Is hospital competition socially wasteful?

(Kessler & McClellan, 2000)

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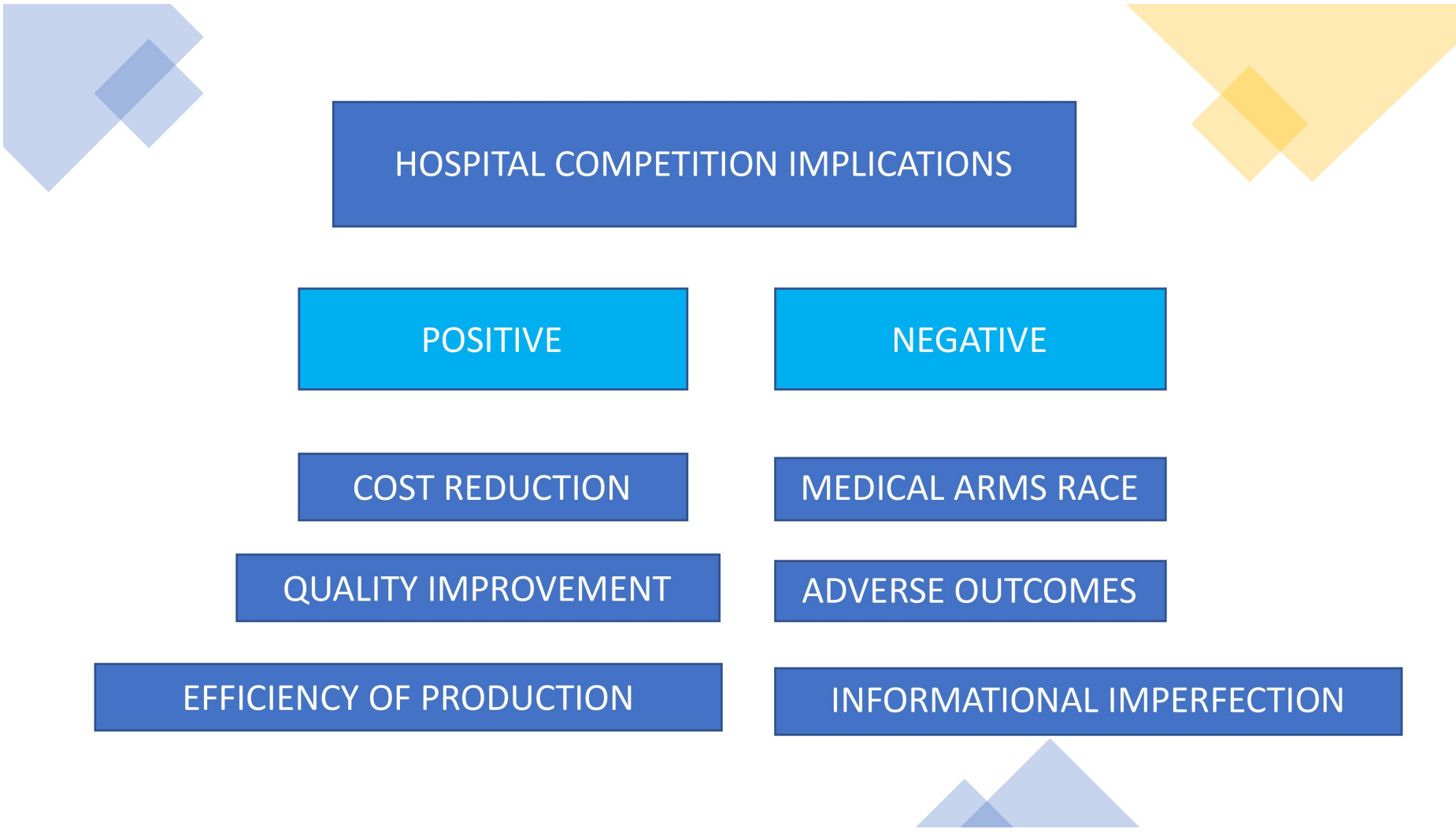
Theoretical ambiguity on welfare implications of health care competition



Motivation: Policy implications

- Improvement in social welfare
  - Strict limits on the cooperation between hospitals may improve efficiency.
- Reduction in social welfare
  - Coordination and mergers should be encouraged.

