Discussion of Timmins, L (2014):

"How Do Hospitals Respond to Financial Pain: Evidence from Hospital Markets in Texas"

Richard C. Lindrooth
Colorado School of Public Health
University of Colorado, Anschutz Medical Campus

Background

- Financial Pain
  - Single specialty hospital enters profitable service→
  - Incumbent hospitals face increased competition → potential profits decline→ hospitals react to increased competition
- Hypothesized Reaction
  - Expand profitable services
    - *Lower admission/treatment thresholds (on the margin)*
    - *Skim generous payers*
    - *Competition on price and quality (?)*
  - Shirk on unprofitable services or payers

Profitable & Uncontested Conditions

- Extensive & (Between DRG) Intensive Margins:

  ++ : Medicare FFS, Private FFS (Elective)

  + (?) : Managed Care

  +/- (?) : Medicaid FFS, Self-pay

  – (?) : Charity

Profitable & Uncontested Conditions

- Extensive & (Between DRG) Intensive Margins:

  ++ : Medicare FFS, Private FFS (Ethical Constraints)

  + (?) : Managed Care (+Gatekeeping Constraints)

  +/- (?) : Medicaid FFS, Self-pay (+Mission?)

  – (?) : Charity (+Mission?)

Profitable & Uncontested Conditions

- Intensive Margin (Within DRG)
  - Prospective Payment (Hodgkin & McGuire, 1994)
    - *Public Payers*
    - *Decline in LOS, tests, etc…*
    - *Decline in discretionary quality?*
  - Per diem payment
    - *Private*
    - *Increase in length of stay*
    - *Change in discretionary quality?*
  - Private FFS
    - *Increase in LOS, tests, etc…*
    - *Increase in discretionary quality?*

Profitable & Uncontested Conditions

- Intensive Margin (Within DRG)
  - Prospective Payment
    - *Public Payers,* ***Private Payers(?)***
    - *Decline in LOS, tests, etc…*
    - *Decline in discretionary quality?*
  - Per diem payment
    - *Private* ***(?)***
    - *Increase in length of stay*
    - *Change in discretionary quality?*
  - Private FFS—***Does it exist?***
    - *Increase in LOS, tests, etc…*
    - *Increase in discretionary quality?*

Texas All-payer Inpatient Data (1999-2007)

25% Sample

Dependent Variables:

- Contested Service Admissions
  - Cardiac & Orthopedic Surgery
    - *Generously reimbursed, known as profitable*
- Uncontested Service Admissions, LOS, & Mortality
  - General Surgery
    - *Elective and Emergency/Urgent*
    - *Flexible treatment thresholds on the margin(s)*
  - Gynocological, Neurosurgery, Urology
    - *Treatment thresholds better defined.*

Explanatory Variables

- DRG, Age, Gender, Race/Ethnicity, Patient Zip Code, Severity, Hospital ID
- Primary Payer
  - Medicare, Medicaid, Private HMO, Private FFS, & Charity/Self Pay
- American Hospital Association Data:
  - Hospital Ownership, Teaching Status, Beds
- Census Data: Area demographics
- Distance from patient Zip to each hospital in market

Explanatory Variables

- DRG, Age, Gender, Race/Ethnicity, Patient Zip Code, Severity, Hospital ID
- Primary Payer
  - Medicare, Medicaid, Private HMO, Private FFS, & Charity/Self Pay **(Public Managed Care ?)**
- American Hospital Association Data:
  - Hospital Ownership, Teaching Status, Beds, **Specialty**
- Census Data: Area demographics
- Distance from patient Zip to each hospital in market

Demand for contested services

- McFadden Choice Model/Random Utility:

$$U_{ij} = V(Distance_{ij}; Hospital_j) + W(Patient_i; Hospital_i) + \varepsilon_{ij}$$

  - Estimated each year by Med, Surg & Disease Type
  - Within allocation of admissions
  - Extensive/intensive margins not modeled
  - Should include payer patient characteristics
    - *Selective contracting, specialty hospitals less likely to contract with managed care?*

Measuring Financial Pain

- Predict probability of admission
  - Aggregate to Patient Health Service Area (HSA) & compute specialty hospital market share (SMS) for each year
- Note degree of pain is heterogenous
  - depends on # of incumbents.

