CROSS-MARKET HOSPITAL MERGERS:
A HOLISTIC APPROACH

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Legal and economic thinking at the Department of Justice and Federal Trade Commission have changed dramatically over time with respect to hospital merger enforcement. Two changes stand out. First, the federal antitrust agencies (the Agencies) have changed their emphasis to now largely focus on how hospital mergers affect competition from the perspective of the health plans that contract with the hospitals rather than from the perspective of patients.[1] Second, the Agencies have increasingly focused on the effects of hospital mergers in urban settings despite having previously discounted the likelihood of competitive concerns, given the large number of hospitals typically located in urban areas. Consistent with this increased attention to urban hospital mergers, the Agencies also now tend to view the geographic market as considerably smaller in scope than was previously the case.[2]

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[1] *See, e.g.*, Gregory Vistnes, *Commentary: Hospitals, Mergers and Two-Stage Competition*, 67 ANTITRUST L.J. 671 (2000); Erica L. Rice, Note, *Evanston's Legacy: A Prescription for Addressing Two-Stage Competition in Hospital Merger Antitrust Analysis*, 90 B.U. L. REV. 431 (2010).

[2] *See, e.g.*, Gregory Vistnes, *Hospital Mergers and Antitrust Enforcement*, 20 J. HEALTH POL., POL'Y & L. 175 (1995) (discussing how the Agencies historically defined broad geographic markets). Examples of the Agencies' move to defining more narrowly defined geographic markets include the FTC's arguments in its hospital merger challenges in the Evanston, Illinois, region and in Northern Virginia. Complaint, Evanston Nw. Healthcare Corp., FTC Docket No. 9315 (Feb. 10, 2004), *available at* http://www.ftc.gov/os/caselist/0110234/040210emhcomplaint. pdf; Complaint, Inova Health Sys. Found., FTC Docket No. 9326 (May 8, 2008) [hereinafter *Inova FTC Complaint 2008*], *available at* http://www.ftc.gov/os/adjpro/d9326/080509admin complaint.pdf. Even before that, the DOJ previously argued for narrowly defined geographic markets in its 1997 challenge of two hospitals in the Long Island region of New York and its 1994 merger challenge of hospitals in the Clearwater, Florida, area. Complaint, United States v. Long Island Jewish Med. Ctr., No. CV-97-3412 (ADS) (E.D.N.Y. June 11, 1997), *available at*

Much of the evolution in how the Agencies analyzed hospital mergers was driven by the fact that Agency staff were frequently confronted with widespread, and vocal, complaints by health plans about certain hospital mergers that, according to prevailing views, should not have posed competitive problems. Rather than ignore those complaints as problems having no theoretical foundation, the Agencies instead took the opportunity to revisit—and ultimately revise—existing theories under which they evaluated hospital mergers.[3] That process led to the evolution of how the Agencies viewed hospital mergers, and culminated in the Agencies both actively investigating, and subsequently challenging, many hospital mergers that previously would not likely have raised competitive concerns.[4]

The Agencies' recognition that urban hospital mergers may need to be carefully assessed for antitrust risk, however, has not completely assuaged health plans' concerns. Health plans continue to complain about a form of conduct that has so far received little antitrust scrutiny: "cross-market" mergers (or joint contracting) involving important hospitals in geographically distinct areas.[5] Historically, the Agencies have tended to view such mergers as largely

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http://www.justice.gov/atr/cases/f1100/1145.pdf; Complaint, United States v. Morton Plant Health Sys., C.A. No. 94-748-CIV-T-23E (M.D. Fla. May 5, 1994) [hereinafter *Morton Plant DOJ Complaint 1994*], *available at* http://www.justice.gov/atr/cases/f5000/5046.pdf.

[3] After a series of losses in which the courts took positions suggesting hospital mergers would rarely be anticompetitive, the FTC renewed its efforts to demonstrate the potential harm from such mergers. In 2002, the FTC began studying consummated hospital mergers in order to determine whether the evidence showed that hospital mergers had resulted in post-merger price increases, even in situations where the courts likely would have historically found the merger to pose no competitive concerns. *See* Timothy J. Muris, Chairman, Fed. Trade Comm'n, Remarks Before the 7th Annual Competition in Healthcare Forum, Everything Old Is New Again: Health Care and Competition in the 21st Century (Nov. 7, 2002), *available at* http://www.ftc.gov/speeches/muris/murishealthcarespeech0211.pdf. These studies and related evidence showing post-merger price increases were likely instrumental in the FTC's subsequent success in blocking hospital mergers.

[4] Credit for spearheading this change goes in substantial part to former DOJ staff attorney Steven Brodsky. Brodsky encountered substantial resistance before successfully convincing others that what was ultimately shown to be true in practice could, in fact, also be true in theory. Perhaps the first case in which the DOJ began exploring these new theories involved a 1992 hospital merger in the suburban area of Covina, California, near Los Angeles. While the DOJ ultimately did not challenge that merger, it appears to be one of the first instances in which these new theories were seriously considered by DOJ Staff and the Front Office. Alan Waldman, *Feds Cast Wary Eye on Mergers in Health Care Arena*, L.A. Bus. J., Nov. 21, 1994, at 16A. (Note that the article mistakenly attributes the DOJ investigation as being conducted by the FTC.) These ideas appear to have been first formally expressed in a DOJ complaint in a 1994 merger challenge of two hospitals (Morton Plant and Mease) in the Clearwater, Florida, area. *Morton Plant DOJ Complaint 1994*, *supra* note 2.

