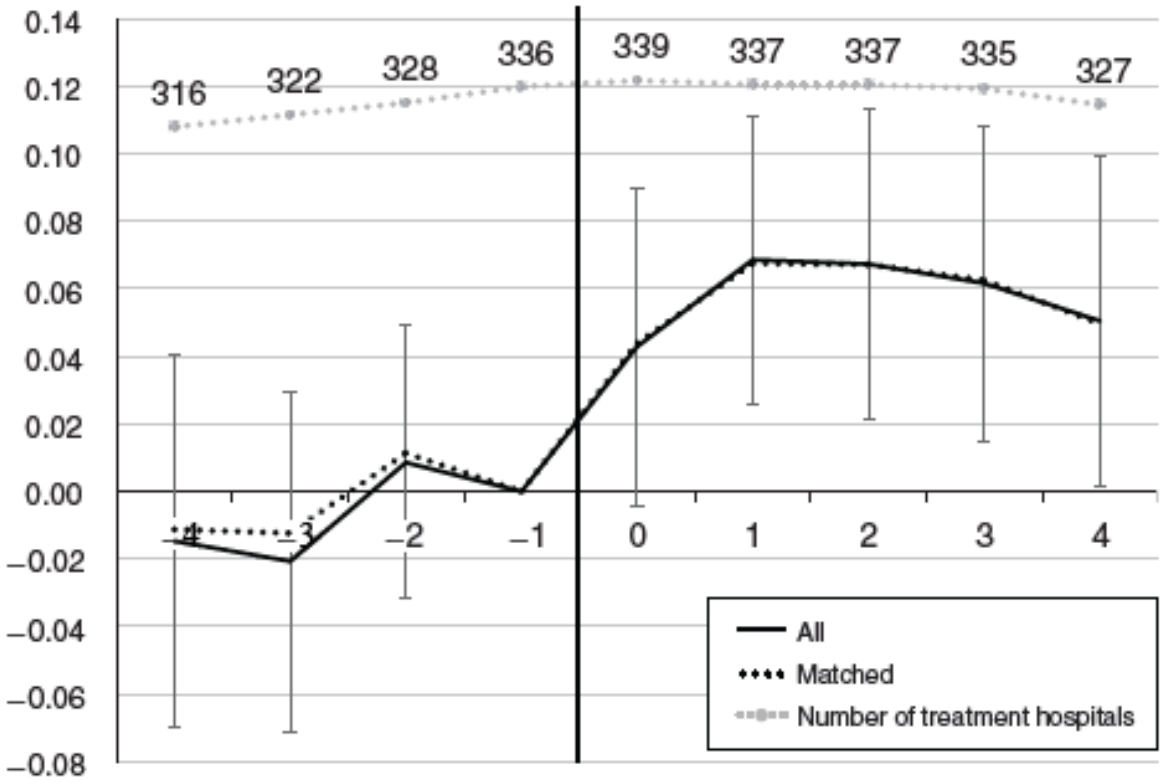

FIGURE 7. LEADS AND LAGS RESULTS

Notes: The figure plots the estimated λ_k coefficients from panel B of Table 2, columns 1 and 3. The year before treatment ($t = \tau_h - 1$) is the omitted category. Ninety-five percent confidence intervals are plotted for the all controls specification. The number of treatment hospitals entering the regression for each period is plotted above the coefficient estimates. These counts are not equal to the total number of treatment hospitals (347) because of occasionally missing price data.

Effect Heterogeneity

TABLE 3—INDIRECT EFFECTS AND EFFECT HETEROGENEITY

	(1)	(2)	(3)	(4)
Post direct	0.069			
	(0.018)			
Post indirect	−0.017			
	(0.015)			
H_0: effects are equal	0.0001			
Post × (HHI < 0.15)		0.028		
		(0.025)		
Post × (0.15 ≤ HHI < 0.25)		0.122		
		(0.033)		
Post × (HHI ≥ 0.25)		0.055		
		(0.025)		
H_0: effects are equal		0.059		
Post × (Bed Share < 0.2)			0.059	
			(0.035)	
Post × (0.2 ≤ Bed Share < 0.5)			0.082	
			(0.027)	
Post × (Bed Share ≥ 0.5)			0.061	
			(0.025)	
H_0: effects are equal			0.806	
Post × (Size Diff ≤ 0)				0.070
				(0.024)
Post × (Size Diff > 0)				0.071
				(0.022)
H_0: effects are equal				0.974
Hospitals	3,372	2,943	2,943	2,943
Observations	46,099	39,080	39,080	39,080
R^2	0.765	0.770	0.770	0.770

Notes: Standard errors are clustered by hospital and observations are weighted by inpatient discharges. All specifications are estimated using the all control group and include hospital fixed

Distinguishing from Other Theories

TABLE 4—DISTINGUISHING MULTIMARKET CONTACT FROM ALTERNATIVE THEORIES

		Control group:	
	All	Matched	Same-system
	(1)	(2)	(3)
Main results (non-Medicare price)			
Post ($t \geq \tau_h$)	0.070	0.065	0.054
	(0.018)	(0.019)	(0.022)
Medicare price falsification test			
Post	−0.000	0.005	0.002
	(0.006)	(0.006)	(0.006)
Active and passive effects			
Post active	0.084	0.079	0.068
	(0.029)	(0.029)	(0.031)
Post passive	0.058	0.052	0.041
	(0.019)	(0.020)	(0.022)
H_0: effects are equal	0.415	0.396	0.392
In-state and out-of-state effects			
Post in-state	0.071	0.066	0.055
	(0.019)	(0.021)	(0.023)
Post out-of-state	0.068	0.062	0.052
	(0.033)	(0.034)	(0.036)
H_0: effects are equal	0.925	0.904	0.933

Notes: Standard errors are clustered by hospital and observations are weighted by inpatient discharges. All specifications include hospital fixed effects, year fixed effects, and all control vari-

Thoughts & Concerns

Thoughts:

- Very cool and straightforward paper!

Concerns:

- What's the mechanism? How could we observe potential (tacit) collusion?
- What's in the parentheses?? Why not use stars or make a note?