Preview of findings

- Research prior to mid-1980's
  - Competition increases costs and prices [Joskow 1980; Robinson and Luft 1985, 1987; Noether 1988]
- Research based on recent data
  - Competition reduces excess capacity; costs and prices [Zwanziger and Melnick 1988; Wooley 1988; Dranove, Shanley and Simon 1992; Melnick et. Al. 1992].

Preview of findings: Key limitations of empirical literature

- No direct assessment on resource use or on patient health outcomes.
  - Eg. Use of 'list prices' over 'transaction prices'
- Measures of competitiveness not based on exogenous determinants.
  - Eg. Restrictive 'Variable radius' method
- Failure to control for hospital and area characteristics .
  - Eg. Bed capacity per patient
- Lack of assessment in environments with managed care.
  - Eg. Insurance

Contribution

- Effect **on costs and health outcomes** for elderly Medicare recipients hospitalized with a new heart attack (AMI) in 1985-94.
- Identification using **exogenous** source of variation.
- Constructs geographical hospital markets with **variable size**.
- Explores **mediation of managed care** on medical treatment costs and outcomes.
- **Control for heterogeneity** across small geographic areas, hospitals and patients.

Primary goal and Research question

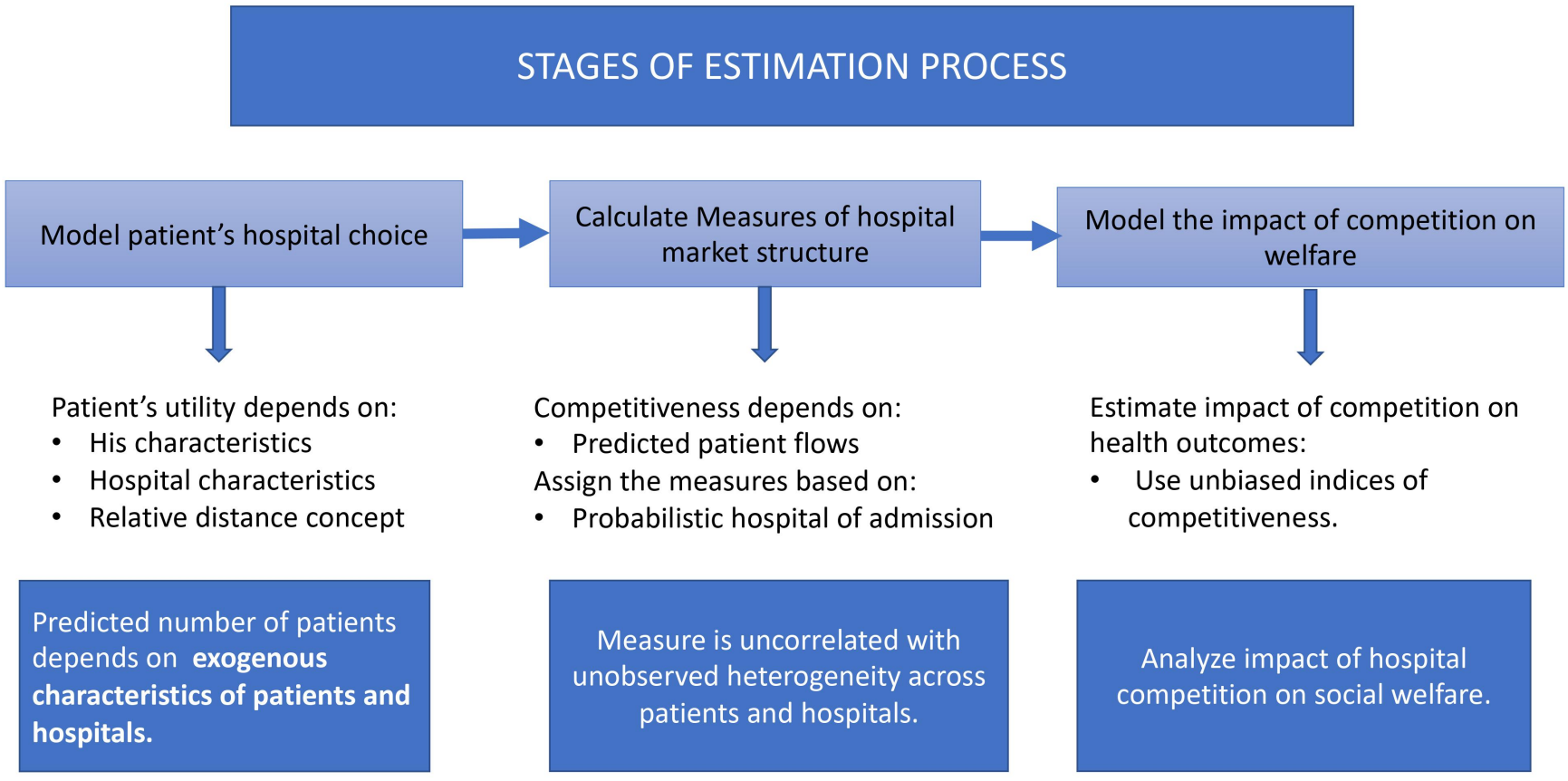
Goal:

