The Effects of Financial Integration with Hospitals on Physician Behaviors

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Motivation

How are hospitals and physicians related?

1. "Traditional" private practice with admitting privileges
2. Administrative support with or without admitting restrictions
3. Practice owned by hospital or hospital system

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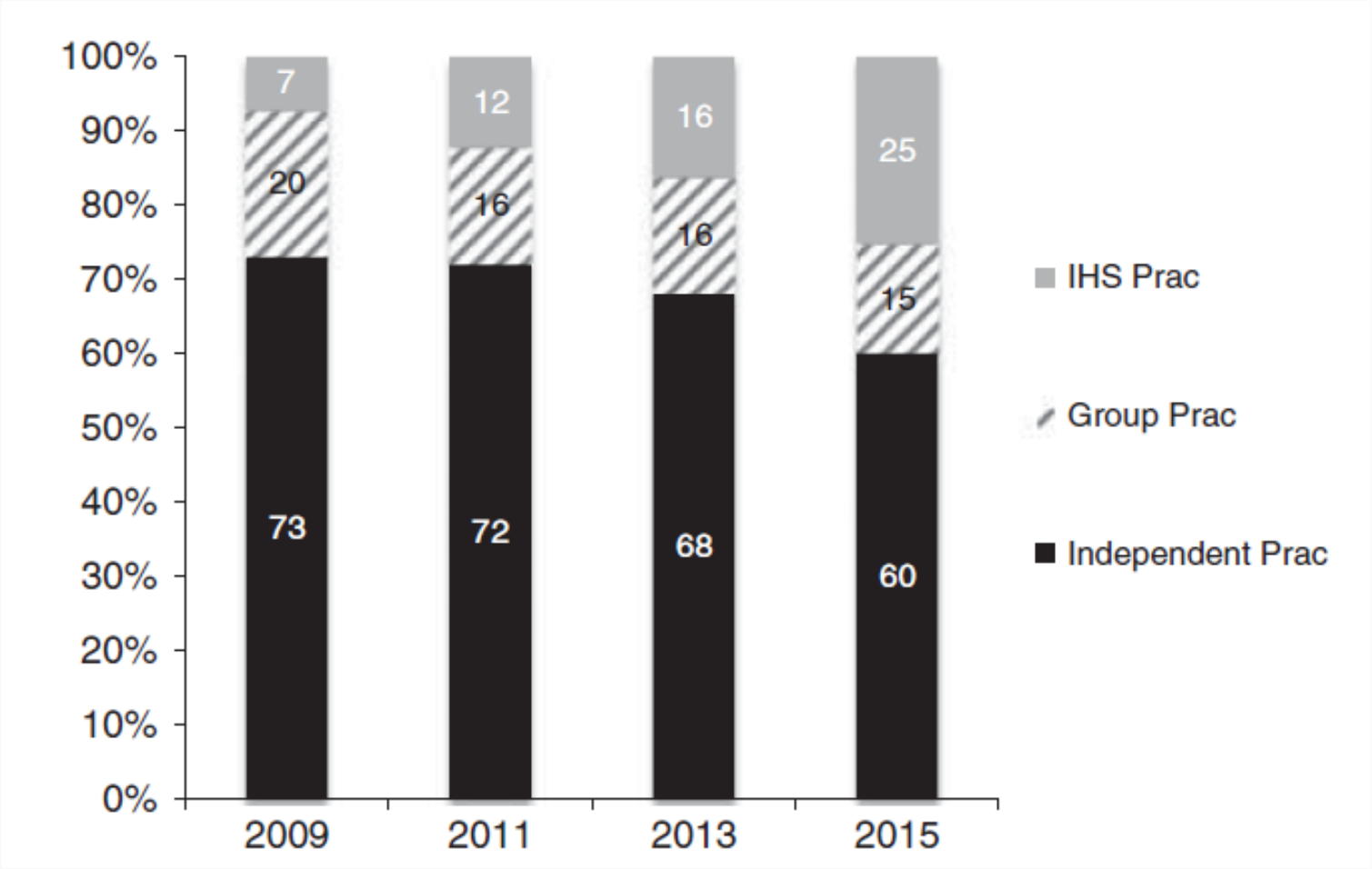

Richards *et al.*, Medical Care, 2016

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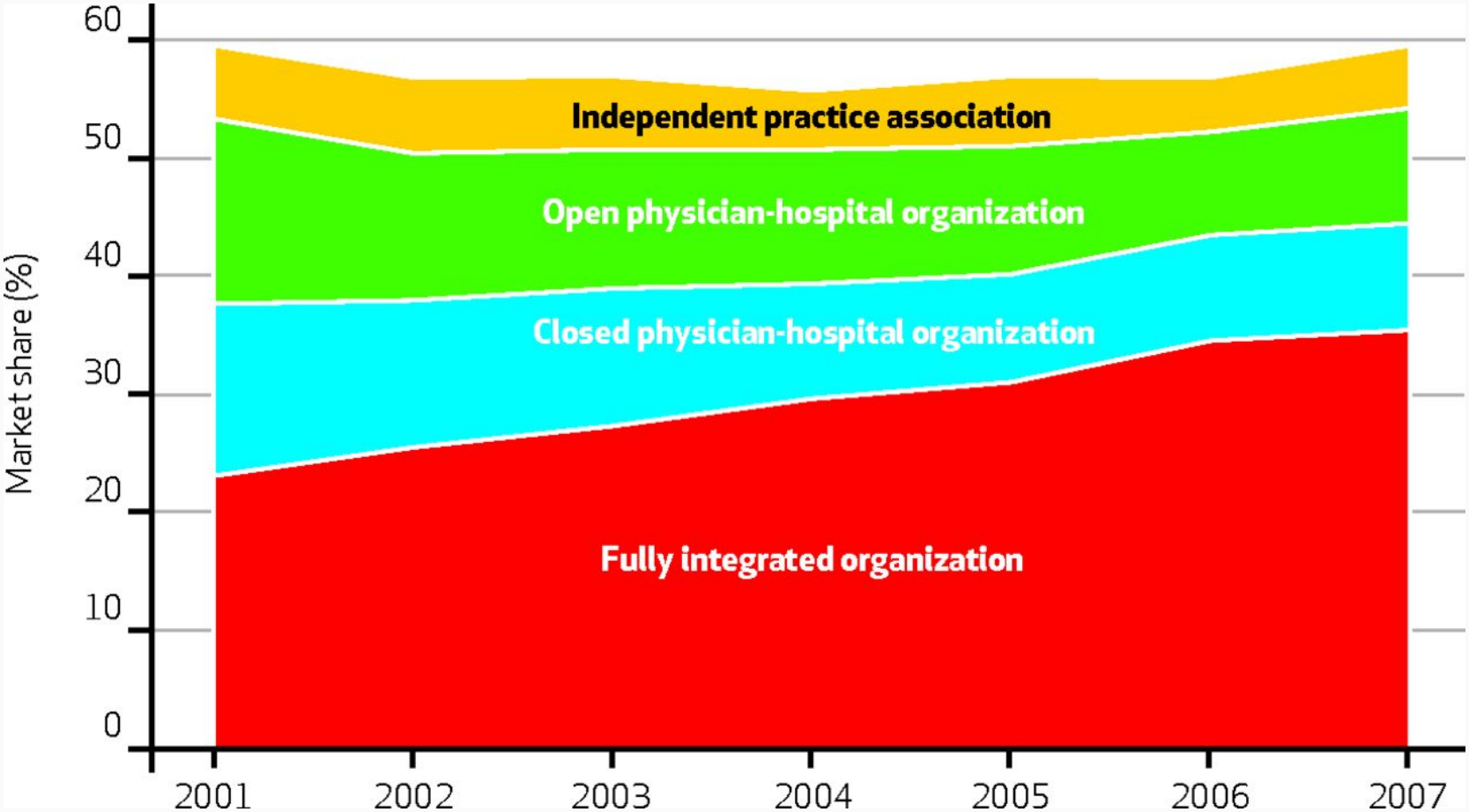

Baker, Bundorf, and Kessler, Health Affairs, 2014

Why would a hospital integrate?

Revenue

- Increase bargaining position
- Bundle products
- Exploit payment differentials

Why would a hospital integrate?

CMS Incentives

- Hospital Readmission Reduction Program
- Hospital Value Based Purchasing Program
- Accountable Care Organizations
- Bundled Payments

Why would a hospital integrate?

Coordination

- Remove inefficiencies from fragmented care
- Improve quality via "team-based" care

Why would a physician practice integrate?

Financial security

- Salaried arrangement
- Potential volume incentives

Why would a physician practice integrate?

Reduce administrative burden

- Billing and insurance approvals
- Electronic Health Records
- Data collection/reporting

Anticipated effects on physicians

1. Focus on patient care
2. Less autonomy
3. More processes, checklists, etc.

Data

Data Sources

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- SK&A: Hospital ownership of physician practices
- AHA, HCRIS, POS: Hospital characteristics
- ACS: County-level demographics, education, income, and employment

Sample Construction

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$\Longrightarrow$ 63,532 unique observations at the physician/hospital/year

$\Longrightarrow$ 3.9mm inpatient stays

Empirical Approach

Initial Specification

$$y_{jht} = \delta_1 I_{jht} + \delta_2 I_{ht} + \delta_3 I_{jt} + \beta_1 x_{jt} + \beta_2 z_{ht} + \beta_3 w_{mt} + \Theta_{jhmt} + \varepsilon_{jht}$$

Physician Affiliation Outcomes

$$y_{jht} = \delta_1 I_{jht} + \delta_2 I_{ht} + \delta_3 I_{jt} + \beta_1 x_{jt} + \beta_2 z_{ht} + \beta_3 w_{mt} + \Theta_{jhmt} + \varepsilon_{jht}$$

	2008	2012	2013	2014	2015	Overall
Hospital Share	0.864	0.878	0.882	0.884	0.909	0.879
	(0.225)	(0.217)	(0.216)	(0.215)	(0.184)	(0.216)

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	(0.225)	(0.217)	(0.216)	(0.215)	(0.184)	(0.216)
Operations	60.80	62.16	62.02	60.45	61.68	61.64
	(43.50)	(43.90)	(45.08)	(45.10)	(45.95)	(44.45)

Mortality Outcomes

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	2008	2012	2013	2014	2015	Overall
90-day Mortality	0.0290	0.0260	0.0250	0.0246	0.0252	0.0263
	(0.0404)	(0.0385)	(0.0380)	(0.0377)	(0.0416)	(0.0391)

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60-day Mortality	0.0237	0.0211	0.0204	0.0203	0.0200	0.0214
	(0.0350)	(0.0334)	(0.0329)	(0.0328)	(0.0358)	(0.0340)

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	(0.0350)	(0.0334)	(0.0329)	(0.0328)	(0.0358)	(0.0340)
30-day Mortality	0.0173	0.0152	0.0144	0.0144	0.0140	0.0153
	(0.0286)	(0.0271)	(0.0264)	(0.0260)	(0.0285)	(0.0273)

Spending and Treatment Intensity Outcomes

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	2008	2012	2013	2014	2015	Overall
Payment	14151.7	16237.5	16593.1	16789.4	16796.3	15792.2
	(6189.7)	(7229.5)	(7295.5)	(7368.5)	(7541.3)	(7010.4)

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Charge	50003.6	64441.6	68092.6	71636.7	73732.0	62436.8
	(25952.6)	(35412.6)	(38170.0)	(41206.7)	(42881.0)	(35694.8)

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DRG	2.377	2.539	2.572	2.698	2.689	2.529
	(0.764)	(0.777)	(0.776)	(0.917)	(0.937)	(0.818)

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LOS	5.659	5.620	5.560	5.644	5.624	5.572
	(1.578)	(1.869)	(1.894)	(2.017)	(2.075)	(1.783)

Main Independent Variables

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I_{jt}	0.310	0.328	0.450	0.432	0.542	0.372

Risk adjustment and physician-hospital "match values"

- Isolate variation from physician-hospital interaction
- Adjust for patient characteristics

Risk adjustment and physician-hospital "match values"

1. Estimate γ_{jh}

$$y_{ijh} = \gamma_j + \gamma_{jh} + \beta x_{ih} + \varepsilon_{jht}$$

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- Combined $\gamma_j + \gamma_{jh}$ from full sample
- Separately identify γ_{jh} from physician "movers"

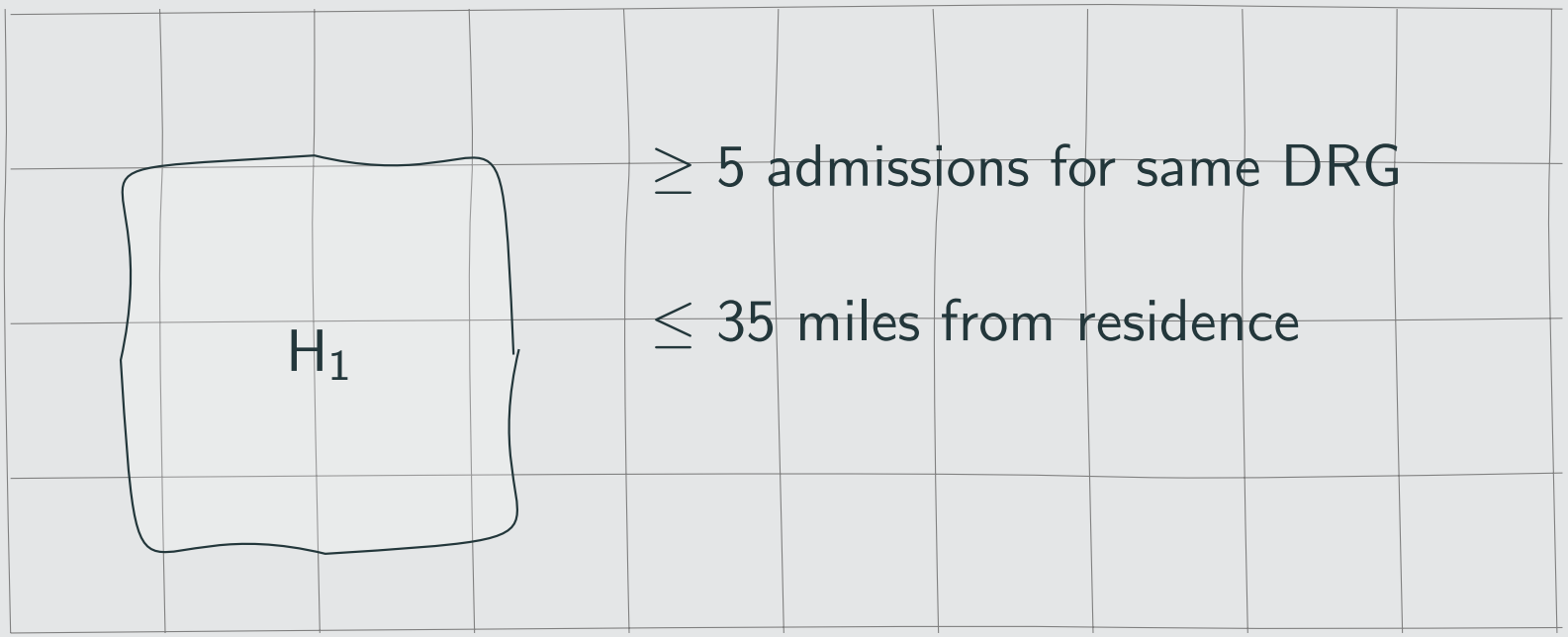
Endogeneity of physician-hospital integration

Integration could be driven by:

- Existing physician behaviors
- Unobserved, time-varying practice characteristics

Endogeneity of physician-hospital integration

1. Set of possible physician-hospital pairs



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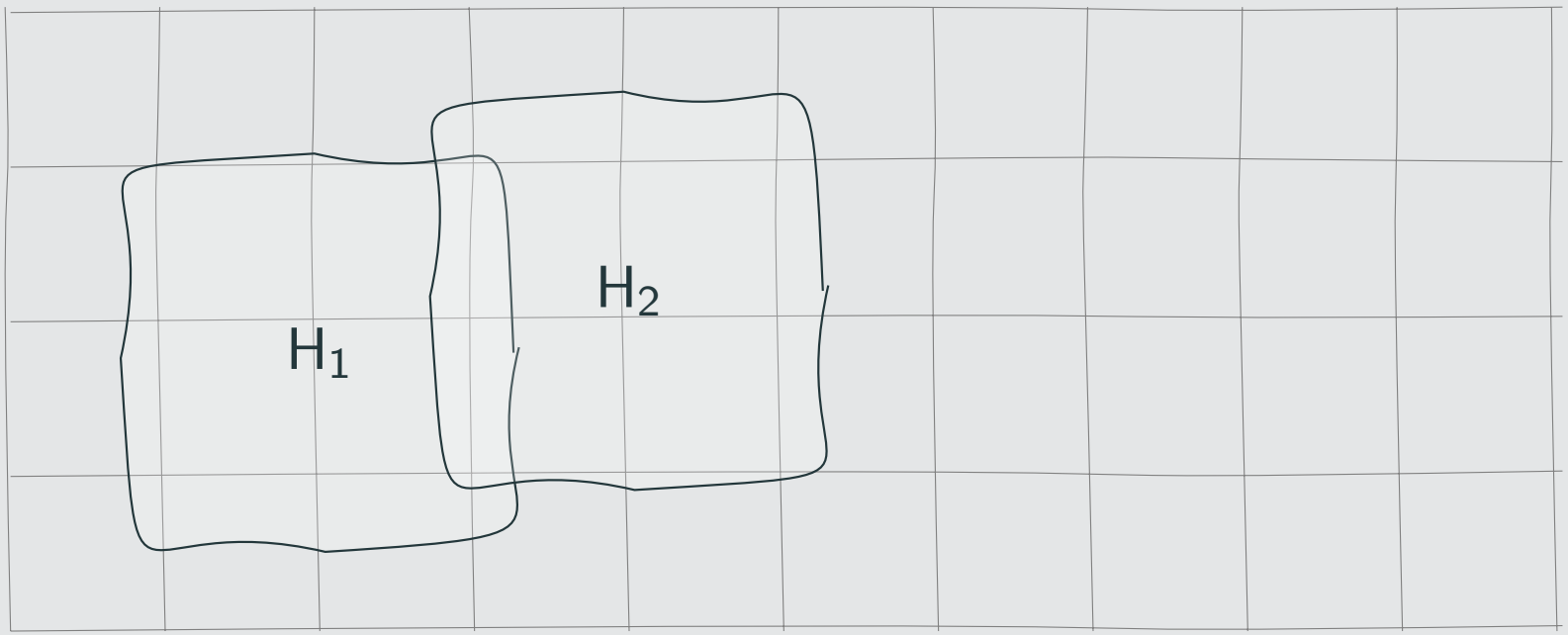

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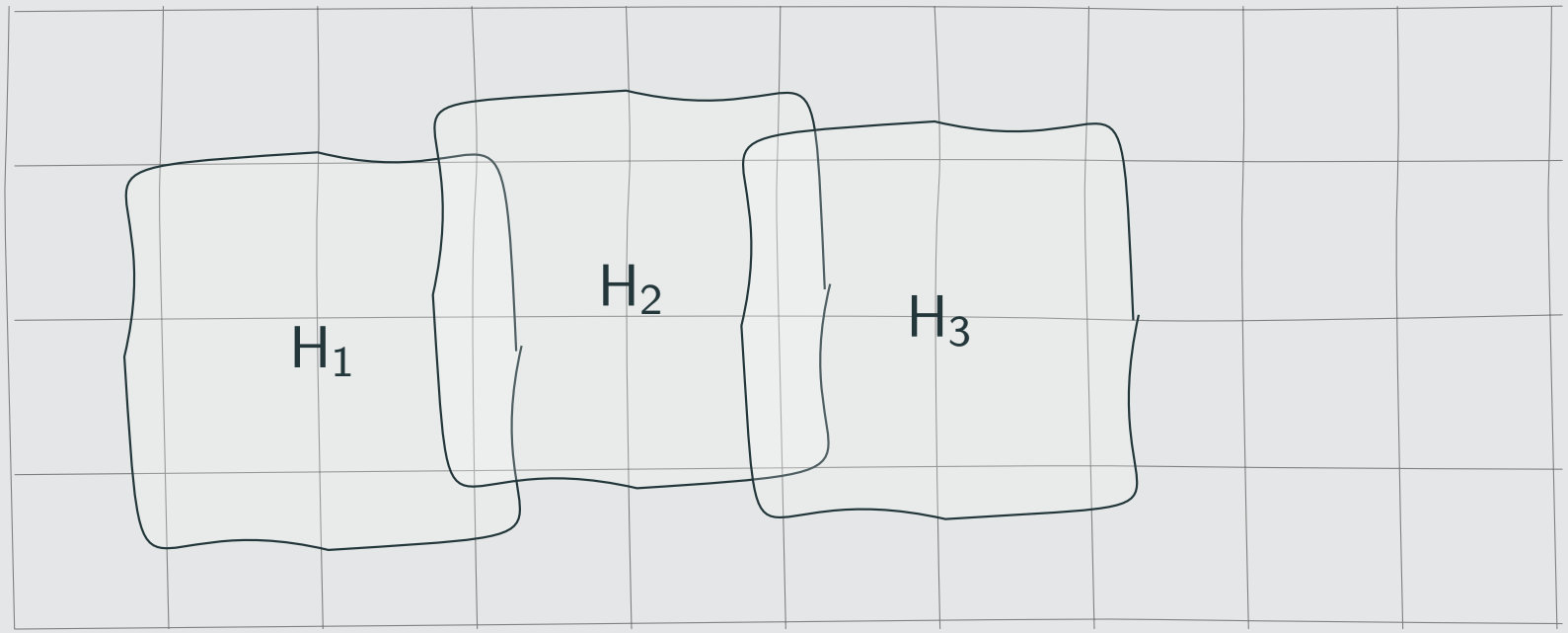

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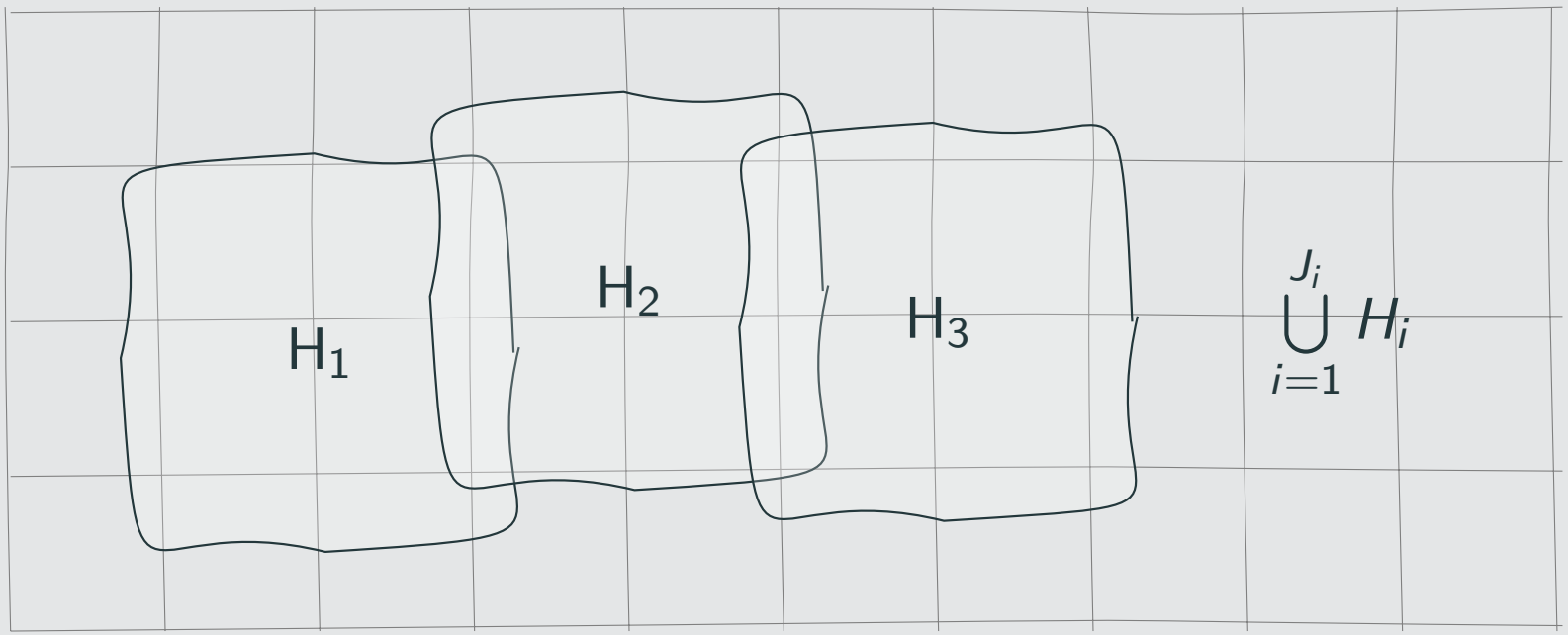

Endogeneity of physician-hospital integration

2. Estimate probability of integration

$$I_{ph} = \lambda_1 z_h + \lambda_2 z_{ph} + \omega_{ph}$$

- Average choice set size
- Average differential distance (relative to nearest hospital)

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$$y_{jht} = \delta_1 \underbrace{I_{jht}}_{\hat{I}_{jht}=\Pr(I_{jht}=1)} + \delta_2 I_{ht} + \delta_3 I_{jt} + \beta_1 x_{jt} + \beta_2 z_{ht} + \beta_3 w_{mt} + \Theta_{jhmt} + \varepsilon_{jht}$$

Results

Integration and physician affiliation

Fixed Effects Estimator

	Hospital Share	Operations
I_{jht}	0.046***	4.574***
	(0.004)	(0.510)
I_{ht}	0.005***	0.670***
	(0.002)	(0.232)
I_{jt}	-0.012***	-1.127***
	(0.002)	(0.285)
Net	0.0392***	4.1180***
	(0.0036)	(0.4394)

* p<0.1, ** p<0.05, *** p<0.01

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With Instrument, $\hat{I}_{jht}$

Hospital Share	Operations
0.072***	11.885***
(0.017)	(4.170)
0.004**	0.489*
(0.002)	(0.256)
-0.019***	-3.175***
(0.005)	(1.223)
0.0573***	9.1988***
(0.0119)	(2.8800)

Integration and mortality

Fixed Effects Estimator

	90-day	60-day	30-day
Overall	0.0016**	0.0010	0.0009
	(0.0008)	(0.0007)	(0.0006)

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(0.0023)	(0.0021)	(0.0018)
0.0041	0.0028	0.0071
(0.0296)	(0.0272)	(0.0212)

Integration and spending/treatment

Fixed Effects Estimator

	Payment	Charge	DRG
Overall	245***	3,076***	0.0369***
	(71.33)	(450)	(0.0091)

* p<0.1, ** p<0.05, *** p<0.01

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321	4,415***	0.0392
(267.62)	(1,625)	(0.0340)
-588***	683	-0.0619**
(216.77)	(1,461)	(0.0261)

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(216.77)	(1,461)	(0.0261)
-1,251	-3,564	-0.3938*
(1,951)	(9,141)	(0.2316)

Summary of Results

- Increase in shares of 4-6 percentage points (4-9 operations)

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- Evidence that integration changes both coding behaviors (upcoding) and patient selection (healthier patients)