Hospital Market Concentration, Pricing, and Profitability in Orthopedic Surgery and Interventional Cardiology

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Objective: To examine the association between hospital market concentration and pricing.

Background: Hospitals have been merging into systems that potentially wield bargaining power over private health insurers. Concern is growing among policy makers that these systems may respond to provisions of the 2010 health reform legislation by further increasing consolidation and prices.

Methods: Multivariate statistical methods were used to evaluate the association between hospital market concentration, prices, and profits (contribution margins) for commercially insured patients admitted for any of 6 major cardiac and orthopedic surgery procedures, adjusting for characteristics of the patient (diagnoses, comorbidities, complications) and of the hospital (size, patient volume, teaching status). Data were obtained on 11,330 patients treated in 61 hospitals in 27 markets across 8 states in 2008.

Results: Hospital prices for patients in concentrated markets were higher than hospital prices for otherwise-comparable patients in competitive markets by 25.1% for coronary angioplasty, 13.0% for cardiac rhythm management (CRM) device insertion, 19.2% for total knee replacement, 24.1% for total hip replacement, 19.3% for lumbar spine fusion, and 22.7% for cervical spine fusion (P <.05). Contribution margins were higher in concentrated than in competitive hospital markets by $5259 for angioplasty, $3417 for CRM device insertion, $4123 for total knee replacement, $5889 for total hip replacement, $7931 for lumbar spine fusion, and $4663 for cervical spine fusion (P <.05).

Conclusion: Hospitals in concentrated markets charge significantly higher prices and earn significantly higher margins from private insurers than do hospitals in competitive markets.

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For author information and disclosures, see end of text.

Hospitals have been merging with and acquiring nearby facilities, creating local and regional chains that potentially wield greater bargaining leverage than do stand-alone facilities.[1] Concerns over the potential impact of health reform on hospital consolidation and pricing have been raised recently in Massachusetts and California, where hospital mergers and large hospital systems have been associated with high costs of care, as well as on a national basis by the Department of Justice (DOJ) and Federal Trade Commission (FTC).[2-4]

The association between hospital market concentration and pricing has been a long-standing focus for federal antitrust agencies concerned with the rising costs of care. It is gaining new attention as a result of 2 provisions in the 2010 health reform legislation. First, the expansion of coverage is to be financed in part via a slowdown in Medicare payment rate updates relative to predicted trends, which may lead to further increases in the prices charged by hospitals to private insurers.[5] Second, the consolidation of local markets may be accelerated by the provisions of the legislation that encourage hospitals and physicians in local markets to integrate and form accountable care organizations that provide the full spectrum of inpatient and outpatient services.[6] It is unclear whether integration with physicians gives hospitals pricing power over and above what they achieve through integration with other nearby hospitals, but the DOJ and FTC have raised concerns about this ongoing process.[7]

DATA AND METHODS

Data were obtained on patients admitted to 61 hospitals in 2008 for coronary angioplasty with drug-eluting stent, insertion of cardiac rhythm management (CRM) device (pacemaker or implantable cardioverter defibrillator), total knee replacement, total hip replacement, lumbar spine fusion, or cervical spine fusion. These facilities were participants in the value-based purchasing initiative of the Integrated Healthcare Association, a coalition of large hospitals, medical groups, and health plans in California, or worked on value purchasing with Aspen Health Metrics, a hospital consulting firm.

Additional data on the hospitals where the procedures were performed were obtained from the American Hospital Association's 2008 Annual Sur-

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This study found that hospitals in more concentrated markets (with fewer competitors, after adjusting for urban/rural location and chain ownership) charge significantly higher prices to private insurers than do otherwise-similar hospitals in more competitive markets.

- Price differentials ranged from 15% to 26% for coronary angioplasty, cardiac rhythm management, knee replacement, hip replacement, lumbar spine fusion, and cervical spine fusion.
- The further consolidation of hospital markets, encouraged by the health reform legislation under the rubric of "accountable care organizations," may have the unintended effect of increasing pricing leverage by hospitals.

vey of Hospitals, including number of staffed beds, average annual earnings for hospital staff, and teaching status of the institution. The market for each hospital was identified as the Hospital Referral Region, developed by the Dartmouth Atlas based on patient flow data for Medicare patients.[8] The Dartmouth Atlas assigns every hospital in the United States to one of 306 markets. The 61 hospitals used in this study are distributed across 27 of those markets, spanning 8 states. To control for the effect of market size, I also measured the population of the metropolitan regions served by each hospital.