Uncontested Service Specifications

- Hospital Level (Contested v. Uncontested, by elective):
  - $\text{Log}(Adm_{jkt}) = f(SMS_{HSAt}, HRR_k, HRR_k{*}T_t, P_{HSAt}, H_{jt})$
- Patient Level (Contested v. Uncontested, by type & elective):
  - $\text{Log}(Adm_{ijkt}) = f(SMS_{HSAt}, SMS_{HSAt}{*}Pay_{ijkt}, Pay_{ijkt}, HSA_k, HSA_k{*}T_t, X_{ijkt})$
  - *With and without Department FE*
- Also model DRG weights, LOS, & Mortality
  - *With and without Comorbidity and DRG FE*
- LPM for computational reasons

Identification: Uncontested Outcomes

- SMS_{HSAt} may be endogenous

- Growth in contested (and uncontested) admissions more likely in wealthy, expanding markets. Specialty hospitals will target wealthy, expanding markets for entry

- Assume distance from patient to hospitals from exogenous
- i.e. Cov(Distance, ε_{ijkt})=0
- Use residual substitution (or Hausman test in LPM):

  - $SMS_{kt} = SMS^{*}_{kt} + u_{kt}$

Results: Hospital Log(Admissions)

	SMS Coefficient	
• Contested Admissions	-1.071*	(0.571)
• Uncontested Admissions	0.133	(0.351)
– Elective	2.648**	(1.197)
– Non-Elective	-1.051*	(0.532)
• Non-Elective Surgery	-0.244	(0.556)
• Elective Surgery	2.855**	(1.103)
– Stomach Procedures	2.668**	(0.954)
– Obesity Procedures	4.427*	(2.307)

Degree of Financial Pain

- Suggest reporting smearing adjusted effects
- Observed SMS:
  - 1999: Median=0.000 (75^{th} %tile=0.000)
  - 2003: Median=0.005 (75^{th} %tile=0.032)
    - *Approx SMS effect = -3.4% ($25^{th} \rightarrow 75^{th}$)*
  - 2007: Median=0.013 (75^{th} %tile=0.056)
    - *Approx SMS effect = -5.5% ($25^{th} \rightarrow 75^{th}$)*
  - Lose about 100 contested admissions in 2007
  - Uncontested admissions:
    - *Gain about 188 Elective offset by 164 Non-elective*
- Heterogenous: # of hospitals in market

Results: Patient pr(Admission)

Elective Surgery	Parameter	(S.D)
• SMS	0.0414	(0.0484)
• SMS * Medicaid	-0.0012	(0.0268)
• SMS * Private HMO	0.132**	(0.0559)
• SMS * Private FFS	0.129***	(0.0429)
• SMS * Uninsured	-0.067**	(0.027)

- About 1% increase in private admissions ($25^{th} \rightarrow 75^{th}$)
- Lower admission thresholds?
- Or Price/Quality competition → More elective admissions

Other Results

- Small increase in Private LOS: ~0.13 days (3.5%)
  - Private HMO and FFS about the same
- Large increase in Private FFS mortality (~5.1 %)
- Huge increase in Charity/Self Pay mortality (~8.1 %)
- Interesting Result
  - Is marginal patient healthier or sicker?
  - Iatrogenic Deaths?
  - Cutting back on quality of uncontested admissions?
    - *Why cut back on quality if uncontested?*
    - *Price competition outweighs Quality Competition?*

Selection on observables?

- Rationale for endogenous SMS inconsistent with exogenous distance
- Growth in contested **and uncontested** admissions more likely in wealthy, expanding markets → Distance to specialty hospital also correlated with demand for uncontested admissions
- Concerns mitigated by:
  - Patient residence rather than hospital definition
  - Aggregation to HSA
  - HSA-specific Trends, zip code income
  - Recommend adding zip code payer mix
- Private results confounded by managed care backlash
  - Recommend adding payer-specific trends…..

Comments

- Unmentioned exclusion restriction (or typo?):
  - Specialty hospital dummy variable in conditional logit
  - Not necessary to compute predicted market share
- Estimate Conditional Logit over entire sample period
  - Hold parameters constant over time
  - Propensity to travel held constant

- David et al, 2014 estimated *exposure* over entire sample period. Used predicted number of admissions with and without entry. Measured system-level impact.
  - Within market exposure to entry to measure cross-subsidization

Suggestions

- Model admissions related to labor and delivery
  - Ideal placebo/falsification test on extensive margin
  - David et al, 2014 used neurosurgery

- Robustness
  - Alternative specifications of trends (i.e. quadratic, HSA'T)

- Decompose mortality risk-adjustment to identify iatrogenic deaths
- Report results w/o IV. Report all coefficients.
- Discuss other changes in market structure?

Suggestions

- Computation Problems:
  - Drop years (e.g. 1999-2000 & 2006-2007)
  - Grouped conditional logit
    - *Aggregate by zip code * payer * severity*

- Allow richer specification of admissions and LOS

- Also LPM with residual substitution identical to 2SLS (if correctly specified)
  - No need to bootstrap standard errors