- Assess the impact of hospital competition on resource use and patient outcomes.

Research question:

- Is hospital competition socially wasteful or useful?

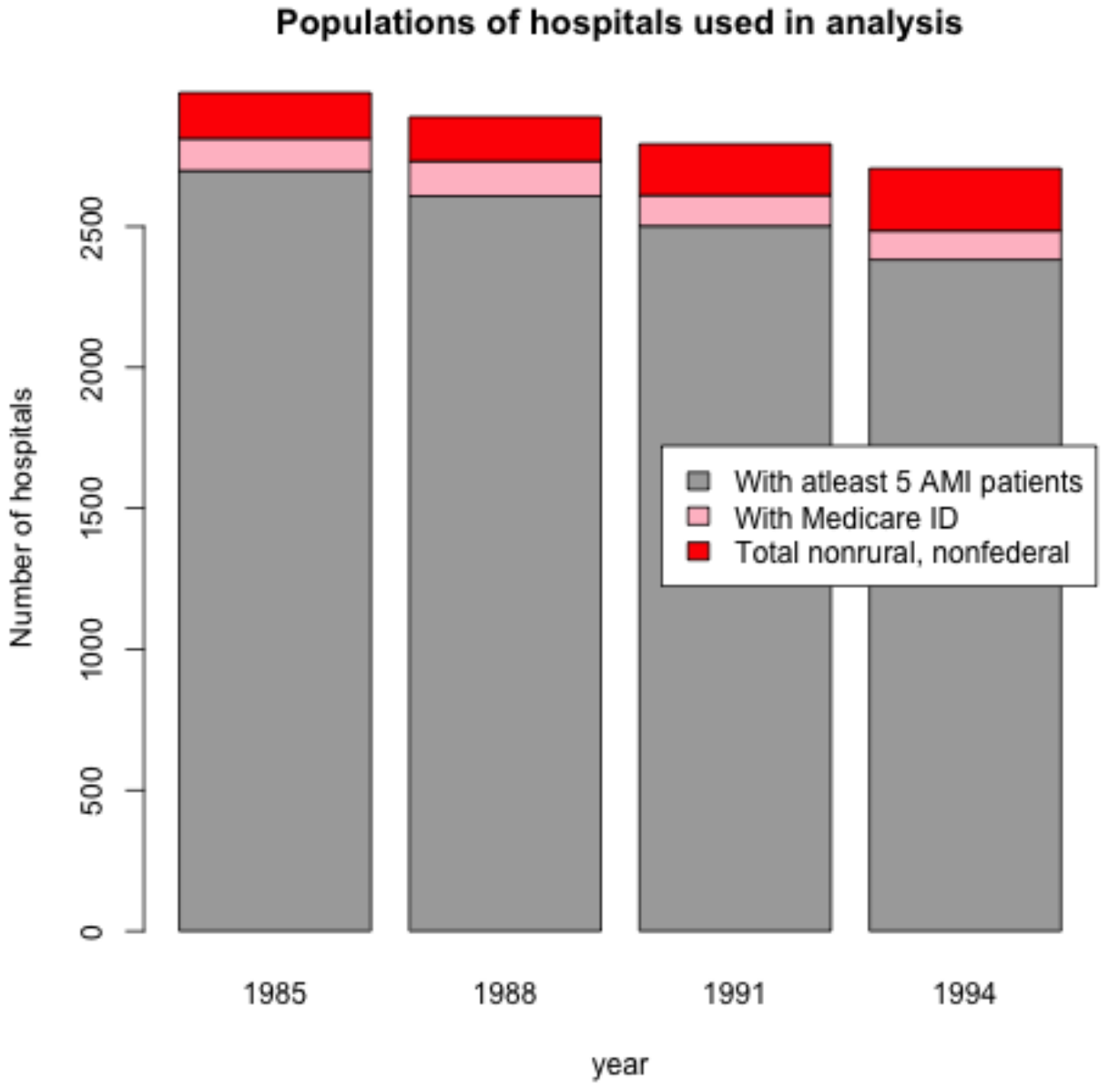
Stages of Estimation process



Data

- Longitudinal Medicare claims data
  - Nonrural Elderly Medicare beneficiaries
  - Primary diagnosis of AMI in 1985, 1988, 1991, and 1994
  - Data on patient demographic characters obtained from Health Care Financing Administration's enrollment files.
- American Hospital Association (AHA) data on U.S.hospital characteristics
  - Examine nonrural, nonfederal hospitals that reported general or surgical services.
- HMO enrollment rates by state from InterStudy Publications, a division of Decision Resources, Inc.

Exclusion restrictions on hospitals and patients



Empirical framework: Baseline specification

$$
\begin{aligned}
ln(R_{ikt}) = \delta_k + \sigma_t M_k + U_{ikt}\phi \\
+ HHI^{pat*}_{kt} * I(1985 \vee 1988)\eta_{1980s} \\
+ HHI^{pat*}{}_{kt} * I(1991 \vee 1994)\eta_{1990s} \\
+ OMC_{kt} * I(1985 \vee 1988)\psi_{1980s} \\
+ OMC_{kt} + I(1991 \vee 1994)\psi_{1990s} + \epsilon_{ikt},
\end{aligned}
\tag{1}
$$

- R_{ikt}: Total health expenditure in the year after health event by individual i, zip code k, time t
- U_{ikt}: Individual observable characteristics (age indicator, gender, race)
- HHI^{pat*}_{kt}: Index of competitiveness assigned to patients
- OMC_{kt}: Other market characteristics like size, ownership, teaching status, travel distance etc.

Specification 2: "Difference-in-difference model"

$$ln(R_{ikt}) = \delta_k + \sigma_t M_k + U_{ikt}\phi + IQ(HHI_{kt}^{pat*} - HHI_{kt-1}^{pat*})\gamma + OMC_{kt}\psi + \epsilon_{ikt}, \quad (2)$$

- δ_k: Zip-code fixed effects
- M_k: Size of individual i's Metropolitan Statistical Areas(MSA)
- IQ(.): Function returns the extent of interquartile changes in competition in k from t-1 to t.
- γ: Estimate of impact of change in competition on outcomes in specific regions, relative to patients in areas without such changes, holding other factors constant.

Descriptive statistics

TABLE II
DESCRIPTIVE STATISTICS FOR ELDERLY AMI PATIENTS AND HOSPITALS ADMITTING FIVE OR MORE PATIENTS PER YEAR

	1985 mean	1988 mean	1991 mean	1994 mean	% Change 1985–1994
Elderly AMI patients					
1-year expenditures (1993 $)	$14,352	$15,589	$16,984	$19,307	34.5%
(standard deviation)	(13,483)	(15,578)	(17,099)	(19,411)	
1-year mortality rate	0.403	0.391	0.346	0.330	−18.1%
1-year AMI readmission rate	0.060	0.055	0.053	0.053	−11.7%
1-year HF readmission rate	0.077	0.084	0.088	0.086	11.7%
Age 65–69	23.2%	21.9%	21.9%	20.5%	−11.6%
Age 70–74	24.8%	23.6%	23.4%	23.6%	−4.8%
Age 75–79	22.2%	22.1%	21.9%	21.4%	−3.6%
Age 80–89	25.9%	27.7%	28.0%	29.3%	13.2%
Age 90–99	3.9%	4.7%	4.8%	5.2%	33.3%
Black	5.8%	6.1%	6.3%	6.7%	15.5%
Female	49.9%	50.9%	50.3%	49.7%	−0.4%
MSA size <100,000	1.8%	1.9%	1.9%	1.8%	0.0%
MSA size 100,000–250,000	13.2%	14.1%	14.9%	15.5%	17.4%
MSA size 250,000–500,000	12.7%	13.2%	14.1%	14.5%	14.2%
MSA size 500,000–1,000,000	19.5%	20.4%	20.7%	21.2%	8.7%
MSA size 1,000,000–2,500,000	28.7%	28.0%	27.2%	26.5%	−7.0%
MSA size >2,500,000	24.1%	22.3%	21.2%	20.5%	−14.9%
Hospitals					
Large size (>300 beds)	20.0%	17.4%	15.6%	13.5%	−32.5%
Medium size (100–300 beds)	54.4%	54.7%	55.4%	53.9%	−0.9%
Small size (<100 beds)	25.6%	27.9%	29.0%	32.6%	27.3%
Teaching %	16.4%	17.6%	17.0%	19.2%	17.1%
Public %	14.5%	13.8%	12.8%	13.0%	−10.3%

Hospital expenditures deflated using the CPI.

Descriptive statistics

TABLE III
DESCRIPTIVE STATISTICS FOR HOSPITAL MARKETS

	1985	1988	1991	1994	% Change 1985–1994
Travel distances from patients to hospitals (miles)					
Mean distance to closest hospital	2.83	3.04	3.28	3.47	22.6%
(standard deviation)	(3.85)	(3.90)	(4.08)	(4.13)	
Median distance to closest hospital	1.74	1.98	2.24	2.47	42.0%
95th %ile distance to closest hospital	10.56	10.74	11.26	11.49	8.8%
Mean distance to hospital of admission	5.03	5.24	5.48	5.73	13.9%
(standard deviation)	(6.18)	(6.20)	(6.33)	(6.57)	
Median distance to hospital of admission	3.47	3.65	3.93	4.12	18.7%
95th %ile distance to hospital of admission	16.09	16.68	17.14	17.78	10.5%
Characteristics of hospital markets					
HHI^{pat*} (standard deviation)	0.325	0.340	0.354	0.369	13.5%
	(0.183)	(0.177)	(0.181)	(0.175)	
Conventional 75-percent variable-radius *HHI* (standard deviation)	0.431	0.441	0.456	0.471	9.3%
	(0.307)	(0.301)	(0.304)	(0.312)	
Correlation between zip-code average levels of HHI^{pat*} and conventional 75-percent *HHI*	0.668	0.663	0.668	0.634	−5.1%
(*P*-value of h_0: $\rho = 0$)	(0.000)	(0.000)	(0.000)	(0.000)	
Correlation between zip-code average changes in HHI^{pat*} and conventional 75-percent *HHI*		0.204	0.139	0.164	−19.6%
(*P*-value of h_0: $\rho = 0$)		(0.000)	(0.000)	(0.000)	
Bed capacity/AMI patient, mean by patients	3.725	3.623	3.155	2.893	−22.3%
(standard deviation)	(1.284)	(1.291)	(1.080)	(1.067)	

Descriptive statistics about hospital markets are calculated using weights equal to the number of AMI patients.

Baseline results

- Before 1991, ambiguous welfare and after 1991, welfare-improving.

TABLE IV

EFFECTS OF HOSPITAL COMPETITION ON EXPENDITURES AND OUTCOMES FOR ELDERLY AMI PATIENTS, HHI^{pat*} VERSUS CONVENTIONAL 75 PERCENT-PATIENT-FLOW HHI, PRE- AND POST-1990

	Using HHI^{pat*}				Using conventional 75-percent patient-flow *HHI*			
	1-year hospital expenditures	1-year mortality	1-year AMI readmit	1-year HF readmit	1-year hospital expenditures	1-year mortality	1-year AMI readmit	1-year HF readmit
Pre-1990 effects of competition and capacity (omitted category = very low HHI)								
Very high HHI	−2.18	0.84	0.58	−0.03	−13.14	2.25	−0.02	−0.16
	(1.04)	(0.67)	(0.32)	(0.39)	(0.62)	(0.39)	(0.19)	(0.22)
High HHI	0.44	0.15	0.34	−0.07	−8.01	1.37	0.23	−0.05
	(0.88)	(0.57)	(0.27)	(0.33)	(0.53)	(0.33)	(0.16)	(0.19)
Low HHI	1.05	0.88	0.11	−0.08	−6.07	1.31	0.03	0.07
	(0.69)	(0.44)	(0.20)	(0.25)	(0.46)	(0.29)	(0.14)	(0.17)
Bed capacity/ AMI patient	4.53	0.31	−0.12	0.03				
	(0.22)	(0.14)	(0.07)	(0.08)				
Post-1990 effects of competition and capacity (omitted category = very low HHI)								
Very high HHI	8.04	1.46	0.54	−0.43	−1.12	1.81	0.24	0.10
	(1.08)	(0.69)	(0.33)	(0.40)	(0.62)	(0.38)	(0.18)	(0.23)
High HHI	4.43	0.46	0.23	−0.30	−0.97	1.64	0.39	0.30
	(0.91)	(0.57)	(0.28)	(0.34)	(0.55)	(0.34)	(0.17)	(0.20)
Low HHI	3.25	0.65	0.16	−0.24	−1.51	0.60	0.38	0.34
	(0.70)	(0.44)	(0.21)	(0.26)	(0.48)	(0.29)	(0.14)	(0.18)
Bed capacity/ AMI patient	1.73	0.42	−0.23	−0.23				
	(0.27)	(0.17)	(0.08)	(0.10)				

Results: Impact of managed care on competition

- Low HMO enrollment areas: high costs and less mortality.
- High HMO enrollment areas:low costs and less mortality.

TABLE VI
EFFECTS OF HOSPITAL COMPETITION ON EXPENDITURES AND OUTCOMES, BASED ON HHI^{pat*}, BY EXTENT OF HMO ENROLLMENT IN SURROUNDING AREA AT DATE OF ADMISSION

	1-year hospital expenditures	1-year mortality	1-year AMI readmit	1-year HF readmit
Effect of HMO enrollment (omitted category = less-than-median enrollment/population)				
High HMO enrollment	−6.07	−0.94	−0.13	0.16
	(1.21)	(0.79)	(0.38)	(0.46)
Effects of competition and capacity in low enrollment areas (omitted category = very low HHI)				
Very high HHI	−4.98	0.68	0.32	0.06
	(1.13)	(0.74)	(0.35)	(0.42)
High HHI	−3.66	−0.31	−0.02	−0.10
	(0.98)	(0.64)	(0.31)	(0.37)
Low HHI	−2.59	0.65	0.12	0.07
	(0.81)	(0.53)	(0.25)	(0.30)
Bed capacity/AMI patient	4.09	0.19	−0.11	−0.03
	(0.24)	(0.16)	(0.08)	(0.09)
Effects of competition and capacity in high enrollment areas (omitted category = very low HHI)				
Very high HHI	4.98	1.44	0.75	−0.41
	(1.08)	(0.68)	(0.33)	(0.40)
High HHI	2.56	0.67	0.52	−0.23
	(0.87)	(0.55)	(0.27)	(0.32)
Low HHI	2.44	0.79	0.23	−0.22
	(0.65)	(0.41)	(0.19)	(0.24)
Bed capacity/AMI patient	2.17	0.50	−0.20	−0.03
	(0.25)	(0.16)	(0.08)	(0.09)

Conclusion

Pre- 1991 period

- Competition led to high costs and low rates of adverse outcomes.

Post-1991 period

- Competition led to lower costs and lower rates of adverse outcomes: HMO enrollment explains this dramatic change.

Managed care increases efficiency and reduces tendency of 'MAR' expenditure growth

Threats

- Representative of sample of the AMI patients. Results may differ for non-acute illnesses.
- Do not model why the welfare effects of competition changed around 1990.
- Not a good measure of estimates to see impact of changes in competition from third to second quartile.

Thank You!