

Bargaining between large health care providers and insurers
(especially the US model)

Hospitals bargaining over price per patient per day

Pharmaceuticals bargaining over price per dosage

Patients pay through insurance premium

Related setting purchasing department

Intro

Bargaining Models

Generalized Estimation

Implications and Comparisons

Hospital price is not (major) part of the patient choice
Demand for A increases if B drops out of the network
Patients may choose insurance that will not have their ex-post preferred hospital
Insurer may be consumer surplus maximizing

Current applied theory analysis of price per-unit NiN bargaining (Horn-Wolinsky 1988) assumes the opposite on all four insurer-market features

Consumers pay the full price when buying

Demand for A fixed at equilibrium level

Consumers choose downstream product (insurer) based on upstream product

Downstream is profit maximizing

Estimate/model patient demand model from each hospital to determine

- Patient's option value from access to each hospital

- Insurer's expected benefit/loss from adding/removing a hospital to/from the network

- Hospital's expected benefit from joining an insurer's network (usually out of scope)
- Competition model between insurers

Use the Nash-in-Nash bargaining model to estimate Hospital costs and bargaining parameters given observed prices

Counterfactual analysis holding bargaining parameters fixed

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Plenty of applied theory (much in marketing) on general setting

Not much theory for the specific structure

One insurer, two hospitals (\mathcal{H} of $A; B$)

Cost of serving a patient is zero

Hospitals' bargaining power $\alpha \in (0; 1)$

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Example

Nash in Nash Bargaining

One-Shot Sequential Bargaining

Repeated Sequential Bargaining

$$p^A = b \quad (1 - a) \quad 10 + a \quad p^B + 5$$

|——{z——}

Patients that prefer A but would stay with the insurer

Adding A to the network creates $v_a^A + p^B - v_a^B > v_a^A$ per patient going to A

A's per-patient value is increased if p^B is higher than the value of B to A's patients

A takes advantage of the insurer's pre-commitment to serve A's patients.

Equilibrium of the bargaining game is such that

$$p^A(p^B) = p^A$$

$$p^B(p^A) = p^B$$

Multiple hospitals, multiple insurers

Main qualification: insurers maximize (fraction of) patient surplus, not short term revenue

Theorem

In the general model with NiN bargaining there is $\bar{\alpha} < 1$ such that for any $b > \bar{b}$; the surplus generated by each insurer is negative.

Regularity assumptions

- At least two hospitals

- Hospitals are substitutes

- Value of a hospital is highest to those that would choose it as first option

- IIA

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Sequential Bargaining Structure

Equivalent question: can the insurer commit not to reopen to a failed negotiation?

Blue Cross CEO: We can and want to only do sequential negotiations

- Limited negotiating resources

- Reduce hospital leverage and negotiation failures

Ultimately empirical question

- Proposed estimation generalization should answer

Suppose A goes first

If A is in the network, B's price determined like in previous version, can be higher than value

If A isn't in the network, B's price is lower

$$p^B = b \frac{a + 10}{1 + a}$$

A's negotiated price is lower: accounts for the effect on B's price

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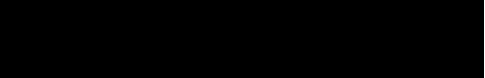
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Insurer sets the price for each hospital

If a hospital disagrees:

Revert to the sequential game

The disagreeing hospital is first

Equilibrium prices maximize insurer profit while preventing deviation (IC)

$$p_j = (1 - d) p_j^{\text{Deviate}}(p_{-j}) + d p_j^{\text{First}}$$

If hospitals are sufficiently impatient, everyone deviates

Each hospital's price is a NiN

Insurer would choose an order and avoid the repeated threat

No market breakdown

When estimating, we observe prices, want to infer δ , costs.

RSN model:

$$p_j = \delta p_j^{\text{First}} + (1 - \delta) p_j^{\text{Deviate}}$$

Estimation Insight

Conditional on the other prices $p_j^{\text{Deviate}} = p_j^{\text{Nash}}$ in Nash

Observation 6

Suppose the true model is RSN with $d = 1$ (so $b = 0.8$)

Estimating with $d = 0$ (Nash-in-Nash) increases hospital margins for every θ

Results in lower estimates of (hospital bargaining power) and/or hospital costs

When b is high, NiN predicts mergers decrease prices and increase total welfare by construction

Formal condition: merging hospital's price is higher than its value as an alternative to the merging partner

Same intuition as Cournot Complements

If NiN is the correct model for these markets, mergers can be good for consumers, bad for hospitals

If NiN is not the correct model for these markets, mergers can seem better to regulators than they are

Under-estimating hospital bargaining power will tend to favor mergers

Effect of under-estimating pre-merger costs?

NiN incorporates specific assumptions

NiN assumptions imply very high profits for upstream providers with strong bargaining power

NiN potential for market breakdown

Models based on sequential Nash bargaining

- Have different assumptions

- Limit upstream profits

- Avoid market breakdown

Estimation can be generalized to accommodate both

Data can test the models

$$p = dp_j^{\text{First}} + (1 - d)p_j^{\text{Deviate}}$$

$$= dq + c \left((1 - db)l + d \right) (1 - d)(+)^{-1} q$$

$$p_j^{\text{Deviate}} = c (+)^{-1} q$$

$$p_j^{\text{First}} = bt \frac{q_j v_j + \sum_{k=2, J; k \neq j} b q_{k;j} v_{k;j} (1 - b) q_{j;k} v_{j;k}}{q_j + b \sum_{k=2, J; k \neq j} q_{k;j}}$$

$$+ b \frac{\sum_{k=2, J; k \neq j} (1 - b) q_{j;k} q_k}{q_j + b \sum_{k=2, J; k \neq j} q_{k;j}}$$

$$+ (1 - b) c_j$$

$$p = dp_j^{\text{First}} + (1 - d)p_j^{\text{Deviate}}$$

$$= dq + c \left((1 - db)l + d \right) (1 - d)(+)^{-1} q$$

$$p_j^{\text{Deviate}} = c (+)^{-1} q$$

$$p_j^{\text{First}} = bt \frac{q_j v_j + \sum_{k=2, j; k=6=j} a_{k2J; k6=j} b_{k;j} v_{k;j} (1 - b) q_{j;k} v_{j;k}}{q_j + b \sum_{k=2, j; k=6=j} a_{k2J; k6=j} q_{k;j}}$$

$$+ b \sum_{k=2, j; k=6=j} a_{k2J; k6=j} (1 - b) q_{j;k} \frac{cb}{1 - b}$$

