

By Maximilian J. Pany, Michael E. Chernew, and Leemore S. Dafny

DOI: 10.1377/hlthaff.2021.00001  
HEALTH AFFAIRS 40,  
NO. 9 (2021): 1386-1394  
©2021 Project HOPE—  
The People-to-People Health  
Foundation, Inc.

# Regulating Hospital Prices Based On Market Concentration Is Likely To Leave High-Price Hospitals Unaffected

**Maximilian J. Pany** (mpany@hms.harvard.edu) is an MD-PhD candidate in health policy at Harvard Medical School and Harvard Business School, in Boston, Massachusetts.

**Michael E. Chernew** is the Leonard D. Schaeffer Professor of Health Care Policy in the Department of Health Care Policy, Harvard Medical School.

**Leemore S. Dafny** is the Bruce V. Rauner Professor of Business Administration at Harvard Business School and the Harvard Kennedy School, Harvard University, in Cambridge, Massachusetts.

**ABSTRACT** Concern about high hospital prices for commercially insured patients has motivated several proposals to regulate these prices. Such proposals often limit regulations to highly concentrated hospital markets. Using a large sample of 2017 US commercial insurance claims, we demonstrate that under the market definition commonly used in these proposals, most high-price hospitals are in markets that would be deemed competitive or “moderately concentrated,” using antitrust guidelines. Limiting policy actions to concentrated hospital markets, particularly when those markets are defined broadly, would likely result in poor targeting of high-price hospitals. Policies that target the undesired outcome of high price directly, whether as a trigger or as a screen for action, are likely to be more effective than those that limit action based on market concentration.

**H**igh and rising hospital prices in commercial insurance markets pose a significant challenge for containing health care spending.<sup>1</sup> Given substantial evidence that hospital consolidation causes price increases,<sup>2,3</sup> federal and state agencies in the US have invested significant effort in investigating mergers and (in some cases) monitoring post-merger conduct.<sup>4</sup> Authorities have also mounted challenges to practices such as anti-tiering and anti-steering provisions in contracts, which heighten the bargaining leverage of dominant health care systems.<sup>5</sup> More recently, policy makers and think tanks have introduced proposals to regulate prices directly in concentrated provider markets.<sup>6-8</sup>

The motivation for linking price regulation to market structure stems from the “structure-conduct-performance” (SCP) paradigm in economics,<sup>9</sup> in which market structure, often measured by the degree of market concentration among firms, directly affects the conduct of firms in the market, which in turn affects the

performance of that market (for example, the extent to which prices are “marked up” over costs). Yet there are important conceptual and measurement issues with this approach. Conceptually, the link between structure and conduct is weak in many settings because of complex incentives and institutional details. Duopolists may (implicitly or explicitly) collude or, alternatively, compete vigorously on price, depending on a range of factors outside of structure. In the case of hospitals, markets in which many patients are enrolled in narrow-network insurance plans are likely to be more competitive than structurally identical markets with limited uptake of such plans.

Difficulty in defining a “market” is a second obstacle to applying the “structure-conduct-performance” paradigm. Markets defined narrowly (in terms of geography or provider type) will generally appear less competitive than those defined broadly. Markets with highly differentiated firms (for example, two hospitals located ten miles apart rather than across the street from one another, or one academic medical center and

one community hospital) will be less competitive than those with the same number of firms that are more similar. These nuances limit the effectiveness of tying regulation to crude measures of concentration. Although market definitions can be tailored, doing so on a national scale is difficult and requires more detailed data than are readily available.

These challenges weaken the connection between market structure and profit margins or prices, making it likely that some hospitals in “unconcentrated” markets possess and exercise some market power. Thus, relying on market concentration-based triggers for regulation or antitrust policy, particularly when markets are defined broadly, is unlikely to effectively target many hospitals whose prices are elevated as a result of market power.

This concern is not merely theoretical. Think-tank proposals as well as two pieces of legislation recently introduced in Congress rely on measures of market structure, such as provider market shares or the Herfindahl-Hirschman Index (HHI), to trigger regulatory action to promote competition in targeted markets. For instance, the Bipartisan Policy Center’s “Bipartisan Rx for America’s HealthCare” proposes that hospitals in markets with HHIs exceeding 4,000 and located in counties with populations at or above the US median be required to enter into negotiations with the Federal Trade Commission (FTC) to bring their HHI below 4,000 or have their prices capped at a percentage of Medicare Advantage rates.<sup>6</sup> The Hospital Competition Act of 2019 (H.R. 506) would require hospitals with market shares of 15 percent or more in markets with HHIs exceeding 4,000 in urban areas and 5,000 in rural areas to accept Medicare rates from commercial payers.<sup>7</sup> The Fair Care Act of 2019 (H.R. 1332) includes the same provision.<sup>8</sup> Price regulation efforts such as these intend to prevent providers in uncompetitive markets from exercising their pricing power. Market structure-based triggers for price regulation are insufficient, however, if providers in structurally competitive markets nonetheless possess market power that allows them to demand higher prices without having to provide higher quality warranting those prices.

Using a combination of more recent and more comprehensive data than used in prior studies, we analyze variation in hospital prices after adjusting for variation in area wages and relate the adjusted price levels to market concentration. We report two key findings. First, high-price hospitals, defined as those in the top quartile of the adjusted national price distribution, were prevalent across the concentration spectrum. Specifically, they were prevalent within all four concen-

tration categories we examined, which include the three categories used by antitrust regulators that are delineated by HHI thresholds of 1,500 and 2,500, and an additional policy-relevant category, delineated by an HHI threshold of 4,000. Second, the majority of these high-price hospitals are located in the bottom two categories, which are “unconcentrated” or “moderately concentrated” markets, per the Horizontal Merger Guidelines of the FTC and Department of Justice (DOJ).<sup>10</sup>

Our findings are relevant to current proposals to selectively regulate providers in highly concentrated markets. This approach will leave a substantial number of high-price providers unaffected. The findings also illustrate the shortcomings of relying too heavily on measures of market structure when evaluating potential triggers for regulatory or antitrust review in this sector, specifically if authorities rely on untailored, commonly used geographic market definitions.

## Conceptual Framework

We divide providers into four categories, defined by price (low or high) and market concentration (low-to-moderate or high) (see exhibit A1 in the online appendix).<sup>11</sup> Low-price providers, whether in markets with low-to-moderate or high concentration, typically do not generate concern as long as they are financially solvent. Existing policy proposals tend to target high-price hospitals (or hospitals with high market shares) in concentrated markets. Yet because of a range of institutional features, including insurance, which shields patients from the price of care, information problems, and product differentiation based on location or reputation, many hospitals in low-concentration markets may have market power and thus charge high prices. In this article we document the prevalence of hospitals in the category of high price/low-to-moderate market concentration. We argue that policies to address high prices should be crafted to address those hospitals as well.

## Study Data And Methods

**DATA** To measure hospital prices, we used 2017 claims data from the Health Care Cost Institute (HCCI)<sup>12</sup> for all hospital inpatient and outpatient facility services delivered to adults ages 18–64 with commercial employer-sponsored health insurance from one of three national insurers. This sample includes more than forty million individuals annually. To measure hospital market structure, we calculated market HHIs using the number of admissions reported by general acute care

hospitals in the 2017 American Hospital Association (AHA) Annual Survey,<sup>13</sup> together with Torch Insight data on system affiliation for each hospital.<sup>14</sup>

**MEASURING HOSPITAL PRICES** Using HCCI data, we constructed separate inpatient facility and outpatient facility samples, in each case restricting the sample to facility claims of general acute care hospitals with valid service codes, positive allowed amounts (the total paid for the service by insurer and patient), and appropriate place-of-service codes (see supplemental details in appendix section 2.1).<sup>11</sup> We excluded non-group insurance claims, Medicare claims, and claims indicating secondary coverage. We identified inpatient facility services by their diagnosis-related group (DRG) and outpatient facility services by their *Current Procedural Terminology* (CPT) code. For the purpose of price measurement, we treated distinct Centers for Medicare and Medicaid Services (CMS) Certification Numbers (CCNs) in distinct markets as unique hospitals. We adjusted market concentration measures for common hospital ownership, as discussed below. We aggregated claim lines to the patient-admission-hospital-DRG level in our inpatient facility sample and to the patient-visit-hospital-CPT-code level in our outpatient facility sample; the sum of allowed amounts is our measure of price for each inpatient or outpatient facility visit. To adjust for geographic variation in area wages, a key input cost, we divided all prices by the Medicare wage index for the relevant market. Following the literature, we excluded hospitals with fewer than fifty cases annually (at the hospital-market level) and excluded the top and bottom 1 percent of most expensive cases for each DRG or CPT code.<sup>15</sup>

To characterize price variation across hospitals, we first calculated an implied price index for each hospital in our inpatient facility and outpatient facility samples by repricing claims to their national service-specific means and dividing observed hospital spending by repriced hospital spending, using the services actually delivered by each hospital.<sup>16</sup> This approach, used by the Institute of Medicine's report on geographic variation<sup>17</sup> and by the HCCI,<sup>18</sup> among others, measures how much prices at any given hospital deviate from national average prices for the services delivered at that hospital. A value greater than 1 implies that a particular hospital has relatively high prices, and a value less than 1 implies the opposite. Crucially, the implied price index reflects differences in service mix across hospitals. An advantage of this measure is that it allowed us to include a large sample of hospitals. The results were robust to other price indices based on fixed market baskets of services (see

appendix section 4.2.2 for details),<sup>11</sup> but those approaches necessitated that we drop many hospitals that did not provide enough volume for some of the services in the market basket.

**IDENTIFYING HIGH-PRICE HOSPITALS AND THEIR VOLUME** We identified high-price hospitals irrespective of market by flagging hospitals in the upper quartile of the national wage index-adjusted price distribution in our HCCI samples. We used the number of inpatient facility admissions or outpatient facility visits, respectively, when calculating the share of inpatient facility or outpatient facility services delivered by high-price hospitals. Additional details, as well as sensitivity analyses that define "high-price" hospital using different national percentiles, are in the appendix.<sup>11</sup>

**MEASURING HOSPITAL MARKET STRUCTURE** To align with existing policy proposals, our primary market definition is the hospital referral region (HRR).<sup>7,8</sup> Because one approach to expanding the reach of concentration-based policy proposals would be to narrow the market definition, we also report results using smaller market definitions, specifically Metropolitan Statistical Areas (MSAs), commuting zones, and hospital service areas (HSAs). We constructed system-adjusted market-level HHIs by summing the squared market share of total hospital admissions attributable to each health care system in each market. These HHIs reflect the concentration of market power that arises because hospitals belonging to the same health system typically negotiate jointly with area insurers. In the appendix (section 4.2.5)<sup>11</sup> we present sensitivity analyses that use the Agency for Healthcare Research and Quality's 2018 Compendium of US Health Systems files, instead of Torch Insight data, to link hospitals to health care systems.<sup>19</sup>

We grouped markets by their HHIs into four policy-relevant categories of concentration. We began with the three categories used in antitrust analysis: markets classified by the FTC and DOJ as "unconcentrated" (HHI below 1,500), "moderately concentrated" (HHI between 1,500 and 2,500), and "concentrated" (HHI above 2,500).<sup>10</sup> Based on language in recently proposed price regulation proposals,<sup>6-8</sup> we further subdivided "concentrated" markets into those with an HHI score between 2,500 and 4,000 and those with an HHI above 4,000, yielding four categories.

**LIMITATIONS** Our analysis had several limitations. First, the HCCI data are a convenience sample of health care claims from three large insurers (Humana, Aetna, and UnitedHealthcare), not a random sample of all commercially insured enrollees in the US. In particular, our version of the data (HCCI 1.0) does not contain

claims from smaller and regional insurers, which may pay different prices than do the large national insurers, or from Blue Cross Blue Shield affiliates, which have significant market share in most states.<sup>20</sup> Although the HCCI data include claims from almost all hospitals registered with the AHA, they cover a smaller fraction of these hospitals after we applied our hospital case threshold (fifty claims). The prevalence of high-price hospitals across the concentration spectrum may differ for hospitals excluded from our price measurement sample, which may have affected our prevalence estimates (see appendix section 2.4 for more information on included and excluded providers).<sup>11</sup> The HCCI data do, however, cover more than a fourth of the privately insured US population across employers of all sizes.<sup>15</sup> Because of the large sample size and because they include provider identifiers (as opposed to only market and service identifiers), the HCCI data are well suited for our study of cross-market variation in hospital prices. For these reasons, many related studies also use HCCI data.<sup>15,21–23</sup> Because we used AHA, and not HCCI, data to measure market concentration, our market structure measures did not depend on the number of hospitals captured in the HCCI data.

Second, we defined hospitals within markets at the CCN level for the purpose of price measurement. The CCN is an imperfect measure. Multiple hospitals can bill or report to Medicare under a single CCN, even if they are in distinct geographic markets. A single hospital may also split service lines into separate National Provider Identifiers for billing—and potentially price negotiation—purposes. Despite these limitations, we adopted this provider identifier because it is used for payment by CMS and is therefore regularly monitored and updated, and because other provider definitions have similar limitations. Our results were robust to measuring prices and volume at the level of billing-entity National Provider Identifiers instead of CCNs (see appendix section 4.2.4).<sup>11</sup> In addition, we report results not only for the number of unique hospitals in each market concentration category but also for the number of admissions or visits in each category. These “volume-based analyses” are likely less sensitive to situations in which an organization splits service lines into subunits for billing purposes. However, the volume-based measures have a different limitation, in that they reflect only claims in our HCCI samples, which do not capture the full scope of business for any provider. Unfortunately, we did not observe volumes at the CCN level, and our volume measures do not reflect case-mix (see appendix section 2.3).<sup>11</sup>

Fourth, we used an implied price measure that included all services actually delivered by each hospital in our sample. A limitation of this approach is that hospital markups may vary by service line, and our approach did not hold the market basket of services constant across hospitals that offer different service lines. However, the main alternative, a price index measure that compares prices of a fixed basket of services across hospitals, has the drawbacks of capturing a smaller share of spending and greatly restricting the sample of hospitals and markets that can be analyzed without imputation. The implied approach and the market-basket approach are highly correlated.<sup>16</sup> Appendix section 4.2.2 shows that our findings were robust to using a market basket approach.<sup>11</sup>

Fifth, following existing policy proposals and per common practice, we measured market concentration using the HHI, which we constructed using the number of hospital admissions in the AHA data. (Note that these HHIs are highly correlated [ $r > 0.95$ ] with versions constructed using total patient revenues or number of staffed beds). As discussed above, the HHI is an imperfect measure of competition when providers offer differentiated products or market definitions are not tailored. In addition, we used the HHI based on inpatient facility admissions for analyses of both inpatient facility and outpatient facility prices. Although competition for outpatient facility services is different, these differences largely arise because there are nonhospital providers offering outpatient facility services. As our sample was limited to hospital providers, HHIs constructed on the basis of inpatient facility admissions are highly correlated with those constructed on the basis of outpatient facility visits ( $r > 0.86$ ), and results using the two measures were qualitatively similar (appendix section 4.2.1).<sup>11</sup> We thus relied on HHIs based on inpatient facility admissions for simplicity. To the extent that there is a substantial number of other, nonhospital competitors for various outpatient facility service lines, markets currently classified as highly concentrated would be reallocated to lower concentration categories if data on these additional competitors were included, reducing the potential reach of current proposals.

Sixth, it is likely that geographic markets for many services are much smaller than the HRR (for example, labor and delivery or acute cardiac care services). Indeed, some prior studies of the relationship between market structure and price have used much narrower geographic market definitions (for example, hospitals within a fifteen-mile radius).<sup>15</sup> Conversely, for some very specialized services (for example, transplants),

HRRs may understate the breadth of the market. Some studies have eliminated quasi-arbitrary geographic boundaries by constructing hospital-specific measures of competition, derived using data on patients' choices in all areas from which the hospital draws patients.<sup>24-26</sup> Although these alternatives are likely preferable to a fixed geographic market definition for causal studies of the effect of competition on prices, policy typically relies on commonly available measures of market structure. Our primary analysis used the HRR because it is a common market definition and is the definition used by existing proposals that specify a market definition.<sup>7,8</sup> We show how our estimates are affected by defining geographic markets in terms of MSAs, commuting zones, and HSAs.<sup>11</sup>

Finally, many variables not included in our analysis (such as insurer market concentration) may affect the relationship between hospital market structure and hospital price. This omission was deliberate—we did not estimate a causal relationship. In fact, our analysis highlights the flaws in relying on one predictor or correlate of the true outcome of interest.

### Study Results

**PREVALENCE OF HIGH-PRICE HOSPITALS** We sought to investigate the proportion of high-price hospitals within each of four HHI concentration categories. Defined as hospitals in the top quartile of the national, area wage index-adjust-

ed price distribution, high-price hospitals were prevalent within each HHI category. Exhibit 1 shows that for inpatient services, high-price hospitals constituted 26.5 percent of hospitals in unconcentrated markets (HHI below 1,500), 20.9 percent in moderately concentrated markets (HHI between 1,500 and 2,500), 24.3 percent in concentrated markets with HHI between 2,500 and 4,000, and 34.1 percent in concentrated markets with HHI above 4,000. For outpatient services, the proportions of high-price hospitals were 28.8, 22.8, 23.1, and 25.4 percent, respectively. These findings remained qualitatively similar for alternative definitions of “high-price” hospitals, hospital providers, and HHI measures (see sensitivity analyses in appendix section 4.2).<sup>11</sup>

Results were similar when we evaluated service volume rather the number of service providers, except for outpatient services, where high-price hospitals in unconcentrated markets garnered a lower share (see appendix section 3.1).<sup>11</sup>

#### MARKET LOCATIONS OF HIGH-PRICE HOSPITALS

We also examined the proportion of high-price hospitals across HHI categories (exhibit 2). High-price hospitals were more prevalent in markets with low-to-moderate concentration (HHI up to 2,500) versus high concentration (HHI above 2,500). Specifically, for inpatient services, 30.0 percent of high-price hospitals were located in unconcentrated markets, 28.4 percent in moderately concentrated markets, 24.2 percent in concentrated markets with HHI between 2,500 and 4,000, and 17.4 percent in concentrated markets with HHI above 4,000. For outpatient services, 34.9 percent of high-price hospitals were located in unconcentrated markets, 27.5 percent in moderately concentrated markets, 24.9 percent in concentrated markets with HHI between 2,500 and 4,000, and 12.7 percent in concentrated markets with HHI exceeding 4,000.

Likewise, most of the volume of high-price hospitals was delivered in unconcentrated or moderately concentrated markets (see appendix section 3.1).<sup>11</sup> For inpatient services, the share of volume delivered by high-price hospitals in markets with HHI up to 2,500 was higher than the share of hospitals in those markets (69.0 percent of volume versus 58.4 percent of hospitals; exhibit 2 and appendix exhibit AR2). For outpatient services, the share of volume delivered by high-price hospitals in markets with HHI up to 2,500 was somewhat lower than the share of hospitals in those markets (59.1 percent versus 62.4 percent; exhibit 2 and appendix exhibit AR2).

Exhibits 3 and 4 show the cumulative distribution of high-price hospitals across HHI values for

#### EXHIBIT 1

Prevalence of high-price hospitals in the US within market concentration categories, 2017

	Hospital market Herfindahl-Hirschman Index				No. of hospitals
	<1,500	≥1,500 to ≤2,500	>2,500 to ≤4,000	>4,000	
<b>INPATIENT</b>					
High price	26.5%	20.9%	24.3%	34.1%	447
Not high price	73.5%	79.1%	75.7%	65.9%	1,340
No. of hospitals	505	608	445	229	1,787
<b>OUTPATIENT</b>					
High price	28.8%	22.8%	23.1%	25.4%	1,273
Not high price	71.2%	77.2%	76.9%	74.6%	3,816
No. of hospitals	1,541	1,535	1,374	639	5,089

**SOURCE** Authors' analysis of Health Care Cost Institute data, 2017. **NOTES** Because this exhibit shows within-market concentration category proportions, column percentages sum to 100%, but row percentages do not. The number of markets (hospital referral regions) in each category is as follows. Inpatient: <1,500, n = 25; ≥1,500 to ≤2,500, n = 68; >2,500 to ≤4,000, n = 103; >4,000, n = 91. Outpatient: <1,500, n = 25; ≥1,500 to ≤2,500, n = 69; >2,500 to ≤4,000, n = 110; >4,000, n = 102. Number of hospitals and hospital prices are measured at the Centers for Medicare and Medicaid Services (CMS) Certification Number (CCN)-market level in the 2017 Health Care Cost Institute data. High-price hospitals were defined as those in the upper quartile of the national wage index-adjusted price distribution in our inpatient or outpatient sample. Hospital market structure is measured at the system-adjusted CCN level in terms of total admissions recorded in the 2017 American Hospital Association Annual Survey. Hospitals are general acute care hospitals. See the text for additional details on sample construction.

four geographic market definitions. These definitions are, from the largest to the smallest individual markets, HRRs, MSAs, commuting zones, and HSAs. For both inpatient (exhibit 3) and outpatient (exhibit 4) services, the number of highly concentrated markets, and thus the prevalence of high-price hospitals within those markets, increased with each successively smaller market definition. For the narrowest market definition (the HSA, which is unconcentrated only in very urban areas), the estimated prevalence of high-price hospitals in markets that were not highly concentrated shrank to 14.3 percent for inpatient services (exhibit 3) and to 23.1 percent for outpatient services (exhibit 4). For all other market definitions studied, between a little more than a third and more than half of high-price hospitals were located in unconcentrated and moderately concentrated markets.

These findings were qualitatively similar for alternative definitions of “high-price” hospitals, hospital providers, and HHI measures (see appendix section 4.2).<sup>11</sup>

## Discussion

Our analysis complements and extends the existing literature on hospital price variation, which highlights variation within and across ge-

### EXHIBIT 2

Prevalence of high-price hospitals in the US across market concentration categories, 2017

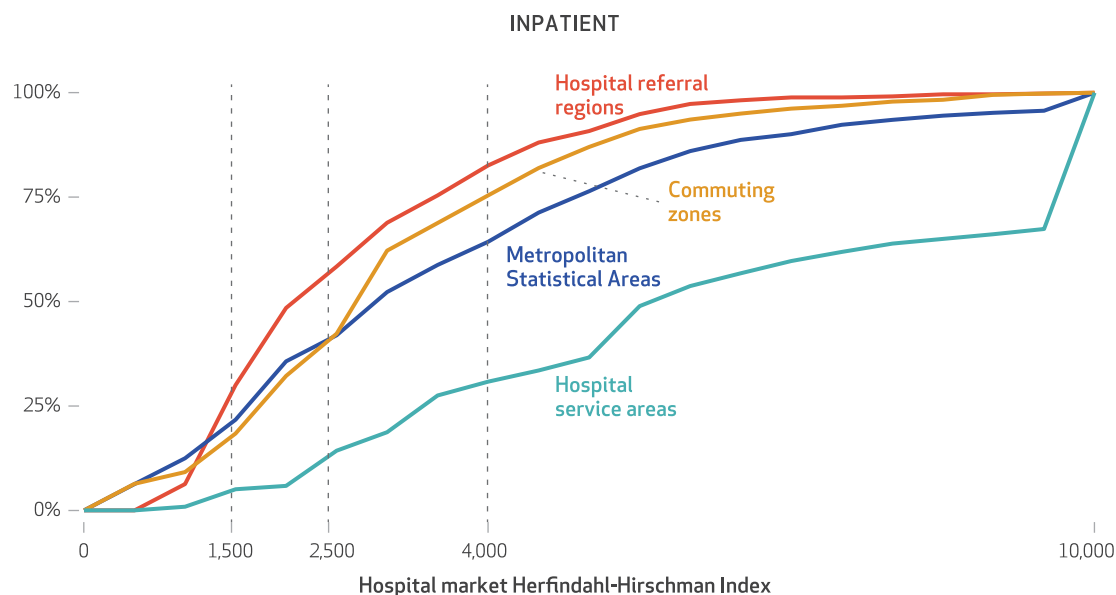
	Hospital market Herfindahl-Hirschman Index				No. of hospitals
	<1,500	≥1,500 to ≤2,500	>2,500 to ≤4,000	>4,000	
<b>INPATIENT</b>					
High price	30.0%	28.4%	24.2%	17.4%	447
Not high price	27.7%	35.9%	25.1%	11.3%	1,340
No. of hospitals	505	608	445	229	1,787
<b>OUTPATIENT</b>					
High price	34.9%	27.5%	24.9%	12.7%	1,273
Not high price	28.7%	31.1%	27.7%	12.5%	3,816
No. of hospitals	1,541	1,535	1,374	639	5,089

**SOURCE** Authors’ analysis of Health Care Cost Institute data, 2017. **NOTES** Because this exhibit shows across-market concentration category proportions, row percentages sum to 100% but column percentages do not. The number of markets (hospital referral regions) in each category is in the exhibit 1 notes. Number of hospitals and hospital prices are measured at the Centers for Medicare and Medicaid Services (CMS) Certification Number (CCN)-market level in the 2017 Health Care Cost Institute data. High-price hospitals were defined as those in the upper quartile of the national wage index-adjusted price distribution in our inpatient or outpatient sample. Hospital market structure is measured at the system-adjusted CCN level in terms of total admissions recorded in the 2017 American Hospital Association Annual Survey. Hospitals are general acute care hospitals. See the text for additional details on sample construction.

ographies and, more recently, within hospitals across insurers. Using claims data for approximately one-fourth of the US commercially insured population in 2017, we constructed an inpatient and outpatient price index for each US

### EXHIBIT 3

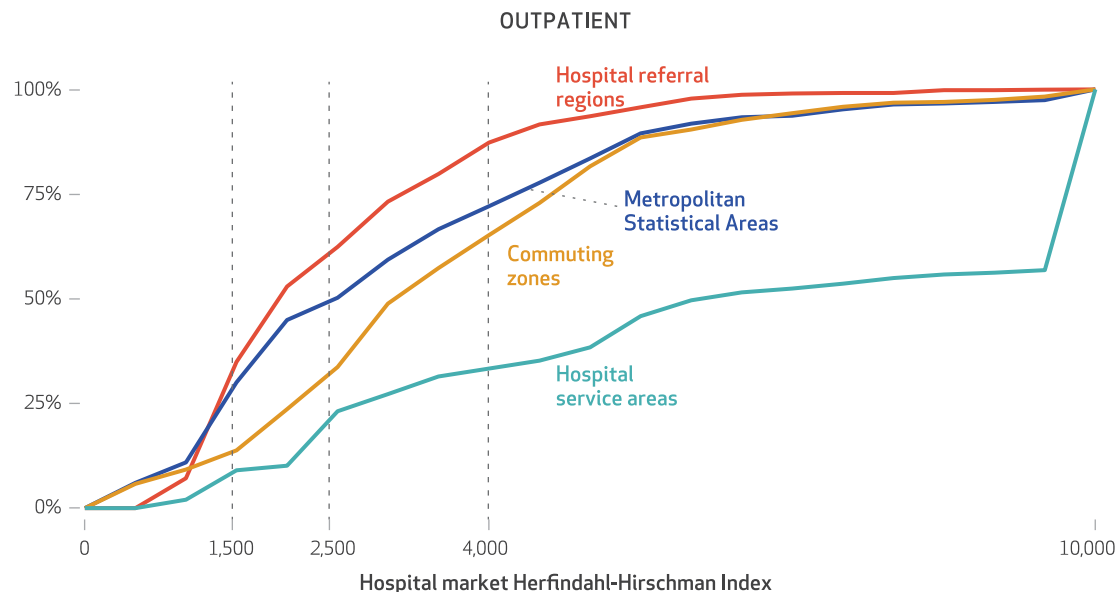
Cumulative distribution of US hospitals with high inpatient prices across concentration thresholds for four common geographic market definitions, 2017



**SOURCE** Authors’ analysis of Health Care Cost Institute data, 2017. **NOTES** Vertical lines represent the market concentration thresholds used in the analysis: Herfindahl-Hirschman Indexes of 1,500, 2,500, and 4,000. Details on sample construction are in the exhibit 2 notes and the text.

EXHIBIT 4

Cumulative distribution of US hospitals with high outpatient prices across concentration thresholds for four common geographic market definitions, 2017



**SOURCE** Authors' analysis of Health Care Cost Institute data, 2017. **NOTES** Vertical lines represent the market concentration thresholds used in the analysis: Herfindahl-Hirschman Indexes of 1,500, 2,500, and 4,000. Details on sample construction are in the exhibit 2 notes and the text.

general acute care hospital with sufficient volume in our sample and examined the relationship between the indices and the degree of hospital market concentration. We found that when we used the market definition common in policy proposals, most high-price inpatient and outpatient hospitals were not located in concentrated markets; in fact, more than a quarter of all high-price hospitals were located in unconcentrated markets, or those with HHIs below 1,500. Only 17.4 percent of all high-price hospitals providing inpatient services and only 12.7 percent of all high-price hospitals providing outpatient services were located in the most concentrated HRR markets (those with HHI exceeding 4,000), even though about a third of the roughly 300 HRRs in our sample were that concentrated. To some degree, this result reflects the fact that more concentrated markets have fewer providers—just under 13 percent of hospitals in our sample were located in markets with HHI greater than 4,000—but it also reflects the reality that high-price providers were prevalent across the spectrum of market concentration.

The prevalence of high-price hospitals across the concentration spectrum did vary with the geographic market definition (see exhibits 3 and 4). We focused on HRRs because they are used in existing policy proposals. However, the smaller the geographic boundaries of markets, the more concentrated the markets will

appear. Although there were still nontrivial numbers of high-price hospitals in unconcentrated and moderately concentrated markets using the HSA, a very narrow market definition, these differences underscore the sensitivity of proposed policies to the choice of market definitions.

**Policy Implications**

The policy action needed to address high-price providers in concentrated markets will likely entail some form of regulation because unraveling past mergers is very difficult, and some markets might not be large enough to support multiple providers. Crafting policy to address high-price providers in less concentrated markets is more controversial. Indeed, one rationale for regulating high-price providers in concentrated markets only is that consumers in those markets have fewer alternatives and therefore cannot easily avoid high prices. In unconcentrated markets, consumers can, in theory, substitute away from high-price providers, and pro-competitive strategies are certainly worthwhile to pursue in those markets. Some examples include limiting “all or nothing” contracting by hospital systems or encouraging benefit designs that have been shown to put downward pressure on prices (such as tiered networks or reference pricing), which so far have been slow to diffuse in the US.<sup>27</sup> Regulation restricting anticompetitive behaviors

such as anti-tiering and most-favored-nation clauses<sup>4,28</sup> may also help reduce provider prices or price growth in unconcentrated markets. But myriad institutional factors such as insurance coverage that insulates patients from the full price of their care, barriers to price shopping, differences in product mix, provider quality that is difficult to discern, and regulatory capture by providers make the path to success long and uncertain.

One concern with policies that target high-price hospitals, even when they are located in unconcentrated markets, is that high-price hospitals may provide higher-quality care that justifies their prices. However, the bulk of the literature to date finds price to be a very poor signal of quality, and there is limited evidence to suggest that price increases yield quality improvements.<sup>29,30</sup> For example, several studies document enormous price variation even for standardized services for which objective quality differences are minimal.<sup>15,31</sup> Although a full discussion of the risks of price regulation was beyond the scope of this study, we note here that in principle, reducing prices may adversely affect quality, and it is unclear whether doing so would decrease or improve the value of care. There currently is no consensus on the magnitude of any effect of price reductions on provider quality.

Although pro-competitive reforms are taking shape and will hopefully improve market performance in many cases, many markets are likely to be left behind, either because consolidation has already occurred or because they are not able to support many competing providers. Recent bipartisan proposals to regulate hospitals in highly concentrated markets demonstrate an appetite to curb the exercise of hospital market power.<sup>6-8</sup> Our results suggest that if the goal is to cap the

highest excesses of pricing, policy makers can narrow the market definition so that most markets are classified as noncompetitive, effectively extending regulation to most high-price hospitals. Yet many high-price hospitals would be missed with even very narrow market definitions such as the HSA. Alternatively, hospital price regulation efforts may be more effective if they are focused on the outcome of interest directly (that is, provider prices) instead of market structure. In either case, policy makers could start with modest approaches, such as capping the highest prices, tracking outcomes and gradually pushing the caps downward, and monitoring trade-offs between savings and any unintended consequences for access or quality.<sup>32</sup>

## Conclusion

If commercial health care prices continue to increase at their current pace, calls for price regulation will grow louder. Clearly, the specifics of regulation matter greatly. We show that hospital market structure is a poor proxy for hospital prices. For the market definitions most commonly used in existing policy proposals, we found that most high-price hospitals are located in markets with low or moderate concentration and would therefore be exempt from regulation. Policies that address high prices regardless of the underlying market structure would be more consistent with a policy goal of constraining high prices. In some cases, these policies may entail promoting competition between hospitals in the same market, but if there are not enough hospitals in a market or if procompetitive policies are not successful at lowering the upper tail of the price distribution, regulation focusing on the most expensive providers may be needed. ■

---

The authors are grateful for support from the Peterson Center on Healthcare and Arnold Ventures. Maximilian Pany received a training grant from the National Institute on Aging (Grant No. T32AG51108) and has received compensation from the Brookings Institution. He serves on the board of trustees of the Massachusetts Medical Society (unpaid). Michael Chernew has research grants from Arnold Ventures, Blue Cross Blue Shield Association, Health Care Service Corporation, National Institute on Aging, Ballad Health, Commonwealth Fund, Signify Health LLC, Agency for Healthcare Research and Quality, and National Institutes of Health; received personal fees from MJH Life Sciences (*American Journal of Public Health*), Elsevier, MITRE, *American Economic Review*, Commonwealth Fund, IDC Herzliya, Madalena Consulting, Chilmark Research,

American College of Cardiology, Health (at)Scale, Blue Cross Blue Shield of Florida, Medaxiom, Humana, American Medical Association, America's Health Insurance Plans, HealthEdge, RTI Health Solutions, Emory University, Washington University, and University of Pennsylvania; has equity in V-BID Health (partner), Virta Health, Archway Health, Curio Wellness (board of directors), and Health(at)Scale; serves (or has served) on advisory boards for the Congressional Budget Office (panel of health advisors), National Institute for Health Care Management, National Academies, AcademyHealth, National Quality Forum, Blue Cross Blue Shield Association, and Blue Health Intelligence; is a board member for the Health Care Cost Institute and the Massachusetts Health Connector (vice chair); and serves as the current chair of the Medicare Payment Advisory

Commission. Leemore Dafny has served as a consultant and litigation expert on matters in the hospital and health insurance sectors and has received compensation from the Center for Equitable Growth, Brookings Institution, Cornerstone Research, Analysis Group, Bates White Economic Consulting, and Intermountain Healthcare. She serves on paid boards for the Congressional Budget Office (panel of health advisors) and in unpaid advisory and editorial roles for the Commonwealth Fund, Management Science, and *American Economic Journal: Economic Policy*. The listed outside activities are unrelated to the substance of this article unless otherwise acknowledged. All opinions expressed are those of the authors and not any organization with which they are affiliated.



## NOTES

- 1 Anderson GF, Hussey P, Petrosyan V. It's still the prices, stupid: why the US spends so much on health care, and a tribute to Uwe Reinhardt. *Health Aff (Millwood)*. 2019;38(1):87–95.
- 2 Gaynor M, Ho K, Town RJ. The industrial organization of health-care markets. *J Econ Lit*. 2015;53(2):235–84.
- 3 Dafny L. Estimation and identification of merger effects: an application to hospital mergers. *J Law Econ*. 2009;52(3):523–50.
- 4 Dafny LS. Health care industry consolidation: what is happening, why it matters, and what public agencies might want to do about it (testimony of Leemore S. Dafny, Harvard University, Boston, MA) [Internet]. Washington (DC): House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations; 2018 Feb 14 [cited 2021 Jul 13]. Available from: <https://docs.house.gov/meetings/IF/IF02/20180214/106855/HHRG-115-IF02-Wstate-DafnyL-20180214.pdf>
- 5 *United States of America and the State of North Carolina v. The Charlotte-Mecklenburg Hospital Authority, d/b/a Carolinas Healthcare System* [Internet]. Charlotte (NC): United States District Court for the Western District of North Carolina Charlotte Division; 2016 Jun 9 [cited 2021 Jul 13]. (Case 3:16-cv-00311). Available from: <https://www.justice.gov/atr/file/867111/download>
- 6 Hayes K, Hoagland GW, Harootunian L, McDonough D, Salyers E, Serafini MW, et al. Bipartisan Rx for America's health care [Internet]. Washington (DC): Bipartisan Policy Center; 2020 Feb 5 [cited 2021 Jul 13]. Available from: <https://bipartisanpolicy.org/report/bipartisan-rx/>
- 7 H.R. 506—Hospital Competition Act of 2019 [Internet]. Washington (DC): 116th Congress; 2019 [cited 2021 Jul 13]. Available from: <https://www.congress.gov/bill/116th-congress/house-bill/506/text>
- 8 H.R. 1332—Fair Care Act of 2019 [Internet]. Washington (DC): 116th Congress; 2019 [cited 2021 Jul 13]. Available from: <https://www.congress.gov/bill/116th-congress/house-bill/1332/text>
- 9 Bain JS. *Industrial organization*. New York (NY): Wiley; 1959.
- 10 Department of Justice, Federal Trade Commission. Horizontal merger guidelines [Internet]. Washington (DC): DOJ; 2010 Aug 19 [cited 2021 Jul 13]. Available from: <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>
- 11 To access the appendix, click on the Details tab of the article online.
- 12 Health Care Cost Institute. Data [home page on the Internet]. Washington (DC): HCCI; [cited 2021 Jul 13]. Available from: <https://healthcostinstitute.org/data>
- 13 American Hospital Association. AHA Annual Survey Database™ [Internet]. Chicago (IL): AHA; [cited 2021 Jul 13]. Available from: <https://www.ahadata.com/aha-annual-survey-database>
- 14 Torch Insight. Healthcare analytics [home page on the Internet]. Seattle (WA): Torch Insight; [cited 2021 Jul 13]. Available from: <https://torchinsight.com/>
- 15 Cooper Z, Craig SV, Gaynor M, Van Reenen J. The price ain't right? Hospital prices and health spending on the privately insured. *Q J Econ*. 2019;134(1):51–107.
- 16 Neprash HT, Wallace J, Chernew ME, McWilliams JM. Measuring prices in health care markets using commercial claims data. *Health Serv Res*. 2015;50(6):2037–47.
- 17 Institute of Medicine. Variation in health care spending: target decision making not geography. Washington (DC): National Academies Press; 2013 Oct.
- 18 Health Care Cost Institute. 2017 health care cost and utilization report: analytic methodology [Internet]. Washington (DC): HCCI; 2019 Feb 25 [cited 2021 Jul 13]. Available from: [https://healthcostinstitute.org/images/pdfs/HCCI\\_2017\\_Methodology\\_public\\_v20.pdf](https://healthcostinstitute.org/images/pdfs/HCCI_2017_Methodology_public_v20.pdf)
- 19 Agency for Healthcare Research and Quality. Compendium of U.S. health systems, 2018 [Internet]. Rockville (MD): AHRQ; 2019 Nov [cited 2021 Aug 9]. Available from: <https://www.ahrq.gov/chsp/data-resources/compendium-2018.html>
- 20 Henry J. Kaiser Family Foundation. Market share and enrollment of largest three insurers—large group market [Internet]. San Francisco (CA): KFF; 2019 [cited 2021 Jul 13]. Available from: <https://www.kff.org/other/state-indicator/market-share-and-enrollment-of-largest-three-insurers-large-group-market/>
- 21 Cooper Z, Craig S, Gray C, Gaynor M, Van Reenen J. Variation in health spending growth for the privately insured from 2007 to 2014. *Health Aff (Millwood)*. 2019;38(2):230–6.
- 22 Cooper Z, Craig S, Gaynor M, Harish NJ, Krumholz HM, Van Reenen J. Hospital prices grew substantially faster than physician prices for hospital-based care in 2007–14. *Health Aff (Millwood)*. 2019;38(2):184–9.
- 23 Pelech D. An analysis of private-sector prices for physician services [Internet]. Paper presented at: AcademyHealth Annual Research Meeting; 2017 Jun 26; New Orleans, LA [cited 2021 Jul 29]. Available from: <https://www.cbo.gov/system/files/115th-congress-2017-2018/presentation/52818-dp-presentation.pdf>
- 24 Kessler DP, McClellan MB. Is hospital competition socially wasteful? *Q J Econ*. 2000;115(2):577–615.
- 25 Town R, Vistnes G. Hospital competition in HMO networks. *J Health Econ*. 2001;20(5):733–53.
- 26 Gozvriskaran G, Town RJ. Competition, payers, and hospital quality. *Health Serv Res*. 2003;38(6 Pt 1):1403–21.
- 27 Mehrotra A, Chernew ME, Sinaiko AD. Promise and reality of price transparency. *N Engl J Med*. 2018;378(14):1348–54.
- 28 Gaynor M. What to do about health-care markets? Policies to make health-care markets work [Internet]. Washington (DC): Hamilton Project; 2020 Mar [cited 2021 Jul 28]. Available from: [https://www.hamiltonproject.org/papers/what\\_to\\_do\\_about\\_health\\_care\\_markets\\_policies\\_to\\_make\\_health\\_care\\_markets\\_work](https://www.hamiltonproject.org/papers/what_to_do_about_health_care_markets_policies_to_make_health_care_markets_work)
- 29 Hussey PS, Wertheimer S, Mehrotra A. The association between health care quality and cost: a systematic review. *Ann Intern Med*. 2013;158(1):27–34.
- 30 Roberts ET, Mehrotra A, McWilliams JM. High-price and low-price physician practices do not differ significantly on care quality or efficiency. *Health Aff (Millwood)*. 2017;36(5):855–64.
- 31 White C, Whaley CM. Prices paid to hospitals by private health plans are high relative to Medicare and vary widely: findings from an employer-led transparency initiative [Internet]. Santa Monica (CA): RAND Corporation; 2019 [cited 2021 Jul 13]. Available from: [https://www.rand.org/pubs/research\\_reports/RR3033.html](https://www.rand.org/pubs/research_reports/RR3033.html)
- 32 Chernew ME, Dafny LS, Pany MJ. A proposal to cap provider prices and price growth in the commercial health-care market [Internet]. Washington (DC): Hamilton Project; 2020 Mar [cited 2021 Jul 13]. Available from: [https://www.hamiltonproject.org/papers/a\\_proposal\\_to\\_cap\\_provider\\_prices\\_and\\_price\\_growth\\_in\\_the\\_commercial\\_health\\_care\\_market](https://www.hamiltonproject.org/papers/a_proposal_to_cap_provider_prices_and_price_growth_in_the_commercial_health_care_market)