[5] By geographically distinct areas, we mean that few patients, if any, would be willing to substitute between the merging hospitals.

outside the scope of antitrust concerns.[6] In essence, absent individuals' willingness to substitute between hospitals, the Agencies appear to have historically taken the position that the competitive analysis is separable with respect to the specific markets in which those merging hospitals operate, and as a result, cross-market mergers are unlikely to reduce competition.[7]

The Agencies' historically sanguine view of cross-market hospital mergers and the emergence of several large hospital systems across the United States,[8] has not been shared, however, by all health plans and health care researchers. Many health plans have been expressing serious concerns that large provider systems encompassing multiple (but generally adjoining or nearby) geographic markets are reducing the ability of health plans to negotiate favorable rates. Perhaps the most commonly heard variant of this concern is that, even though a health plan may be able to continue marketing its plan to employers when they have one or two important "holes" in their provider network, at some point a plan may have so many holes in its network that employers will be unwilling to offer that plan to their employees. Large hospital systems can thus threaten the economic viability of a health plan by threatening to pull out of the plan's provider network and create so many holes in its network that employers will stop offering the plan.[9]

Concerns about the effect of large provider systems are not unique to any particular provider system or geography.[10] In California, such concerns have

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[6] Particularly as the Agencies have come to believe that hospitals frequently compete in localized geographic markets, mergers that combine hospitals in separate (even if nearby) communities are more likely to be viewed as cross-market mergers.

[7] This view that cross-market mergers will insulate hospitals from antitrust problems is expressed, for example, by Robert Berenson et al.: "Negotiating as a system across a broad geographic area avoids antitrust scrutiny, which focuses on local market concentration." Robert A. Berenson et al., *Unchecked Provider Clout in California Foreshadows Challenges to Health Reform*, 29 HEALTH AFF. 699, 702 (2010).

[8] Hospital systems in the United States are prevalent. According to the American Hospital Association, 3,007 of the 4,973 community hospitals in the United States are in a system. *See Fast Facts on U.S. Hospitals*, AM. HOSP. ASS'N, http://www.aha.org/research/rc/stat-studies/fast-facts.shtml.

[9] *See, e.g.*, OFFICE OF MASS. ATT'Y GEN., EXAMINATION OF HEALTH CARE COST TRENDS AND COST DRIVERS 28 (2010) [hereinafter 2010 MASS. HEALTH CARE COST REPORT] ("Large health care providers have a great deal of leverage in negotiations because insurers must maintain stable, broad provider networks. Insurers have explained to us that the failure to contract with a large provider organization would cause serious network disruption . . . .").

[10] *See, e.g.*, Robert A. Berenson et al., *The Growing Power of Some Providers to Win Steep Payment Increases From Insurers Suggests Policy Remedies May Be Needed*, 31 HEALTH AFF. 973, 976 (2012) (identifying several multi-hospital systems in the United States that the authors believe have bargaining leverage attributable to their control of multiple "noncompeting" hospitals over a broad geographic region).

been voiced about Sutter Health,[11] Catholic Healthcare West,[12] and hospitals
in the University of California system.[13] Outside California, concerns have
been expressed about such systems as the Partners system in eastern Massa-
chusetts,[14] the Long Island Health Network in New York,[15] Inova Health Sys-
tems in Virginia,[16] and Intermountain Healthcare in Utah.[17] In several of these
instances, the system for which competitive concerns have been expressed
encompass hospitals in what might be viewed as different, although proxi-
mate, geographic regions across which there may be little patient substitu-
tion.[18] Thus, health plans and other commentators have expressed competitive

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[11] See, for example, the claim that "Sutter Health Co. . . . has market power that commands
prices 40 to 70 percent higher than its rivals per typical procedure" and that "Sutter can charge
these because it has acquired more than a third of the market in the San Francisco-to-Sacramento
region," something that allows Sutter to "dictate terms" with health insurers. Peter Waldman,
Why Baby Costs Less Down the Road in Silicon Valley, BLOOMBERG, Aug. 20, 2010, http://www.
bloomberg.com/news/2010-08-20/hospital-monopolies-ruin-mri-bill-as-sutter-gets-price-it-
wants.html. Also see earlier arguments that Sutter Health's growth in Northern California was an
effort to "strengthen its oligopoly hold on Northern California" and that Sutter Health has "im-
mense clout in the market." Kathy Robertson, *Sutter Strikes Out in Try to Expand Along Hwy.
50*, SACRAMENTO BUS. J., Mar. 23, 2001, at 3 (quoting Albert Lowey-Ball, a Sacramento health
care consultant); Kathy Robertson, *Sutter in the Crosshairs*, SACRAMENTO BUS. J., May 13,
2005.

[12] *See, e.g.*, Joanne Spetz et al., *The Growth of Multihospital Firms in California*, 19 HEALTH
AFF. 224 (2000).