The extent of consolidation of the local hospital market was measured in terms of the Herfindahl-Hirschman Index (HHI),[9] the standard measure used in economic analyses of market competition. It is constructed by dividing the number of staffed beds for each facility by the total number of beds within the market to obtain each hospital's share. The share of each facility then is squared and the shares of all hospitals are summed to create an index that potentially ranges from zero (many competitors, each with a negligible share) to 10,000 (1 facility, with 100% market share). For ease of interpretation, the index was scaled here so it ranged from a potential low of zero to a potential high of 100.

Some analyses of hospital market structure implicitly assume that every facility competes with every other facility in the same market, in that they construct the HHI using market shares for each facility separately. Given the importance of local chain ownership, this assumption likely is invalid. In this study, data from the American Hospital Association survey were used to identify the chain with which each hospital in the study was affiliated, if any. All hospitals owned by the same chain in the same market then were treated as part of the same organization in calculating market shares and HHI.

The hospitals included in this study were located in 27 local markets, as defined by the Hospital Referral Regions of the Dartmouth Atlas. These markets varied substantially in terms of the number of hospitals within them, from a low of 2 to a high of 92, with an average of 15.6. However, many of these individual hospitals within particular markets belonged to the same hospital chains and so were not competing with one another on the basis of price. When chain ownership was taken into account, the number of competitors ranged from a low of 2 to a high of 54, with a mean of 11.3. The traditional HHI, measured using each facility as a competitor regardless of chain ownership, had a mean of 21.1, while the chain-adjusted HHI had a mean of 25.1. By way of comparison, in 2008 the average HHI across all 306 markets in the nation was 19.5, and the chain-adjusted HHI was 25.2 (calculated using the American Hospital Association Annual Survey of Hospitals). The 6 procedures studied here are all performed on an inpatient rather than outpatient basis, so the relevant measure of market structure is that of the hospital rather than including, for instance, the presence of ambulatory surgery centers.

Prices charged by the hospitals were measured in terms of the amount collected from the private insurer for each patient, after all contractual discounts. Collected revenues per patient are a more valid indicator of true prices than are the hospital's billed charges, which typically never are collected in full. In the multivariate statistical analyses, prices are measured on a logarithmic scale to facilitate interpretation as the association between market concentration and percentage (rather than dollar) differences in prices. I measured the profitability to the hospital of each patient in terms of the difference between the insurer's payment and the hospital's direct costs for treating that patient. This "contribution margin" measures the profitability of each particular patient exclusive of indirect hospital costs such as administrative overhead, depreciation of capital investments, and the charity care provided to uninsured patients.

The data included information on each patient's principal diagnoses, comorbidities, age, discharge destination, and in-hospital complications. For hip and knee replacement procedures, coded diagnoses included osteoarthritis, rheumatoid arthritis, aseptic necrosis, and fractures. The knee and hip replacement analyses were limited to patients undergoing primary, rather than revision, surgery. For lumbar and cervical spine fusion, diagnoses included fracture, spondylolisthesis, and intervertebral disk disorder. For angioplasty, the analysis was limited to patients receiving a drug-eluting stent (as distinct from a bare metal stent or no stent) and adjusted for the number of stents used in the case. For CRM device insertion, the statistical analyses were adjusted for whether the implant was a single-chamber or dual-chamber pacemaker, a pacemaker with cardiac resynchronization therapy capability, an implantable cardioverter defibrillator, or an implantable cardioverter defibrillator with resynchronization capability. In these data, comorbidities were defined as preexisting conditions that resulted in an increase in the length of stay by at least 1 day. For

