



- March 2010 health reforms include physician financial incentives to control costs in the Medicare and Medicaid programs
  - Accountable Care Organizations share cost savings
  - Physicians receive bundled payments for episodes including hospitalizations
- Goal: cost control without compromising quality
- Similar cost control incentives currently used by health maintenance organizations (HMOs) for private enrollees in California
- Previous papers document lower costs in HMOs compared to other insurers but not the mechanisms used.

This paper: do patients whose physicians have a financial incentive to control costs receive care at lower-priced hospitals?

# Motivation cntd.

- A substantial previous literature uses hospital discharge records to estimate models of hospital choice
- Important for regulatory analysis (e.g. hospital mergers and investment)
  - How much do decision-makers value each hospital?
  - How much would the valuation change after merger/investment?
- But previous papers largely ignore impact of price paid by the insurer to the hospital.

- Overview of the Market and the Model
  - Why should choices respond to hospital prices?
  - How will we estimate price sensitivity?
- The Data
- The Model
  - Multinomial Logit Analysis
  - Inequalities Methodology
- Results and Conclusion



# Implications for Analysis

- We utilize hospital discharge data for California in 2003, focus on women in labor
- Dataset does not identify patients' physician groups or details of compensation schemes
- We observe each patient's HMO and percent of each HMO's payments for primary services that are capitated
- Considerable dispersion across insurers
  - Blue Cross: 38% capitated payments
  - Paci...care: 97% capitated payments

Questions: Are hospital choices influenced by price? Does price matter more when th1-49.079353ter

# Overview of the Model

Estimate utility of patient/insurer/physician agent making hospital choice:

$$W_{i,\pi,h} = \theta_{p,\pi} \text{price}_{i,\pi,h} + g_{\pi} q_h s_i + \theta_d d_{i,h} + \varepsilon_{i,\pi,h}$$

- $\text{price}_{i,\pi,h}$







# Descriptive Statistics: Discharge Data

	Mean	Std Devn.
Number of patients	88,157	
Number of hospitals	195	
Teaching hospital	0.27	
List price (\$)	\$13,312	\$13,213
List price*(1-discount)	\$4,317	\$4,596
Length of Stay	2.54	2.39
Died	0.01%	0.004%
Acute Transfer	0.3%	0.02%
Special Nursing Transfer	1.5%	0.04%

# Prices and Outcomes By Patient Type

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# Inequalities Analysis

Econometrician prediction of utility from  $i, \pi, h$  is

$$U_{i,\pi,h} = \theta_{p,\pi} \delta_{\pi,h} \ln p_{c_i,h} + g_{\pi} q_h s_{i,s_i} + \theta_d d_{l_i,l_h}$$

- $s_i, c_i$  much more detailed than logit equivalents
- $g_{\pi} q_h s_{i,s_i}$  interacts severity dummies with hospital F.E.s
- 106 populated groups x 157 hospitals
- Assumption:  $g_{\pi}$  absorbs all unobservables known to decision-maker that affect hospital choice
- Remaining unobservable is measurement error s.t.  $E \varepsilon_{i,\pi,h} | l_{i,\pi} = 0$ :

$$W_{i,\pi,h} = \theta_{p,\pi} \delta_{\pi,h} \ln p_{c_i,h} + g_{\pi} q_h s_{i,s_i} + d_{l_i,l_h} + \varepsilon_{i,\pi,h}$$

# Inequalities Analysis, Intuition

Identifying assumption: for every patient  $i_h$ , utility from chosen hospital  $h$  = that from any alternative  $h^0$

$$W_{i_h, \pi, h} \geq W_{i_h, \pi, h^0}$$

Notation:

$$W_{i_h, h, h^0} - W_{i_h, \pi, h} + W_{i_h, \pi, h^0} \geq 0.$$

Intuition: ...nd all pairs of same- $\pi$ , same- $s$ , different- $c$  patients  $i_h, i_{h^0}$  s.t.:

- $i_h$  visited  $h$  and had alternative  $h^0$
- $i_{h^0}$  visited  $h^0$  and had alternative  $h$

Sum their inequalities. Equal and opposite  $g_{\pi}$  terms drop out. .io380cm0g



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# Results: Inequalities Analysis

Add price instruments:

	% capitated	Discharges	Dist insts		Add price insts	
			$[\theta_{LB},$	$\theta_{UB}]$	$[\theta_{LB},$	$\theta_{UB}]$
Paci...care	0.97	15,479	[-,	-0.74]	[-1.62,	-0.74]
Aetna	0.91	6,291	[-,	-1.07]	[-3.60,	-1.07]
Health Net	0.80	16,950	[-,	-0.34]	[-2.05,	-0.34]
Cigna	0.75	8,097	[2.17,	-]	[2.17,	1.50]
Blue Shield	0.57	16,302	[-1.26,	4.18]	[-0.51,	1.38]
Blue Cross	0.38	25,038	[-,	2.04]	[-2.79,	1.44]

# Magnitude of Results

Insurer	% cap	Logits (less-sick patients) elasticity	Inequalities (all patients) min. elasticity
Paci...care	0.97	-0.25	-4.11
Health Net	0.80	-0.12	-1.88

- Ineqs: results implied by U.B. of  $\theta_{LB}, \theta_{UB}$  if logits otherwise correct
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