Mergers and marginal costs: New evidence on hospital buyer power

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- Motivation: classic bargaining question of understanding the merger effect in real life, understanding the hospital input market.
- Research question: the merger effect on the negotiated price.
- Contribution: Novel data
- Preview of findings: merging resulted in saving costs (increase in bargaining power)

Hospital market and mergers

- Upstream input market ✓

- Downstream insurer market

- The welfare effect of mergers is unsure.

Data

- PriceGuide benchmarking service:
    hospital purchasing data (price, quantity, transaction month, supplier)

- CMS (Center for Medicare and Medicaid Services), AHA (American Hospital Association):
    Hospital data and merger information.

Variation in Price

Item (Non-PPI)	$CV_{h \setminus jmy}$	Item (PPI)	$CV_{h \setminus jmy}$
Nylon sutures	0.27	Intraocular lenses	0.13
Bone wres	0.38	Spinal rod implants	0.32
Surgical drapes	0.28	Mammary prosth.	0.11
Tracheal tubes	0.54	Acetabular hip prosth.	0.30
Trocars	0.31	Spinal stimulators	0.13
Average	0.25	Average	0.18

Table: Summary of Product Categories

CV: within-brand-month coefficient of variation across hospitals, averaged across all brand-months (higher CV: more variation)

Estimation

TWFE:

$$
\begin{aligned}
\ln P_{uhjmy} &= \alpha_u * 1[y = \tau_h] + \beta_u * 1[y > \tau_h] \\
&\quad + \theta_{hj} + \theta_{jmy} + X_{hmy}\theta^X + \epsilon_{uhjmy}
\end{aligned} \tag{1}
$$

- u: product category, h: hospital, j: brand, m: month, y: year
- τ_h: the year of hospital h's merger (if any)
- Separate regressions for acquirers and targets
- β_u: the TE on unit price of u. $\Leftarrow$ weighting using quantity share[1].
- Control group: never merged / before merged

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[1] within h, weight b using quantity share(fixed at first obs')

Estimation

Hospital fixed effect

$$\ln P_{uhjmy} = \alpha_u * 1[y = \tau_h] + \beta_u * 1[y > \tau_h]$$
$$+ \theta_{uh} + \theta_{jmy} + X_{hmy}\theta^X + \epsilon_{uhjmy} \qquad (2)$$

- u: product category, h: hospital, j: brand, m: month, y: year
- Weight hospital-brand-year using the brand's quantity share within the hospital-year.
  $\Rightarrow$ the effect of mergers on negotiated prices per unit across all brands within-category.

Identification - Parallel Trend

Homogeneity of the hospitals

TABLE 3   Comparison of Merging and Non-Merging Hospitals

	(1) Controls	(2) Target Controls (Matched)	(3) Targets	(4) Acquirer Controls (Matched)	(5) Acquirers
Panel A: Non-PPI Purchasers					
FTEs	2540	2533	2246	2893	2713
Technologies	74.26	77.69	76.13	79.28	79.53
Beds	355.08	333.62	306.37	406.51	404.91
Number of unique products	49.09	32.24	34.95	37.77	42.01
Average monthly quantity	244.80	326.99	356.36	229.31	220.11
Admissions	17,431	16,936	15,384	20,458	19,995
Teaching	0.55	0.49	0.39	0.63	0.60
Non-Profit	0.75	0.94	0.91	0.81	0.77
Number of HMO contracts	1.68	1.95	2.05	1.89	1.85
Percent Medicaid	0.20	0.16	0.15	0.19	0.20
Percent Medicare	0.44	0.49	0.51	0.45	0.45
Output price	12,440	12,397	9,518	12,624	12,593
Input price index (θ_h)	4.95	4.96	4.93	4.95	4.92
Number of hospitals	433	286	33	369	85
Panel B: PPI Purchasers					
FTEs	2674	2484	2366	2945	2897
Technologies	75.74	78.78	79.62	78.86	81.46

- Monthly event studies with different pre/post-merger time horizons. (pseudo-treatment?)

Identification - Endogeneity of Treatment

- Monthly event studies with different pre/post-merger time horizons. (pseudo-treatment?)
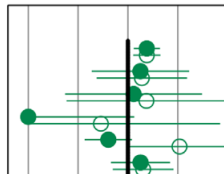
- Merged: Only when DoJ approved.

- Monthly event studies with different pre/post-merger time horizons. (pseudo-treatment?)

- Merged: Only when DoJ approved.

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$$\text{Price}^d \perp\!\!\!\perp \text{Merge} \mid \text{Controls?}$$

(1) *hj* fixed effect: solid, (2) *h* fixed effect: hollow.
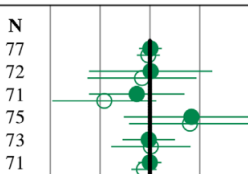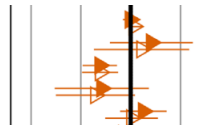
Results - Pooled product class price effects

TABLE 4   Merger Treatment Effects—Pooled

Dependent Variable:	$\ln(Price)_{uhjmy}$			
Non-PPIs	-0.006	0.003	-0.004	-0.012^{**}
	(0.008)	(0.011)	(0.004)	(0.005)
PPIs	$-0.034\dagger$	$-0.038\dagger$	$0.017\dagger$	0.012^{**}
	(0.010)	(0.009)	(0.006)	(0.005)
Fixed effects:	$\theta_{uhj} + \theta_{jmy}$	$\theta_{uh} + \theta_{jmy}$	$\theta_{uhj} + \theta_{jmy}$	$\theta_{uh} + \theta_{jmy}$
Treatment:		Targets		Acquirers

Notes: Authors' calculations from PriceGuide data. $*p < 0.10$, $**p < 0.05$, $\dagger p < 0.01$. Standard errors clustered at the hospital-brand level in parentheses. Coefficients estimated from pooled specifications (1) and (2). The dependent variable $\ln(Price)$ is the logged transaction price measured at the hospital-brand-month-year. All price specifications include brand-month-year fixed effects.

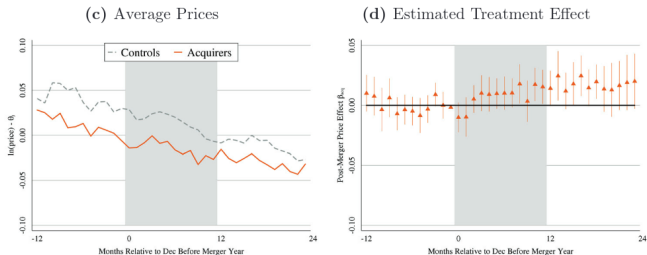Acquirers, PPI: price has gone up

Results - Event Study (PPI)

Panel A: Targets

(a) Average Prices   (b) Estimated Treatment Effect

Panel B: Acquirers

(c) Average Prices   (d) Estimated Treatment Effect
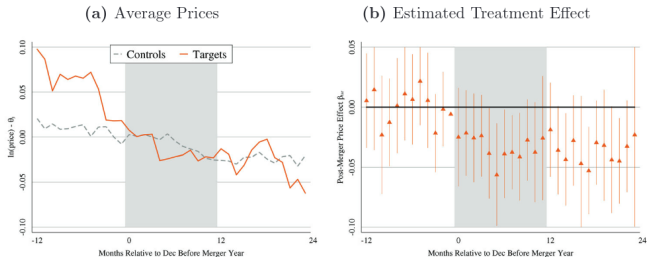
Conclusion

- Using the richer data directly analyzed the effect of merging.

- Endogeneity?

- Treatment timing?

References

S. Craig, M. Grennan, A. Swanson, 2021, Mergers and marginal costs: New evidence on hospital buyer power