[13] Robert Berenson argues that, by negotiating as a system rather than as individual entities,
hospitals in the University of California system appear to have increased their negotiating power:
"They [the hospitals] realized only recently that the potential power of group negotiating
trumped what some respondents described as bureaucratic inertia. . . . Contracting as a full [Uni-
versity of California] system is frightening to the payers . . . . These are contracts with big
leverage." Berenson et al., *supra* note 7, at 702 (footnote and internal quotation marks omitted).

[14] A series run by *The Boston Globe* describes how "Partners began to build a network, ac-
quiring strategically located hospitals to the north, west and south of [Boston]," resulting in a
"dominant" system in which Partners' physicians and hospitals are paid from 10% to 40% more
than their non-Partners peers. Scott Allen et al., *A Healthcare System Badly out of Balance* (pts.
1–3), BOSTON GLOBE, Nov. 16, Dec. 21 & Dec. 28, 2008.

[15] A 2003 report by the *Long Island Business News* stated that the New York Attorney Gen-
eral was "investigating whether the Long Island Health Network, a loosely affiliated group of 11
hospitals, violates antitrust laws by negotiating collectively with insurers." Claude Solnik,
Spitzer Pursues LIHN Probe, LIBN.COM: LONG ISLAND BUS. NEWS (July 11, 2003), http://libn.
com/2003/07/11/spitzer-pursues-lihn-probe/. The Long Island Health Network includes hospitals
located across a relatively wide geographic region in the Long Island region.

[16] *See, e.g.*, Steven Pearlstein, *Northern Virginia's St. Everywhere*, WASH. POST, Apr. 28,
2006, at D1 (editorial) (stating that "[a]s a result of Inova's size and stellar reputation, no health
insurer can afford not to have it in its preferred provider network, effectively giving Inova the
ability to dictate terms and prices.").

[17] *See, e.g.*, *Intermountain Health Care, Inc. History*, FUNDINGUNIVERSE.COM, http://www.
fundinguniverse.com/company-histories/Intermountain-Health-Care-Inc-Company-History.html
(characterizing Intermountain Healthcare as facing "major legal and public relations problems
concerning . . . antitrust . . . that have received considerable attention by the media and public
policy experts" and noting that "[b]ecause of IHC's dominance in its main market, it sometimes
was accused of creating a health care monopoly and violating federal antitrust laws.").

[18] In some cases, when looking at particular sets of hospitals within a system, it might be
argued that there is within-market competition between hospitals. *See, e.g.*, *Inova FTC Com-*

concerns that are seemingly inconsistent with competitive models premised solely on the view that patient substitution between hospitals is necessary in order for there to be competitive concerns. Alternatively, if there is at least some patient substitution between those system hospitals, it raises the question of whether there may exist some type of "cross-market" competitive effect that co-exists with traditional "within-market" concerns.

The possibility that cross-market linkages across hospitals might affect competition appears to have been considered by the DOJ in at least one case. In 2002, the DOJ issued a business review letter regarding a proposal by the Michigan Hospital Group (MHG) under which seven geographically dispersed hospitals in Michigan sought to engage in joint contract negotiations. Here, the DOJ noted:

> Although the [health] plans recognized that MHG's hospital members serve distinctly different local geographic areas and thus are not substitutes to provide hospital services for those areas, a small number of plan representatives expressed the concern that the MHG hospitals might be able to increase their bargaining leverage with health plans by refusing to contract except through MHG.[19]

In discussing how competition might be harmed, despite the fact that the jointly negotiating hospitals were not competing with each other for patients, the DOJ explicitly recognized the possibility that hospitals could increase their overall bargaining leverage[20] by increasing the number of network holes with which they could threaten a health plan.

> [The health plans] explained, for example, that a health plan seeking a hospital network to satisfy customers desiring state-wide or otherwise broad geographic coverage might be able to make do without one or two of the MHG hospitals in its network but, as a matter of commercial viability, could not make do without all seven MHG hospitals.[21]

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plaint 2008, *supra* note 2 (FTC's challenge of Inova's proposed merger in Northern Virginia). Competitive concerns with multi-hospital systems, however, may extend beyond a system's ownership of hospitals within a properly defined relevant market. Moreover, it may be that certain hospital mergers involve elements of both within-market and cross-market competition.

[19] Letter from Charles A. James, Assistant Att'y Gen., U.S. Dept. of Justice, to Clifton E. Johnson, Att'y, Hall, Render, Killian, Heath & Lyman 2–3 (Apr. 3, 2002), *available at* http://www.justice.gov/atr/public/busreview/10933.pdf.

[20] The economics bargaining literature distinguishes between the terms "bargaining power" and "bargaining leverage." The former captures a party's relative negotiating skill vis-à-vis its bargaining partner, whereas the latter captures a party's payoff in case the negotiation breaks down and the parties fail to reach an agreement (also known as the party's "outside option"). In nontechnical parts of the article, we occasionally use the jargon-free term "negotiating power" as a shorthand for "bargaining power and/or bargaining leverage."

[21] Letter from Charles A. James, *supra* note 19, at 3 n.3. While the DOJ ultimately concluded that MHG's proposal was unlikely to significantly reduce competition, this decision was based in large part on the DOJ's understanding that there would be efficiencies associated with the pro-

This article explores the issue of how payers' complaints about cross-market hospital systems, and the related concerns expressed by the DOJ in its MHG business review letter, may warrant increased attention by antitrust enforcers. We explain how the same principle for why within-market hospital mergers can raise antitrust concerns can be generalized to explain how cross-market hospital mergers can reduce competition: in both cases, there can be a type of inter-hospital linkage that makes a health plan's bargaining position relative to one hospital depend on whether the plan can contract with a second hospital. As a result of these inter-hospital linkages, it may be possible for a merger to increase the hospitals' bargaining leverage relative to health plans.

