Does Reality Match?: Empirical retrospectives of UPP & HHI theories by Garmon (2017)

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Overview

1. Hospital Mergers
2. Data sources
3. Theory
4. Estimation
5. Results
6. Limitations

Intro: Hospital Mergers

1. Number of hospital mergers between 1997-2001 where FTC lost every case and prices went up a lot.
2. Useful because we can evaluate predictive power of merger analysis methods without selection bias caused by blocked mergers.
3. Hospital mergers have a big impact on the economy!
4. tools used from class include HHI, Diversion Ratios, UPP.

The Data

Appendix B: Sample of Mergers

State Data Used	Alternate Control Bed Threshold	MSA	Choice Population	Acquiring System	Primary Hospital in Acquiring System	Acquired Hospital
NC	100		HRR	Moses Cone	Moses Cone Memorial Hospital	Annie Penn Hospital
PA/NY	100		Combined PSA	Upper Allegheny Health System	Olean General Hospital	Bradford Regional Medical Center
NC	100	Wilmington	HRR	New Hanover Regional Medical Center	New Hanover Regional Medical Center	Cape Fear Memorial Hospital
MO	100	Columbia	HRR	University of Missouri Health Care	University Hospitals and Clinics	Columbia Regional Hospital
NC	100	Greensboro-Winston-Salem-High Point	HRR	Novant Health	Forsyth Memorial Hospital	Community General Hospital
NY	100	Syracuse	HRR	Upstate University Hospital	Upstate University Hospital	Community-General Hospital of Greater Syracuse
MO	100		HRR	Tenet	Lucy Lee Hospital	Doctors Regional Medical Center
NC	100	Raleigh-Durham-Chapel Hill	HRR	Duke	Duke University Medical Center	Durham Regional Hospital
PA	100		HRR	Schuylkill Health System	Pottsville Hospital	Good Samaritan Hospital
NC	100	Hickory-Morganton-Lenoir	Combined PSA	Carolinas Healthcare	Valdese General Hospital	Grace Hospital
AR	0	Hot Springs	HRR	Mercy	St. Joseph's Mercy Health Center	Healthpark Hospital
GA	100	Atlanta-Sandy Springs-Marietta	HRR	Piedmont	Piedmont Hospital	Henry Medical Center
NC	100	Greenville & Rocky Mount	HRR	UHS East	Pitt County Memorial Hospital	Heritage Hospital
NC	100	Fayetteville	HRR	Cape Fear Valley Health System	Cape Fear Valley Health System	Highsmith-Rainey Memorial Hospital
CT	100	New Haven-Milford	HRR	Yale	Yale-New Haven Hospital	Hospital of Saint Raphael
PA	100	Philadelphia-Camden-Wilmington	HRR	Abington Health	Abington Memorial Hospital	Lansdale Hospital

$N = 12$

UPP model

MCO k,
New customers who join because of coverage at hospital j - y_j
New people admitted to hospital j because of coverage - y_h
People admitted to alternative hospital i - y_i

$$\pi_k = Premium \times policy - costs \times policy \ - payment \ \times admit(h)$$
$$= \rho_k y_j - c_k y_j - \sum p_j y_h$$

$$\max_{p_j} \{ (\underbrace{\rho_k y_j - c_k y_j - p_j y_h}_{\text{k's profit from adding j}})^{(1-\gamma)} (\underbrace{p_j y_h - c_j y_h}_{\text{j's new proft}})^{\gamma} \}$$

$$\text{FOCs give: } P_j = \frac{\gamma \pi_k + (1-\gamma) c_j y_h}{y_h}$$

$$\max_{p_j}\{(\underbrace{\rho_k y_j - c_k y_j - p_j y_h}_{\text{k's profit from including j}})^{(1-\gamma)}(\underbrace{p_j y_h - c_j y_h - d_{hi}(\overbrace{p_j y_i - c_j y_i}^{\text{diverted profit}})}_{\text{j's net profit}})^{\gamma}\}$$

$$\text{FOCs give: } P_j = \frac{\gamma\pi_k + (1-\gamma)c_j y_h}{y_h} + (1-\gamma)(p_i - c_i)d_{hi}$$

$$\%\Delta p_j = \frac{p^{post} - p_j}{p_j} = (1-\gamma)\left(\frac{p_i - c_i}{p_i}\right)\left(\frac{p_i}{p_j}\right)d_{hi}$$

HHI

for market m

$$HHI_m = \sum_{h \in m} s_h^2$$

where m is the area in which $< 10\%$ of people leave the area for service and where $< 10\%$ of patients are from outside the area. and s_h is

- the share of beds
- the share of admissions of patients residing in the area

Estimation

Estimate prices

$$\bar{P}_{ht} = \alpha_t P_{ht} + \epsilon_{ht}, \qquad \epsilon \sim N(0, \sigma)$$

Estimate price changes

$$P_{ht} = \alpha + \beta_1 POST_{ht} + \beta_2 POST_{ht} \times MERGED_{ht} + \Gamma \delta_h + \epsilon_{ht}$$

Results

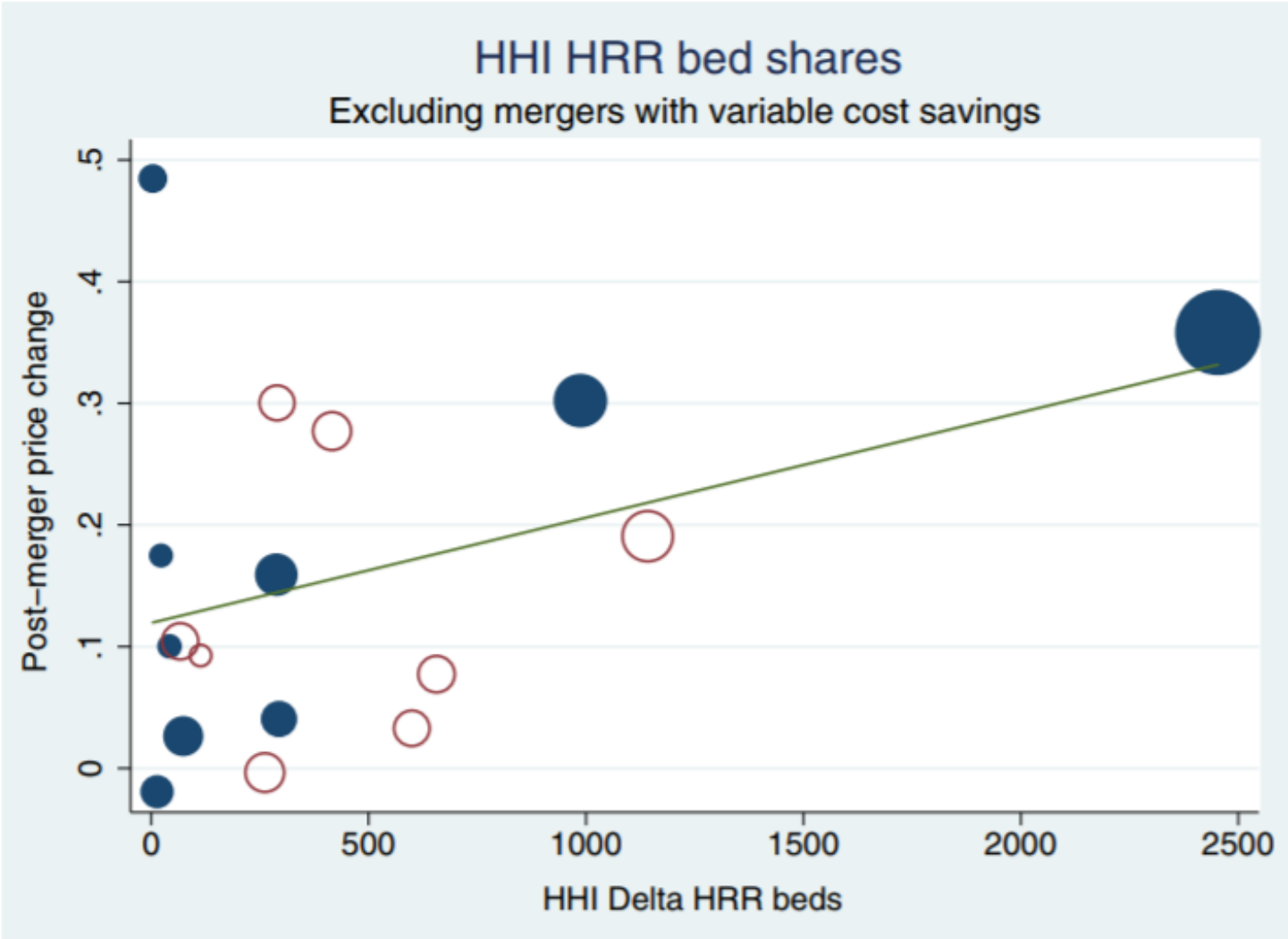
TABLE 2 Correlation between Price Changes and Combinations of Merger Screens

	Entire Sample		Excluding Mergers with Variable Cost Savings	
Combining rule	WTP	UPP	WTP	UPP
Minimum	0.15	0.21	0.47	0.40
Maximum	−0.04	0.04	0.34	0.32
Mean	0.02	0.11	0.40	0.36
Convex combination[a]	0.03	0.12	0.43	0.37

[a]Using weights from Raval, Rosenbaum, and Wilson (2016): Semiparametric (0.5), Parametric w/Hospital Characteristics (0.26), Parametric w/Hospital Fixed Effects (0.24).

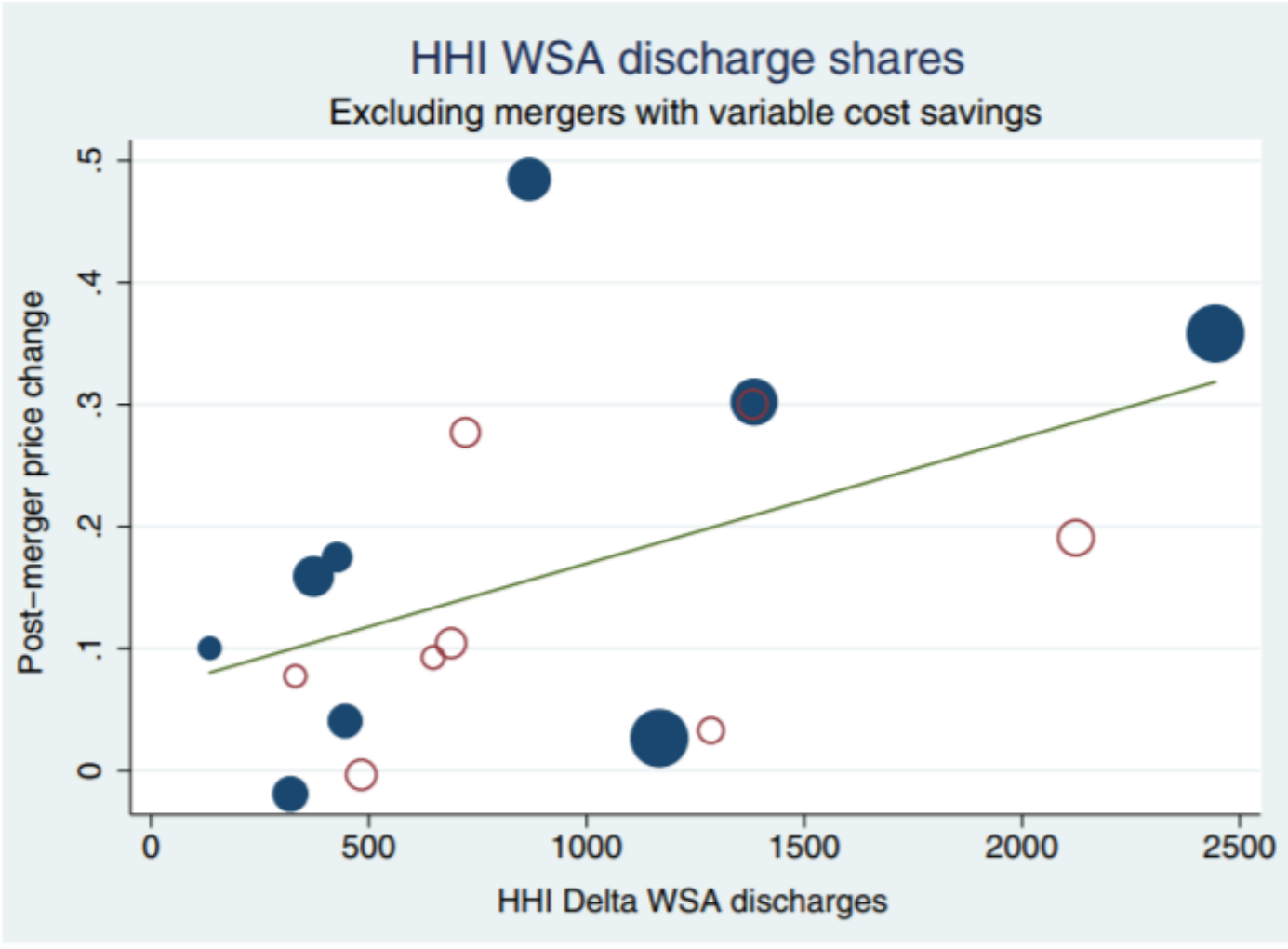
$N = 12$

POST-MERGER PRICE CHANGE AND HHI DELTA (BED SHARES IN THE HRR) [Color figure can be viewed at wileyonlinelibrary.com]



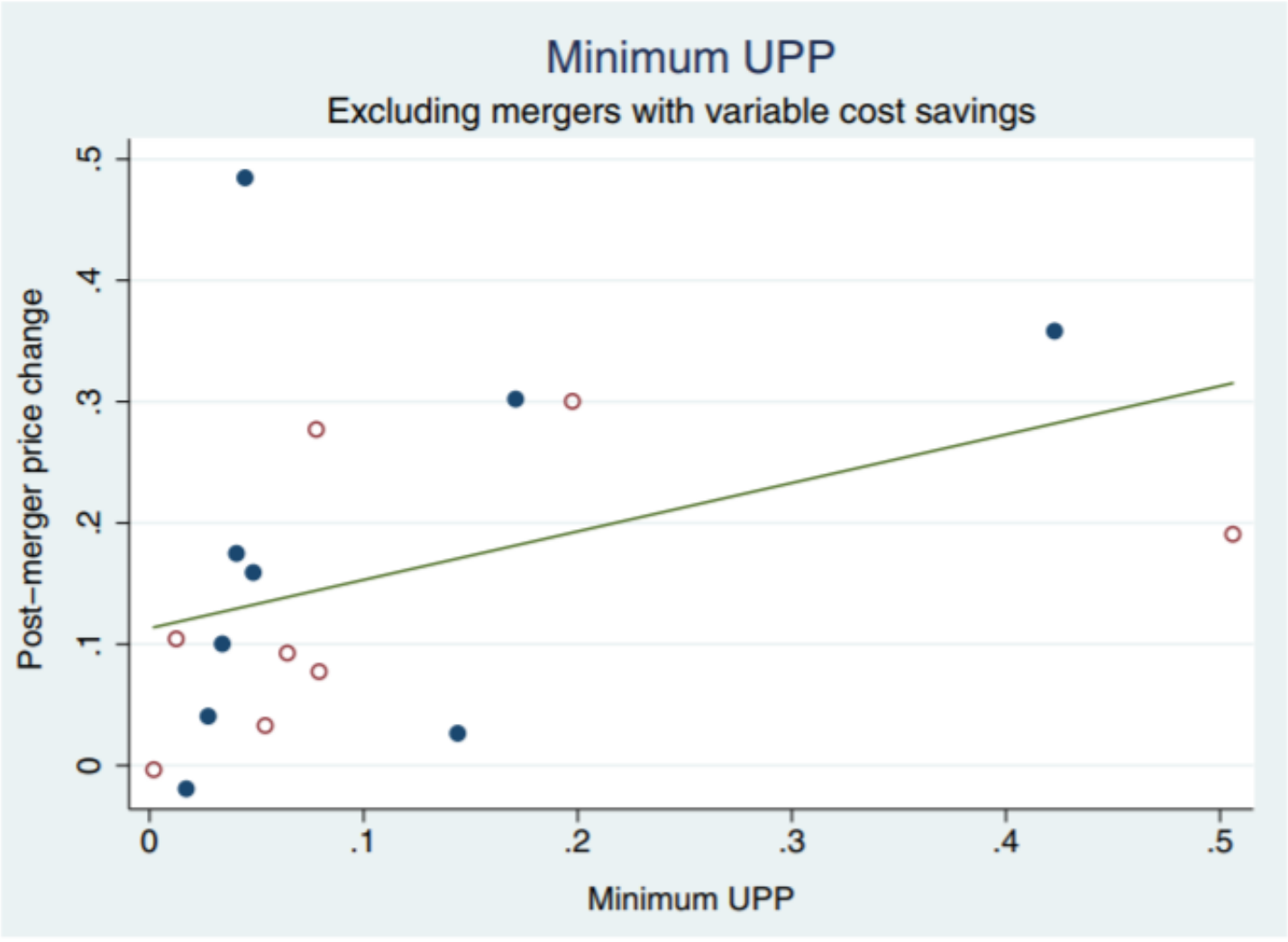
(Larger dots indicate larger post-merger HHI levels. Hollow dots are Missouri/North Carolina.)

POST-MERGER PRICE CHANGE AND HHI DELTA (DISCHARGE SHARES IN THE WSA) [Color figure can be viewed at wileyonlinelibrary.com]



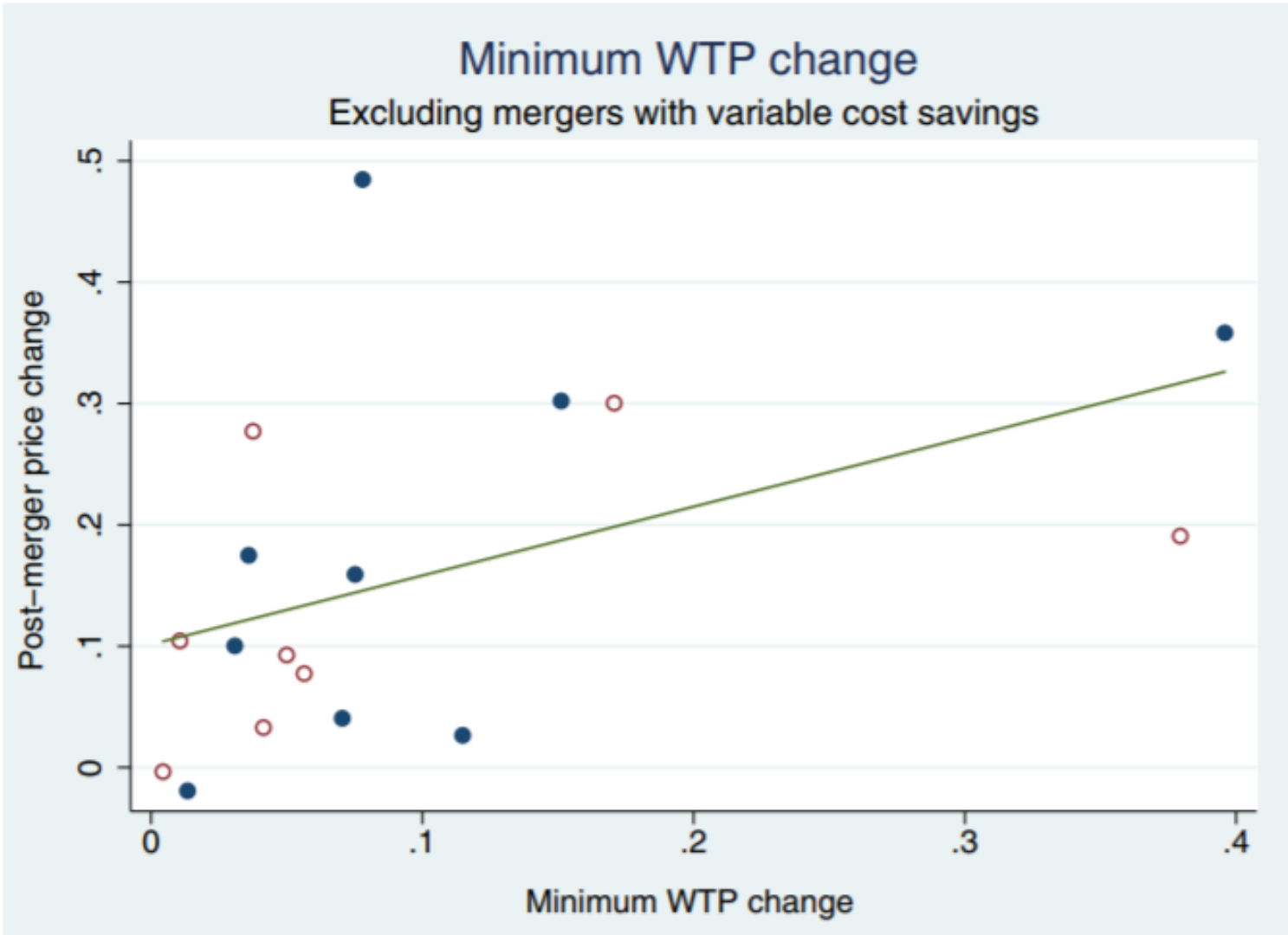
(Larger dots indicate larger post-merger HHI levels. Hollow dots are Missouri/North Carolina.)

POST-MERGER PRICE CHANGE AND MINIMUM UPP [Color figure can be viewed at wileyonlinelibrary.com]



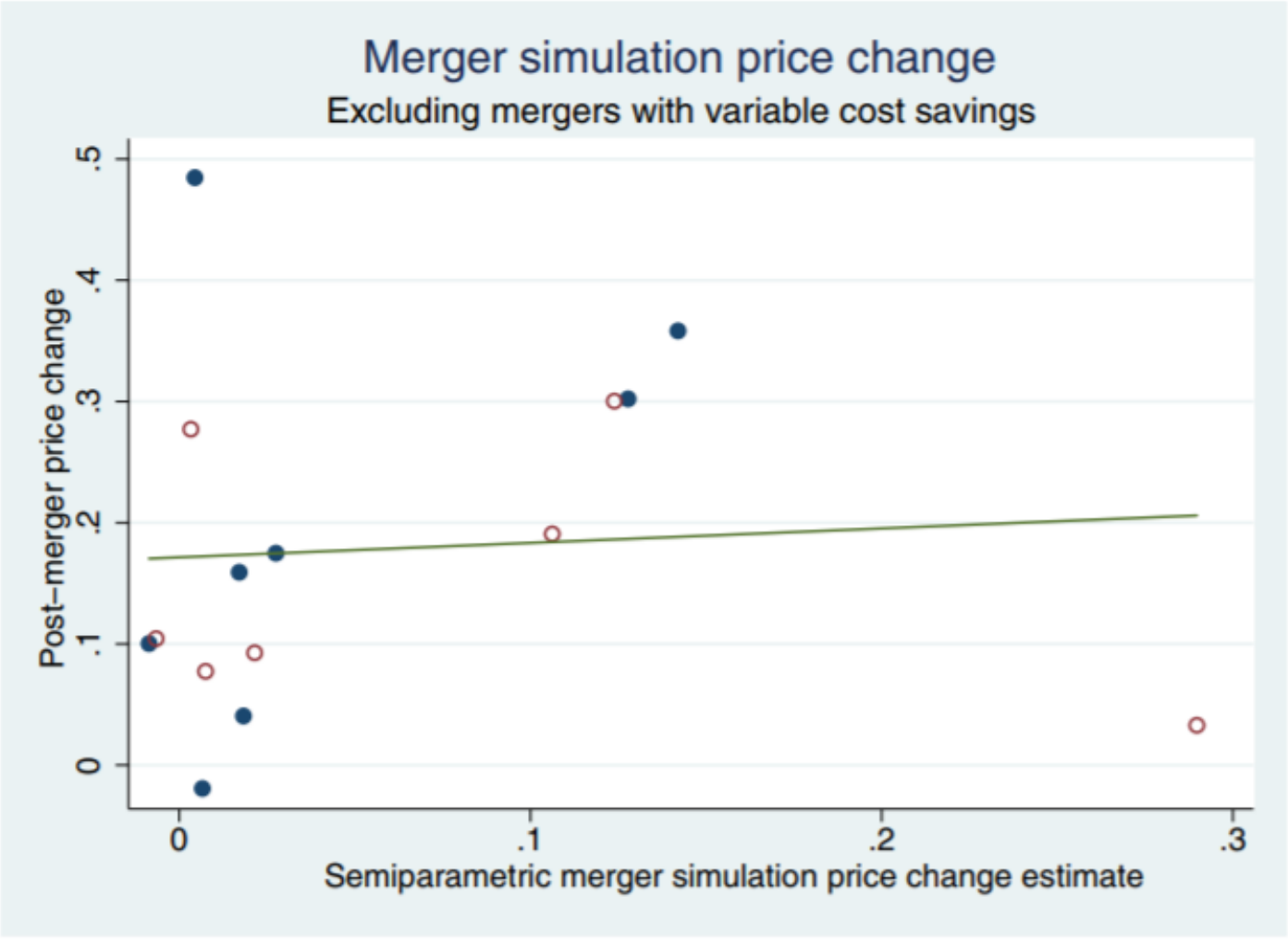
(Hollow dots are Missouri/North Carolina.)

POST-MERGER PRICE CHANGE AND MINIMUM WTP CHANGE [Color figure can be viewed at wileyonlinelibrary.com]



(Hollow dots are Missouri/North Carolina.)

POST-MERGER PRICE CHANGE AND WTP-BASED MERGER SIMULATION [Color figure can be viewed at wileyonlinelibrary.com]



(Hollow dots are Missouri/North Carolina.)

Takeaway and Limitations: Usual Disclaimers Apply

Takeaway: Willingness to Pay (WTP) and UPP outperformed performed HHI metrics in some circumstances.
Limitations:

- No statistically significant differences in full sample.
- This isn't a rigorous empirical test - there are a million things potentially wrong with the empirical specification.
- The question is whether the tests are even a reasonable first order screen.
- They are all useful if variable costs do not change, but how can we know if variable costs will change?