Table 1. Characteristics of Patients, Hospitals, and Hospital Markets

Characteristic	Mean Value (SD)					
	Angioplasty	CRM Device Insertion	Knee Replacement	Hip Replacement	Lumbar Fusion	Cervical Fusion
Commercial price	$26,052	$37,379	$22,616	$23,930	$47,085	$21,125
	($20,573)	($34,418)	($13,197)	($13,845)	($30,439)	$15,712)
Commercial margin	$14,525	$16,294	$10,630	$11,335	$22,690	$9483
	($18,415)	($28,424)	($12,389)	($13,303)	($27,439)	($14,708)
Market structure HHI	18.09	15.46	19.93	16.59	21.34	17.73
	(17.3)	(12.34)	(16.83)	(12.58)	(16.6)	(13.85)
Market population (1000)	4603	4911	3549	3692	2996	4136
	(5375)	(5384)	(4732)	(4598)	(4218)	(4877)
Hospital volume	324	168	428	212	216	105
	(162)	(88)	(286)	(132)	(167)	(49)
Hospital bed size	385	382	332	340	406	369
	(177)	(180)	(165)	(165)	(204)	(168)
Teaching hospital	0.20	0.14	0.19	0.14	0.27	0.16
	(0.4)	(0.35)	(0.39)	(0.35)	(0.44)	(0.37)
Hospital staff salary	$52,176	$53,323	$53,293	$54,342	$54,178	$54,938
	($10,830)	($11,537)	($11,484)	($11,823)	($11,773)	($11,843)
Comorbidities per patient	0.44	0.84	0.31	0.38	0.30	0.03
	(0.71)	(1.25)	(0.55)	(0.65)	(0.63)	(0.18)
Complications per patient	0.12	0.15	0.03	0.03	0.10	0.002
	(0.32)	(0.36)	(0.16)	(0.17)	(0.32)	(0.04)
Age, y	57.6	63.9	59.5	56.6	50.5	50.2
	(8.8)	(14.3)	(8.0)	(9.9)	(11.3)	(9.1)
Discharge to home	0.98	0.91	0.26	0.30	0.81	0.95
	(0.14)	(0.28)	(0.44)	(0.46)	(0.39)	(0.23)
Number of patients	2226	756	3435	2067	1589	1257

CRM indicates cardiac rhythm management; HHI, Herfindahl-Hirschman Index.

orthopedic joint replacement and spine procedures, complications were defined as in-hospital events serious enough to result in at least 1 extra day of hospital stay. For angioplasty and CRM device insertion, complications were defined in terms of those serious enough to cause a shift in the patient's diagnosis-related group assignment. Our measure of complications only captured events that occurred during the hospital stay; I had no data on events that occurred after discharge.

To examine the bivariate association between market structure and hospital performance, I divided hospitals according to whether their index of market concentration (HHI) was above or below the median for all study hospitals, and calculated average prices and contribution margins for patients undergoing each of the 6 procedures. I then conducted multivariate regression analyses of hospital prices and contribution margins as a function of market structure (HHI, population size), procedure volume (number of study procedures performed in the hospital during 2008), hospital characteristics (number of staffed beds, teaching status, average staff salary), and patient characteristics (principal diagnoses, age, comorbidities, complications, discharge destination). I modified the calculation of standard errors for the multivariate regression analyses to cluster for within-hospital correlation of prices and margins across patients. It is to be expected that unmeasured determinants of prices and margins will be correlated for patients treated at the same hospital.[10]

RESULTS

Table 1 presents means and standard deviations for the market, hospital, and patient characteristics used in the study. Average prices per procedure ranged from $21,125 for cervical fusion to $47,085 for lumbar fusion. These procedures were highly profitable, with contribution margins per patient ranging from $9483 for cervical spine fusion to $22,690 for lumbar

Table 2. Procedure-Specific Prices and Contribution Margins for Commercially Insured Patients in Consolidated and Competitive Hospital Markets

	Mean					
Type of Market	Angioplasty	CRM Device Insertion	Knee Replacement	Hip Replacement	Lumbar Fusion	Cervical Fusion
Consolidated markets						
Price (insurance payment)	$32,411	$47,477	$26,713	$29,140	$51,998	$23,755
Contribution margin	$20,173	$23,872	$14,614	$16,412	$28,101	$11,711
Percent contribution margin	62%	50%	55%	56%	54%	49%
Competitive markets						
Price (insurance payment)	$21,626	$30,399	$18,337	$19,534	$39,568	$18,370
Contribution margin	$10,612	$11,056	$6467	$7050	$14,411	$7150
Percent contribution margin	49%	36%	35%	36%	36%	39%

CRM indicates cardiac rhythm management.

spine fusion. In percentage terms, the contribution margins were 56% for angioplasty, 44% for CRM, 47% for knee replacement, 47% for hip replacement, 48% for lumbar fusion, and 45% for cervical fusion.