Understanding the nature and effect of these inter-hospital linkages is critical to understanding how a merger can affect competition. In the case of within-market hospital mergers, inter-hospital linkages emerge because of patients' willingness to substitute between hospitals.[22] This patient-based willingness to substitute between hospitals means that the importance of including one of those hospitals in a plan's provider network will depend on whether the plan already includes the other hospital. The nature of any inter-hospital linkages, however, must be different with cross-market hospital mergers since, by definition, there are no linkages attributable to patients' willingness to substitute between those hospitals. Patient preferences, however, are not the only mechanism by which inter-hospital linkages can arise.

This article identifies two possible ways in which cross-market linkages between hospitals might arise even when patients are unwilling to substitute between those hospitals. First, cross-market linkages might arise when, rather than view a health plan's provider network as a collection of independent, market-specific components, employers consider the totality of a health plan's provider network when deciding whether to offer that health plan to their employees. A second way in which inter-hospital linkages can arise is if a health plan's premium does not vary across the different regions in which employers' employees live. In that case, the pricing incentives attributable to the need to set a common price across markets, and the fact that the plan's optimal

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posed joint contracting and that the hospitals would not be negotiating on an exclusive basis. The DOJ noted, however, that absent those considerations, the joint contracting across those non-competing hospitals could have been problematic: "Whether the hospitals' bargaining leverage could in fact be expanded by negotiating exclusively through MHG is by no means clear and to make that determination would require additional investigation and analysis." *Id.* at 3.

[22] This is not to say that patient substitution in response to increased hospital prices is the most important means by which hospital competition occurs. Rather, the Agencies' recent focus has been on whether health plans are willing to substitute between hospitals in response to relative price changes. An implicit predicate for that competition (from the perspective of health plans), however, has been that the health plans are able to induce patient-level substitution between hospitals. Patient-level willingness to substitute between hospitals thus underlies a finding of within-market competition among hospitals.

price will then depend on demand across each of those markets, can create a linkage between hospitals in distinct markets.

Inter-hospital linkages, however, are not a sufficient condition for a merger to reduce competition. The relationship between a health plan's profits and the hospitals that the plan excludes from its provider network is also important—for both within-market and cross-market mergers, a merger is more likely to increase the hospitals' bargaining leverage and lead to higher prices when the incremental impact on a health plan's profits from losing one of the merging hospitals *increases* if the plan also loses the second hospital. This relationship between increasing marginal losses to a health plan's profits as the number of hospitals excluded from a plan increases describes a "concave" profit function for the health plan with respect to the number of hospitals excluded from the plan's provider network. In other words, mergers are more likely to reduce competition if the incremental impact on a health plan's profits from losing one of the merging hospitals increases if the plan also loses the second hospital. The article shows that this concavity condition, which is frequently satisfied in the case of within-market mergers, may also be satisfied in the case of cross-market mergers.

We emphasize upfront that this article is principally intended to stimulate further discussion and analysis regarding the question of whether cross-market hospital mergers can reduce competition and, if so, under what circumstances. To this end, we show that, under some circumstances, cross-market hospital mergers *may* reduce competition even in the absence of any significant patient substitution between the merging hospitals. Accordingly, competitive concerns regarding mergers of hospitals in distinct communities should not be dismissed out-of-hand as has seemingly been the case in the past. We do not, however, mean to imply that most (or even many) such mergers should raise competitive concerns or a presumption of competitive harm. Likewise, we do not view the aforementioned trade press citations as "proof" of a potential problem[23] but rather as an indication that there is a need for a more careful analysis to determine if there really is such a problem to begin with. And, finally, we do not wish to imply that the two mechanisms we identify in this article for how cross-market linkages may arise are the only ones, or even the most likely to be encountered in practice; there may be others.[24]

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[23] *See supra* notes 11–17.

[24] In fact, this is the reason that we refrain from attempting to identify the type of conditions that may make a cross-market merger more or less likely to be anticompetitive. We believe that given the premature state of "theory" in this area, we would be overreaching if we used our two models to predict where and when cross-market mergers may be problematic and to identify the determinants of the magnitude of the potential problem.

We believe that understanding how cross-market effects might arise involves two critical steps. The first is to understand that hospital mergers affect both individual patients and the health plans that contract with hospitals. As a result, even if there are no linkages between merging hospitals from the perspective of individual patients (i.e., individual patients are unwilling to substitute between those merging hospitals), merger effects can arise if there is some type of linkage between hospitals from the health plans' perspective. The second step is then establishing why such linkages may exist at the health plan level even if there are no linkages at the patient level. Put differently, why might health plans view two such hospitals as substitutes when patients do not? We view the article as contributing on this second front by identifying two mechanisms that may create such linkages from the perspective of a health plan, even when there are no such linkages at the patient level.

The article is structured as follows. In Part I we provide a brief summary of the economic literature regarding the effect of cross-market mergers on prices. In Part II we provide the industry background and context necessary for understanding why cross-market mergers may reduce competition. In Part III we provide a quick overview of the characteristics of the market in which health plans and hospitals compete and how this relates to the type of product that employers seek to purchase for their employees, and in Part IV we summarize how inter-hospital linkages across hospitals helps to explain why within-market mergers can increase providers' bargaining leverage. In Part V we discuss how those same intuitions regarding inter-hospital linkages explain why a cross-market hospital merger can increase hospitals' bargaining leverage. In Part VI we then discuss how the concept of cross-market mergers, and the resultant effect on provider bargaining leverage, may be relevant not only to multi-market hospital mergers and affiliations but also to systems that bring together providers in different product markets, such as hospital/physician mergers, or the creation of multi-specialty physician groups.

I. LITERATURE REVIEW

The relevant literature includes both empirical studies assessing cross-market mergers and affiliations in the health care industry, as well as a more general theoretical literature relating to cross-market mergers and tying that extends beyond the health care industry.

A. THE HEALTH CARE LITERATURE

For years, industry participants and observers have expressed concern about how the growth of hospital and multi-provider systems have affected negotiations with health plans. After site visits in six regions in California and interviews with several hundred market participants including hospitals, health plans and employers, Robert Berenson et al. concluded, "One clear goal of an

alliance between hospitals and physicians is to improve the negotiating clout for both" and that "negotiating as a system across a broad geographic area . . . . permits hospital systems with strong bargaining positions in some markets to negotiate high rates elsewhere as well."[25]

The same types of questions that Berenson et al. asked of market participants have also been studied in more formal economic contexts. Esther Gal-Or provides one of the first explanations of how multi-provider systems might affect bargaining leverage. She finds that, while multi-provider systems will not always increase those providers' bargaining leverage, there are some circumstances in which system formation will benefit providers at the expense of payers. In her model, the key determinant of whether system formation is likely to lead to higher provider prices is the relative degree of competition facing the providers versus the payers: she finds that increased provider bargaining leverage is more likely when the providers and payers are fairly comparable in the pre-merger world with respect to how much competition they face.[26]

With theory relatively ambiguous as to whether, and under what conditions, system formation is likely to increase providers' negotiating power, much of the recent economic work has focused on an empirical examination of whether system formation has historically led to higher provider prices.[27] Although much of this work fails to distinguish whether provider systems involve competing providers versus providers in distinct markets (or somewhere in between),[28] a growing body of literature suggests that cross-market systems may increase providers' negotiating power.[29]

Glenn Melnick and Emmett Keeler examine how membership in multi-hospital systems affects prices. Focusing on California hospitals from 1999–

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[25] Berenson et al., *supra* note 7, at 703; *id.* at 702.

[26] Esther Gal-Or, *The Profitability of Vertical Mergers Between Hospitals and Physician Practices*, 18 J. HEALTH ECON. 623, 625 (1999).

[27] The ambiguous predictions of these theoretical models, however, is nevertheless important in that it tends to reject the claim that cross-market system formation will *not* affect provider negotiating power; rather, even these ambiguous results support the claim that cross-market system formations *can* sometimes affect negotiating power.

[28] *See, e.g.*, Alison Evans Cuellar & Paul J. Gertler, *How the Expansion of Hospital Systems Has Affected Consumers*, 24 HEALTH AFF. 213 (2005); Katherine Ho, *Insurer-Provider Networks in the Medical Care Market*, 99 AM. ECON. REV. 393 (2009).

[29] Interestingly, many of these studies also suggest that the creation of cross-market systems does not (at least yet) appear to be generating any significant efficiencies or other benefits. A lack of concomitant efficiencies is consistent with payers generally being concerned about the formation of those systems.Were there significant efficiencies offsetting any change in relative negotiating power, one would expect that payers would be more sympathetic towards those systems' formation. As noted by Berenson et al., however, payers (and even some providers) are often quite cynical about whether systems are being formed to improve quality or to instead simply increase price. Berenson et al., *supra* note 7, at 704.

2003, they find that multi-hospital systems charge higher prices, even when the hospital system does not include hospitals within the same market: "We find that belonging to a multi-hospital system allows member hospitals to charge substantially higher prices and further, that this effect is not dependent on a hospital having other system members in its local market."[30] Thus, their findings support concerns that multi-market hospital systems can lead to higher hospital prices.

Matthew S. Lewis and Kevin E. Pflum investigate whether multi-hospital systems can extract a higher share of the surplus from managed care organizations (MCOs), relative to stand-alone hospitals by possessing superior negotiation skills (i.e., bargaining power).[31] This may be the case, for example, if larger systems can pool information on MCOs more efficiently or have the resources to put together larger and more skilled negotiation teams. Citing an article by Mike Colias,[32] the authors point to the example of "Tenet Healthcare—a national system of 73 hospitals—[which] adopted a 'national negotiating template and new technology to analyze payer-specific profit and loss data, giving negotiators ammunition during contract talks.'" Looking at California data, the authors conclude that there is at least some evidence that the formation of (cross-market) hospital systems can increase hospitals' ability to extract higher prices through improved negotiation skills. In a related paper, Gautam Gowrisankaran et al. note that a property of the Nash-bargaining solution to bargaining games is that cross-market hospital mergers will have price effects, even if the merger does not alter the parties' relative bargaining power, but the impact of these price effects on consumer welfare is ambiguous.[33]

Finally, responding to concerns that the growth of multi-provider systems in Eastern Massachusetts has affected competition, a 2010 report by the Massachusetts Office of the Attorney General studied how changing market dynamics were affecting provider prices. The report found that "[l]arge health care providers have a great deal of leverage in negotiations because insurers must maintain stable, broad provider networks. Insurers have explained to us that the failure to contract with a large provider organization would cause

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[30] Glenn Melnick & Emmett Keeler, *The Effects of Multi-Hospital Systems on Hospital Prices*, 26 J. HEALTH ECON. 400, 403 (2007).

[31] *See supra* note 20 (defining bargaining power, bargaining leverage, and the use of those terms in this article). Matthew S. Lewis & Kevin E. Pflum, Diagnosing Hospital System Bargaining Power in Managed Care Networks (Jan. 14, 2013) (unpublished manuscript), *available at* http://www.kevinpflum.com/wp-content/uploads/hospital-systems.pdf.

[32] *Id.* at 4 (citing Mike Colias, *Ready to Rumble*, HOSPS. & HEALTH NETWORKS, Jan. 2006, at 32, 36).

[33] Gautam Gowrisankaran et al., Mergers When Prices Are Negotiated: Evidence from the Hospital Industry (Mar. 1, 2013) (unpublished manuscript), *available at* http://www.u.arizona.edu/~gowrisan/pdf_papers/hospital_merger_negotiated_prices.pdf.

serious network disruption . . . ."[34] Defining a hospital system's leverage as a function of the system's size, which often spanned a broad geographic region, the Massachusetts Attorney General's report found that "there is a strong correlation between the price insurers pay to providers and providers' market leverage."[35] The State's report also investigated whether there are any other factors that may explain why larger systems command higher prices. It found that price variation among systems is not correlated with quality of care, cost, or patient-mix differences.[36]

B. CROSS-MARKET MARKET EFFECTS OUTSIDE HEALTH CARE

There is no reason to believe that concerns about cross-market mergers should be limited to the health care industry.[37] And, in fact, competitive concerns regarding possible competitive effects from cross-market mergers, and the resulting potential for bundling across markets, have been raised by economists for many years in a variety of contexts.[38] In Europe, these concerns are often characterized as "portfolio power" or "conglomerate effect" theories,

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[34] 2010 MASS. HEALTH CARE COST REPORT, *supra* note 9, at 28.

[35] *Id.* The State also considered a second measure of leverage based on the relative sizes of the hospital system and the insurer and found that this measure of leverage was also correlated with price. *Id.*

[36] *Id.* at 3. However, Margaret Guerin-Calvert and Guillermo Israilevich argue that differences in prices may be at least partially explained by differences in costs and patient-mix. Margaret Guerin-Calvert & Guillermo Israilevich, Assessment of Cost Trends and Price Differences for U.S. Hospitals (2011) (unpublished manuscript), *available at* http://www.aha.org/content/11/11costtrendspricediffreport.pdf; Margaret Guerin-Calvert & Guillermo Israilevich, A Critique of Recent Publications on Provider Market Power (2010) (unpublished manuscript), *available at* http://www.aha.org/content/00-10/100410-critique-report.pdf. The difficulty of estimating hospital quality has also been noted by others. *See, e.g.*, John Geweke et al., *Bayesian Inference for Hospital Quality in a Selection Model*, 71 ECONOMETRICA 1215 (2003).

[37] Certain characteristics of the health care industry, however, may increase concerns in that industry relative to many other industries. In particular, the role of health plans and employers as intermediaries between hospitals and individuals may create cross-market linkages that would not otherwise exist.

[38] One document summarizes those concerns and how they relate to the concerns as expressed in this article: "So far the [European] Commission has raised portfolio power issues only in those multi-market mergers where the products being merged have a common customer who buys a range of products (usually a retailer). The underlying rationale behind portfolio power was summarised by a competitor as follows: '*the market power deriving from a portfolio of brands exceeds the sum of its parts*'. But what is the source of this additional market power? Possibilities identified by the Commission include the following . . . . The threat of a refusal to supply would be more potent." Charles River Associates, CRA Competition Memo: A New Doctrine in Merger Control? (Apr. 1998) (originally published by Lexecon Ltd. prior to that company's acquisition by CRA), *available at* http://www.crai.com/ecp/assets/Portfolio_Power.pdf. *See generally* Jeffrey Church, *Conglomerate Mergers*, *in* 2 ABA SECTION OF ANTITRUST LAW, ISSUES IN COMPETITION LAW AND POLICY 1503 (W. Dale Collins ed., 2008).

and have arisen in mergers involving complementary liquor products,[39] complementary aerospace products,[40] and different types of packaging materials.[41]

In the United States, similar concerns have arisen with respect to patent aggregation[42] and might also be applicable in industries as diverse as cable television or academic journals.[43] And while there has been a great deal of debate among economists and policymakers as to the merits of these theories as applied to particular cases,[44] economists have expressed concern that competitive harm might sometimes result from cross-market mergers.[45]

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[39] *See* Case IV/M.938—Guinness/Grand Metropolitan, Comm'n Decision, 1998 O.J. (L 288) 24 (Oct. 15, 1997) (regarding the merger of Guinness and Grand Metropolitan).

[40] The merger involved General Electric's aircraft engines and Honeywell's avionics equipment. *See* Case COMP/M.2220—General Elec./Honeywell, Comm'n Decision, 2004 (L 48) 1 (July 3, 2001), *upheld in part*, Case T-210/01, General Elec. Co. v. Comm'n, 2005 E.C.R. II-5575.

[41] This merger involved Tetra Laval and Sidel, two producers of different types of packaging materials *See* Case COMP/M.2416—Tetra Laval/Sidel, Comm'n Decision (Oct. 30, 2001), *annulled*, Case T-5/02, Tetra Laval v. Comm'n, 2002 E.C.R. II-4381, *confirmed*, Case C-12/03P, Comm'n v. TetraLaval BV, 2005 E.C.R. I-987.

[42] Patent aggregators, which purchase multiple, non-competing, patents, are criticized by many for charging significantly higher prices for patent rights. For a discussion of the economic implications of patent aggregation, see Fiona Scott Morton, Deputy Assistant Att'y Gen., U.S. Dep't of Justice, Speech at Fifth Annual Searle Conference on Antitrust Economics and Competition Policy, Patent Portfolio Acquisitions: An Economic Analysis (Sept. 21, 2012), *available at* http://www.justice.gov/atr/public/speeches/288072.pdf; Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007); Fiona Scott Morton & Carl Shapiro, *Strategic Patent Acquisitions*, 79 ANTITRUST L.J. (forthcoming 2014) (July 2013 version available at http://faculty.haas.berkeley.edu/shapiro/pae.pdf).

[43] For cable television, the concern might be that certain firms obtain control of a broad range of non-competing but "must have" programs. Similarly, for academic journals, the concern might be that a publisher obtains control of a broad range of "must have" journals.

[44] *See, e.g.*, Donna E. Patterson & Carl Shapiro, *Transatlantic Divergence in* GE/Honeywell: *Causes and Lessons*, ANTITRUST, Fall 2001, at 18; *see also* William Kolasky, Deputy Assistant Att'y Gen., U.S. Dep't of Justice, Address Before George Mason University Symposium, Conglomerate Mergers and Range Effects: It's a Long Way From Chicago to Brussels (Nov. 9, 2001), *available at* http://www.justice.gov/atr/public/speeches/9536.htm; Charles James, Assistant Att'y Gen., U.S. Dep't of Justice, Address to Fordham Corporate Law Institute, 28th Annual Conference on International Law and Policies, Reconciling Divergent Enforcement Policies: Where Do We Go From Here? (Oct. 25, 2011), *available at* http://www.justice.gov/atr/public/speeches/9395.htm.

[45] Interestingly, many of the economic theories loosely characterized as "portfolio power" or "conglomerate effects" theories focus on how cross-market mergers may reduce competition because rivals become foreclosed (at least in part) from the market or entrants are dissuaded from entering. For example, the 2008 European Merger Guidelines state that "the main concern in the context of conglomerate mergers is that of foreclosure." European Comm'n, Guidelines on the Assessment of Non-Horizontal Mergers Under the Council Regulation on the Control of Concentrations Between Undertakings, 2008 O.J. (C 265) 6, ¶ 93; *see also* Valérie Rabassa, Portfolio Power as a New European Doctrine in Merger Control: A Theoretical Justification (2009) (unpublished manuscript) (on file with author); Thibaud Vergé, Portfolio Effects and Entry Deterrence (2007) (unpublished manuscript) (on file with author). Such foreclosure or entry deterrence does not exist in this article; rather, this article focuses on how cross-market mergers can affect a

In a slightly different context, economists have also long-recognized that tying of products across distinct markets can cause harm.[46] Thus, by creating an opportunity for bundling non-competing products, cross-market mergers might create a potential for reducing competition.[47]

II. BACKGROUND OF THE HOSPITAL AND HEALTH INSURANCE INDUSTRY

This Part provides a brief background of the health insurance market as it relates to hospital competition and health plans' decisions on provider networks.

A. THE STRUCTURE OF EMPLOYER-PROVIDED INSURANCE IN THE UNITED STATES

Most Americans receive their health insurance through their (or a family member's) employer.[48] These employers differ, however, with respect to the type of choice they offer their employees, with some employers offering a single health plan to all employees, while other employers offer their employees a choice among multiple health plans.

The number of health plans an employer offers will generally affect the characteristics of the plan(s) it offers. If employees are only offered a single health plan, an employer will generally prefer to offer a plan that is attractive

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supplier's negotiating power vis-à-vis a consumer regardless of whether or not that supplier faces any competition from existing or potential rivals.

[46] *See, e.g.*, Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries*, 33 RAND J. ECON. 194 (2002); Barry Nalebuff, *Exclusionary Bundling*, 50 ANTITRUST BULL. 321 (2005); Michael D. Whinston, *Tying Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837 (1990).

[47] More generally, this article raises the following issue. Cross-market mergers may result in higher prices because they change firms' pricing incentives even though there is no clear nexus to a direct reduction in competition (as might occur in a typical horizontal merger) or harm to competitors as might be the case with a vertical merger that results in market foreclosure). Whether merger-related price increases that cannot be directly tied to a reduction in competition are illegal appears to be an area of debate under the law, with some of this debate emerging in the FTC's *Ovation* case in which the FTC alleged (in part) that Ovation raised price by approximately 1300% for its drug Indocin after purchasing the drug from Merck, even though that acquisition seemingly involved no reduction in competition. Complaint, FTC v. Ovation Pharm., Inc., Nos. 08-cv-6379 & 08-6381 (D. Minn. Dec. 16, 2008), *available at* http://www.ftc.gov/os/caselist/0810156/index.shtm. Instead, that price increase was ascribed by Commissioners Rosch and Leibowitz to Ovation having different pricing incentives (relating to reputational issues) than Merck. *See* Press Release, Fed. Trade Comm'n, FTC Sues Ovation Pharmaceuticals for Illegally Acquiring Drug Used to Treat Premature Babies with Life-Threatening Heart Condition (Dec. 16, 2008), *available at* http://www.ftc.gov/opa/2008/12/ovation.shtm.

[48] Approximately 49% of individuals in the United States had employer-sponsored health coverage in 2011. Approximately 5% had private non-group coverage, while the remainder were split roughly equally between Medicare, Medicaid, and other public insurance, and the uninsured. *Health Insurance Coverage of the Total Population, 2011*, HENRY J. KAISER FAM. FOUND., http://kff.org/other/state-indicator/total-population.

to all employees.[49] This, in turn, requires that this single plan include providers in all the geographic areas where employees live or work. If, however, the employer offers a choice of plans, the employer can offer niche plans that may not appeal to some employees since those employees have other plans from which to choose. Thus, an employer offering multiple plans may be more willing to offer plans that do not necessarily include strong provider coverage in every region where its employees are located.

Over time, employers appear to have become increasingly resistant to offering their employees a large number of alternative health plans from which to choose.[50] For U.S. firms offering health benefits to their employees, the share of firms offering three or more plan types to their employees fell from 21 percent in 2003 to approximately 3 percent in 2012.[51] That limitation of employees' choice of health plans, in turn, likely increases the burden to a given employer of ensuring the plans it continues to offer have relatively broad appeal to its employee base.[52]

B. Health Plans and Their Provider Networks

Health plans compete in a type of two-stage game. In the first stage, health plans compete to be one of a limited number of health plans offered by an

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[49] Consistent with this, we understand that in Kaiser Health's early days, it would not serve as an employer's sole health plan. This was said to reflect the view that, at the time, HMOs were not well received by some individuals, and Kaiser did not want any of its members to feel "forced into" their system.

[50] This reduction in choices may reflect increased consolidation in the health plan market.

[51] Henry J. Kaiser Fam. Found. & Health Res. & Educ. Trust, Employer Health Benefits, 2003 Annual Survey 64 (2003) (Exhibit 4.2: Percentage of Employers Providing a Choice of Health Plans, by Firm Size, 2003), http://kaiserfamilyfoundation.files.wordpress.com/2013/04/kaiser-family-foundation-2003-employer-health-benefits-survey-full-report.pdf; Henry J. Kaiser Fam. Found. & Health Res. & Educ. Trust, Employer Health Benefits, 2012 Annual Survey 61 (2012) (Exhibit 4.1: Among Firms Offering Health Benefits, Percentage of Firms That Offer One, Two, or Three or More Plan Types, by Firm Size, 2012), http://kaiserfamilyfoundation.files.wordpress.com/2013/04/8345.pdf. In contrast, data from the Agency for Healthcare Research & Quality (AHRQ) reports that the share of private-sector firms offering health insurance that offered two or more plans increased from approximately 33% to 42.5% from 2003 to 2011. AHRQ, U.S. Dep't of Health & Human Servs., *Insurance Component National-Level Summary Tables*, http://meps.ahrq.gov/mepsweb/data_stats/quick_tables_search.jsp?component=2&subcomponent=1 (select relevant year and search across all tables; then follow "Table I.A.2.d" hyperlink). Although neither the Kaiser/HRET and AHRQ data look specifically at the number of independent health plan organizations with which the employer contracts, the Kaiser/HRET data is likely to be a better proxy for that measure as long as employers offering multiple health plan products, e.g., multiple PPOs or multiple HMOs, are likely to rely on different health plans to offer alternative versions of the same type of health plan product. In contrast, an employer that relies on a single health plan to provide its employees with multiple products (e.g., an HMO and a PPO) will be counted in the AHRQ data as multiple plans.

[52] This may help explain why health plans are now increasingly inclusive with respect to the providers they include when designing their provider networks.

employer. Once offered, the health plans compete in a second stage to be chosen by the employer's employees.[53]

An important dimension of competition by which health plans compete (in both stages) is their provider network. This provider network consists of the set of health care providers (hospitals, physicians, and ancillary providers) that enrollees are encouraged to use. All else equal, a health plan with a more comprehensive provider network will be more attractive to both employers and employees. At the same time, a health plan that includes more providers loses some ability to threaten to drop high-priced providers, thereby increasing health plan's costs. Thus, in choosing how inclusive their provider network should be, health plans seek to balance the benefits of a more comprehensive hospital network with the costs of having to pay more to hospitals in its network.

The importance that employers and employees place on network comprehensiveness is evidenced by changes over time regarding provider networks. