

Price Discrimination and Bargaining:

Empirical Evidence from Medical Devices

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Research Questions

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The Model

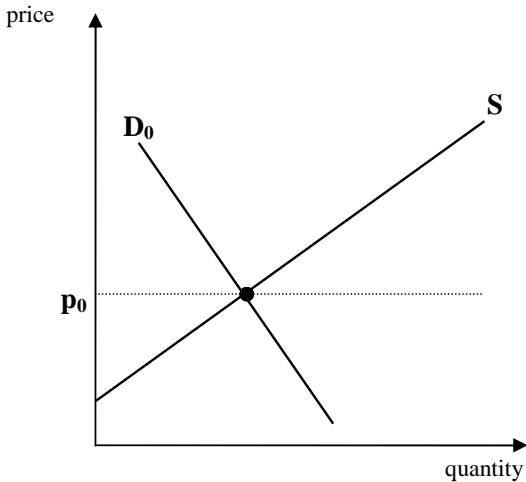
AGE: Price barrier and competition

p, wtp, c, ba for a stents at each hospital for contract period

AGE: Demand patients arrive doctors choose

q, p, wtp for a stents at each hospital for each month

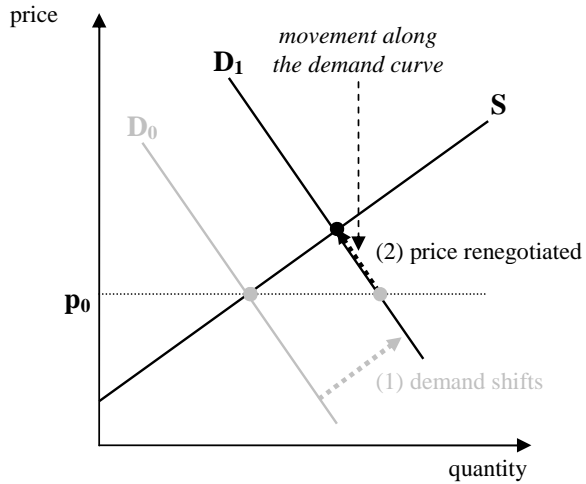
Demand Identification with Negotiated Prices



Demand Identification with Negotiated Prices



Demand Identification with Negotiated Prices



Pricing Model: Bargaining and Competition

Incorporate cost ~~de~~ and ~~co~~mpetition, range, and bargaining ability


Pricing Model: Bargaining and Competition

Incorporate cost demand and competition, random and bargaining ability

Nash Equilibrium of bilateral Nash Bargaining problems

Pricing Model: Bargaining and Competition

Incorporate cost demand and competition, range, and bargaining ability



Pricing Equation from Model

$$\underbrace{p_{jh} - c_{jh}}_{\text{margin}} = \underbrace{\frac{b_{j_i} h_i}{b_{j_i} h_i + b_{h_i} j_i}}_{\text{bargaining abilities}} \left(\underbrace{\frac{q_{jh} p_{jh} - c_{jh}}{p_{jh} q_{jh}}}_{\text{adjust for } q \text{ dependent on } p} \right) \left(\underbrace{\frac{h - d_{jh}}{q_{jh}}}_{\text{"Added Value" of } j} \right) p_{jh} - c_{jh}$$

surplus up for negotiation

Pricing Equation from Model

$$\underbrace{p_{jh} - c_{jh}}_{\text{margin}} = \frac{b_{j_i} h_i}{\underbrace{b_{j_i} h_i}_{\text{bargaining abilities}} \underbrace{b_{h_i} j_i}_{\text{bargaining abilities}}} \cdot \frac{q_{jh} p_{jh} - c_{jh}}{p_{jh} q_{jh}}$$

adjust for q dependent on p

“Added Value” of j

Pricing Equation from Model

$$\underbrace{p_{jh} - c_{jh}}_{\text{margin}} = \underbrace{\frac{b_{j_i} h_i}{b_{j_i} h_i} \frac{b_{h_i} j_i}{b_{h_i} j_i}}_{\text{bargaining abilities}} \underbrace{\left(\frac{q_{jh} p_{jh} - c_{jh}}{p_{jh} q_{jh}} \right)}_{\text{adjust for } q \text{ dependent on } p} \underbrace{\left(\frac{h - d_{jh}}{q_{jh}} \right)}_{\text{"Added Value" of } j} (p_{jh} - c_{jh})$$

surplus up for negotiation

Pricing Equation from Model

$$\underbrace{p_{jh} - c_{jh}}_{\text{margin}} = \underbrace{\frac{b_{j_i} h_i}{b_{j_i} h_i + b_{h_i} j_i}}_{\text{bargaining abilities}} \left(\underbrace{\frac{q_{jh} p_{jh} - c_{jh}}{p_{jh}}}_{\text{adjust for } q \text{ dependent on } p} \right) \left(\underbrace{\frac{h - d_{jh}}{q_{jh}}}_{\text{"Added Value" of } j} \right) p_{jh} - c_{jh}$$

surplus up for negotiation

Empirical specification

$$p_{jht} = \alpha_j \frac{q_{jh} p_{jh} - c_{jh}}{p_{jh}} \frac{h - d_{jh}}{q_{jh}} p_{jh} - c_{jh}$$

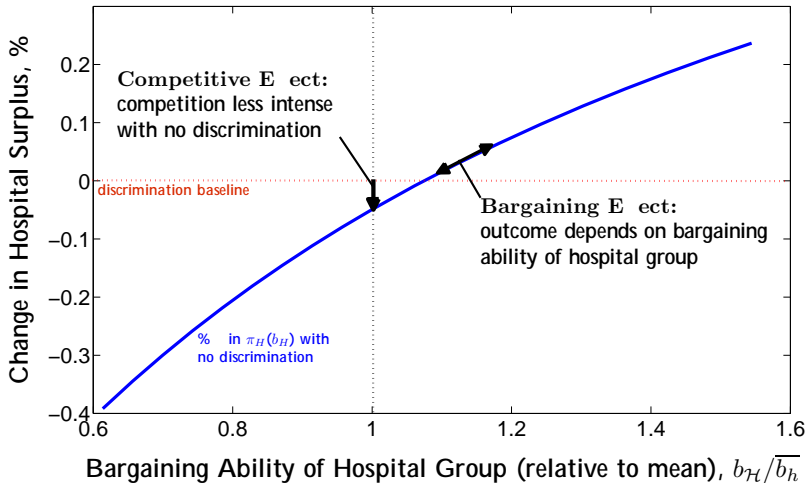
cost

Parameter Estimates: Sources of Price Variation

	Price Data		Cost Est.	Barg.	Ratio Est.	Added Value Est.	
	mean (\$)	s.d. (\$)	mean (\$)	mean	s.d.	mean (\$)	s.d. (\$)
BMS4	1006	175	34 (79)	0.33 (0.04)	0.07 (0.004)	2980 (327)	254 (25)
BMS5	926	191	34 (79)	0.32 (0.10)	0.07 (0.006)	2807 (313)	155 (13)
BMS6	952	156	34 (79)	0.31 (0.06)	0.05 (0.004)	2993 (321)	291 (28)
BMS7	1035	174	34 (79)	0.35 (0.02)	0.07 (0.004)	2899 (314)	248 (21)
BMS8	1063	338	34 (79)	0.36 (0.04)	0.10 (0.01)	2809 (310)	222 (18)
BMS9	1088	224	34 (79)	0.34 (0.01)	0.08 (0.005)	3171 (341)	403 (31)

What Determines Bargaining Abilities?

Why GPOs May Not Benefit Hospitals



Mergers and Demand \rightarrow A symmetry

Takeaways

GPOs, Hospital Mergers, and Patient Prices

- Competition more intense with non-uniform prices
- Barriers to entry of merged group important