The bivariate association between hospital market concentration on the one hand and the prices charged and contribution margins earned on the other is presented in Table 2. Defining concentrated markets as those with an HHI above the median and competitive markets as those with an HHI below the median, the average price per procedure was significantly higher in concentrated markets than in competitive markets for all 6 procedures. The difference in price associated with market structure ranged from 29.3% for cervical fusion to 56.2% for CRM device insertion (P <.01 for all procedures).

The market-related differences in prices charged to commercial insurers were associated with substantial market-related differences in the contribution margins earned from commercial insurers. The average difference in contribution margins earned in concentrated markets compared with competitive markets was $9561 (90%) for angioplasty, $12,816 (116%) for CRM device insertion, $8147 (126%) for knee replacement, $9362 (133%) for hip replacement, $13,690 (95%) for lumbar fusion, and $4561 (64%) for cervical fusion (P < .01 for all procedures). It is interesting to note that these procedures generated positive contribution margins even in competitive markets where hospitals' pricing leverage is weak. As indicated in Table 2, the average contribution margins for patients treated in competitive hospital markets was 49% for angioplasty, 36% for CRM insertion, 35% for knee replacement, 36% for hip replacement, 36% for lumbar fusion, and 39% for cervical fusion.

The associations between market structure, pricing, and contribution margins in Table 2 did not adjust for other hospital and patient characteristics that are likely to influence how much a hospital is able to charge and earn from a particular procedure. Table 3 and Table 4 present the results of multivariate statistical analyses that identify the association between market structure, pricing, and contribution margins after adjusting for hospital characteristics such as size (staffed beds, number of procedures per year), teaching status, and average staff earnings, along with patient characteristics including diagnoses, comorbidities, age, complications, and discharge destination.

Hospitals in concentrated markets were able to charge higher prices to commercial insurers than otherwise-similar hospitals in competitive markets for all 6 procedures (see Table 3). To illustrate the scale of the association between concentration and price, one can multiply the coefficient on the chain-adjusted HHI in Table 3 by 1 standard deviation in the HHI variable obtained from Table 1. Using this definition of concentration, the data in Table 3 indicate that hospital prices for patients in concentrated markets were higher than hospital prices for otherwise comparable patients in competitive markets by 25.1% for angioplasty (95% confidence interval [CI] 24.1, 26.1), 13.0% for CRM device insertion (95% CI 12.4, 13.6), 19.2% for total knee replacement (95% CI 18.5, 19.9), 24.1% for total hip replacement (95% CI 23.3, 24.9), 19.3% for lumbar fusion (95% CI 18.4, 20.2), and 22.7% for cervical spine fusion (95% CI 21.7, 23.7).

Hospitals whose patients have in-hospital complications were able to pass on the cost of those complications to insurers in the form of higher prices (see Table 3), but the differences are only statistically significant at P <.10 or higher for angioplasty, CRM device insertion, knee replacement, and lumbar spine fusion. Hospitals performing high volumes of procedures were able to charge higher prices to commercial insurers than otherwise-similar hospitals performing fewer procedures per year, but there was no consistent association between prices and hospital size as measured in terms of staffed beds.

Table 3. Association Between Hospital Consolidation and Prices for 6 Major Procedures[a]

	Dependent Variable: Log Price (Insurance Payment)					
Independent Variable	**Angioplasty**	**CRM Device Insertion**	**Knee Replacement**	**Hip Replacement**	**Lumbar Fusion**	**Cervical Fusion**
Market structure HHI	0.0145[b]	0.0105[b]	0.0114[b]	0.0192[b]	0.0116[c]	0.0164[b]
	(0.00486)	(0.00302)	(0.00375)	(0.00413)	(0.00465)	(0.00499)
Market population (1000)	1.51e-05	9.49e-06	8.57e-06	1.27e-05	2.45e-05	2.23e-05
	(1.45e-05)	(1.78e-05)	(9.13e-06)	(7.76e-06)	(1.51e-05)	(1.50e-05)
Hospital volume (100)	0.0475	0.0668	0.0318[b]	0.0283[b]	0.0814[d]	0.144[b]
	(0.0448)	(0.0701)	(0.00885)	(0.00783)	(0.0429)	(0.0455)
Hospital bed size (100)	0.0149	-0.00382	0.0130	0.0167	0.0311	-0.00379
	(0.0492)	(0.0441)	(0.0278)	(0.0237)	(0.0406)	(0.0477)
Teaching hospital	0.0239	0.0641	-0.190[c]	-0.190[c]	-0.222	-0.406[c]
	(0.265)	(0.137)	(0.0936)	(0.0947)	(0.183)	(0.189)
Hospital staff salary ($1000)	0.0113[d]	0.0113	0.0112[b]	0.0128[b]	0.0148[c]	0.0149[c]
	(0.00667)	(0.00829)	(0.00342)	(0.00345)	(0.00559)	(0.00711)
Comorbidities	-0.0228	0.0716[c]	-0.0177	0.0240	0.110[c]	-0.119
	(0.0340)	(0.0322)	(0.0227)	(0.0226)	(0.0451)	(0.118)
Complications	0.159[c]	0.291[b]	0.143[b]	0.0516	0.162[c]	0.208
	(0.0637)	(0.0830)	(0.0521)	(0.0667)	(0.0601)	(0.489)
Age	-0.00364	-0.0113[c]	-0.00725[d]	-0.00815[b]	-8.53e-05	0.00160
	(0.00275)	(0.00426)	(0.00365)	(0.00298)	(0.00226)	(0.00274)
Discharge to home	-0.286[c]	-0.224[b]	-0.00335	0.0171	-0.0108	-0.00865
	(0.132)	(0.0725)	(0.0560)	(0.0457)	(0.0764)	(0.117)
R^2	0.208	0.286	0.172	0.210	0.160	0.187

CRM indicates cardiac rhythm management; HHI, Herfindahl-Hirschman Index.
[a]Regression analysis also controlled for patient diagnoses, number of stents (angioplasty), type of CRM device (pacemaker, implantable cardioverter defibrillator), and intercept term. Robust standard errors are in parentheses.
[b]$P < .01$.
[c]$P < .05$.
[d]$P < .1$.

Table 4 presents results from the multivariate analysis of hospital contribution margins for commercially insured patients. Contribution margins were higher in concentrated than in competitive markets for each of the study procedures, with a difference of 1 standard deviation in the chain-adjusted HHI measure of market concentration being associated with higher margins of $5259 for angioplasty (95% CI $5001, $5517), $3417 for CRM device insertion (95% CI $3186, $3648), $4123 for total knee replacement (95% CI $3918, $4328), $5889 for total hip replacement (95% CI $5631, $6147), $7931 for lumbar fusion (95% CI $7475, $8387), and $4663 for cervical spine fusion (95% CI $4446, $4880).

Hospitals performing high volumes of procedures earned significantly higher contribution margins than did low-volume hospitals, consistent with the association between procedure volume and pricing reported in Table 3. Despite charging higher prices for patients who had in-hospital complications than for patients who did not have analogous complications (see Table 3), hospitals did not earn higher contribution margins from patients with complications. The positive association between complications and prices but lack of association between complications and contribution margins is due to higher costs of care associated with patients with complications.

LIMITATIONS

The findings from this study must be interpreted within the context of its limitations. The 61 hospitals from which data were obtained are distributed across 27 local markets and 8 states, but nevertheless are not fully representative of all US hospitals. They are concentrated in the west and the southeast rather than distributed nationally. The 6 procedures studied are all prominent and high-volume interventions, yet do not represent the full range of hospital care. As documented in Table 4, all 6 procedures are highly profitable, with con-

Table 4. Association Between Hospital Consolidation and Profitability (Contribution Margin) for 6 Major Procedures[a]

	Dependent Variable: Contribution Margin					
Independent Values	**Angioplasty**	**CRM Device Insertion**	**Knee Replacement**	**Hip Replacement**	**Lumbar Fusion**	**Cervical Fusion**
Market structure HHI	304.0[c]	276.9[c]	245.0[c]	468.1[b]	477.8[c]	336.7[b]
	(131.6)	(118.0)	(104.8)	(131.5)	(232.5)	(110.6)
Market population (1000)	0.136	-0.0458	0.146	0.245	0.715	0.378
	(0.254)	(0.451)	(0.202)	(0.227)	(0.766)	(0.281)
Hospital volume (100)	326.0	1630	631.2[b]	552.2[b]	3844[c]	2036[b]
	(1079)	(2409)	(187.2)	(173.0)	(1581)	(733.2)
Hospital bed size (100)	20.11	-767.2	239.4	136.6	378.7	778.6
	(935.9)	(1358)	(632.4)	(603.1)	(1481)	(689.6)
Teaching hospital	-1118	1044	-5916[c]	-6085[c]	-17,610[c]	-13,003[b]
	(4995)	(6336)	(2382)	(2552)	(7673)	(3770)
Hospital staff salary ($1000)	295.2[b]	411.0[d]	190.3[b]	244.7[b]	482.8[b]	147.0[c]
	(99.45)	(218.9)	(66.53)	(82.28)	(159.6)	(70.53)
Comorbidities	-872.7	2941[d]	-787.6	-25.99	4991[b]	-1827
	(768.6)	(1728)	(525.6)	(561.4)	(1618)	(2814)
Complications	3230[d]	8151[c]	1786	-496.9	5622[b]	2516
	(1773)	(3639)	(1354)	(1543)	(1957)	(4387)
Age	-70.54	-309.8[c]	-104.4[d]	-106.0[c]	-38.78	19.84
	(59.23)	(123.6)	(60.10)	(48.09)	(67.90)	(55.25)
Discharge to home	-6023	-2278	-517.1	559.4	2448	2776
	(5975)	(5084)	(1250)	(1166)	(2564)	(3407)
R^3	0.136	0.133	0.145	0.206	0.162	0.151

CRM indicates cardiac rhythm management; HHI, Herfindahl-Hirschman Index.
[a]Regression analysis also controlled for patient diagnoses, number of stents (angioplasty), type of CRM device (pacemaker, implantable cardioverter defibrillator), and intercept term. Robust standard errors are in parentheses.
[b]$P < .01$.
[c]$P < .05$.
[d]$P < .1$.

tribution margins ranging from $3471 to $7931, whereas the totality of hospital procedures, once combined with overhead expenses, generated an average hospital profit margin of only 2.6% in 2008.[11]

The data used in this study are derived from hospital cost accounting systems, which are not standardized across facilities. They are not independently audited and may differ in the criteria according to which they assign various joint costs, such as operating room equipment, to particular procedures and patients. However, differences among hospitals in the manner by which they assign costs to particular patients will only raise concerns of interpretation for the association documented here between market structure and hospital pricing if cost accounting methods differ systematically between hospitals in competitive markets and otherwise similar hospitals in concentrated markets. There is no reason for this to be the case.

I was unable to include a measure of the structure of the demand side of the local hospital market, in terms of the number and market shares of health insurers. The private health insurance market is heavily concentrated, with 36 states having 3 firm concentration ratios above 65%.[12] The structure of the local insurance market would only be a matter of concern for interpreting the results of the present study if buyer (insurance) concentration was great in precisely those local markets where seller (hospital) concentration were weak. There is no reason to assume this is the case. If anything, it would be plausible to assume that insurers and hospitals are most likely to merge with nearby competitors in those markets where their principal bargaining adversaries had already consolidated, in which case buyer and seller concentration would be positively rather than inversely correlated.

The data here are from a single year, and hence the analysis is limited in what it can infer with respect to causality

rather than association. It always is possible that unmeasured characteristics of the patients and the hospitals, which are correlated with the structure of the local market, are responsible for the observed association between market structure, prices, and profitability. The study was able to control for the most obvious determinants of pricing and profitability, however, including cost drivers such as patient demographics, co-morbidities, and complications and hospital size, teaching status, and wage costs.

The data reported here have 2 major strengths, compared with the data used in other published studies of hospital concentration and pricing. Most studies have been hampered by measures of market structure that do not account for chain ownership, and hence treat every facility in a local market as if it were competing with every other facility. Furthermore, many studies measure hospital prices at the level of the hospital itself, which blends the prices for many different procedures and services. This study developed a measure of market concentration that treats jointly owned hospitals as if they are part of the same organization rather than as if they were independent. Prices and profitability were measured at the level of the individual patient within clearly demarcated procedures, and hence are much less affected by case mix severity differences than are hospital prices averaged across multiple procedures. Diagnoses, co-morbidities, complications, age, and discharge destination were measured for patients undergoing each procedure type as additional controls on severity differences.

DISCUSSION

Economic theory argues that firms in concentrated markets are able to charge higher prices than firms in competitive markets since consumers have more limited ability to shift their purchases; moreover, new firms with more efficient processes are less able to enter and charge lower prices to attract their first customers.[13] Translated to the hospital services market, where only a small fraction of services are paid for by patients themselves, this theory argues that hospitals in concentrated markets can charge higher prices to insurers because they face lower risks than do hospitals in competitive markets of being excluded from the insurers' contractual networks. Over the past 3 decades, as health insurers have evolved from passive indemnity payers into active managed care organizations, hospitals in many communities have merged with or acquired neighboring facilities precisely to reduce the risk of network exclusion and to enable higher prices.[14-16]

As hospital markets are mostly local in nature, with few patients traveling significant distances for any except the most complicated forms of care, the important structural characteristic is the distribution of market capacity and patient volume among competing hospital chains, not merely their distribution among distinct hospital facilities. Hospital markets in the United States now mostly fall within the definitions adopted by the DOJ and FTC as moderately to highly concentrated. The chain-adjusted HHI for all 306 hospital markets in the nation is 25.2 and for the 61 hospitals from which patient records are drawn for this study it is 25.1. The DOJ/FTC threshold between moderately and highly concentrated markets is 25.0 (prior to October 2010, the threshold was an even more stringent 20.4).[4]

The results presented in this article are consistent with economic theory in documenting a strong positive association between hospital market concentration on the one hand and the prices charged to private insurers on the other. After adjusting for hospital and patient characteristics, facilities in concentrated local markets charged higher prices across all 6 procedures than did hospitals in competitive local markets. These higher prices generated higher profits, measured in this study as the difference between the insurer's payment and the hospital's direct cost of providing care to the patient (contribution margin). Adjusting for other hospital and patient characteristics, hospitals in concentrated markets earned $4561 (64%) to $13,690 (95%) more per patient across the 6 procedures than did hospitals in competitive markets.

While the emphasis of this study was on the variation across markets in the structural potential for competition (HHI), there clearly also was variation within markets in hospitals' ability to price their services and earn attractive margins. Even in the most competitive local markets, some hospitals were able to charge more than their peers due to a reputation for quality or other features that made them must-have facilities from the perspective of managed care plans' contractual networks. This underlying characteristic was reflected in this study by the association between how often each procedure was done annually at particular hospitals and the prices charged by those hospitals. This association was positive for all 6 procedures and significantly so for 4 procedures. The willingness of an insurer to contract with a hospital may be inversely associated with the prices charged by that hospital, but often the characteristics of the facility that attract large numbers of patients also allow it to price its services especially high to insurers.

CONCLUSION

Hospitals need revenues to finance operating expenses, to invest in new capacity, and to provide charity care for

the uninsured, yet they receive payments from public insurance plans that lag behind the growth in the costs of care.[17] Positive contribution margins on orthopedic and cardiac procedures for privately insured patients can be used to subsidize less remunerative procedures and patient groups. The average total margin for US hospitals in 2008 was 2.8%, according to American Hospital Association data, indicating the extent to which the double-digit contribution margins documented here are used to support other services. The extent to which the margins documented here are too high, too low, or just right depends on the mandates placed on hospitals by public policy, private litigation, and cultural expectations.

Public policy has been ambivalent with respect to the consolidation of hospital markets. Antitrust regulatory agencies tend to see mergers as socially undesirable and have sought to block many.[18] On the other hand, the 2010 Patient Protection and Affordable Care Act contains provisions encouraging the formation of accountable care organizations that would encourage hospitals and physicians to combine into larger entities capable of managing the full continuum of care.[19] Hospitals traditionally have funded charity care and other socially desirable activities by charging high prices to and earning high profits from commercially insured patients. While understandable given the lack of near-term alternatives, this indirect approach to funding desirable activities rewards hospitals for forestalling competition rather than for improving the efficiency of the care they provide. As argued by MedPAC,[20] high commercial insurance prices and profits may reduce pressures on hospitals to control costs, thereby accelerating the cycle of higher payments leading to higher costs, and then a subsequent need for even higher payments. Prices should reflect the value of the hospital services offered, not the consolidation of the local hospital market.

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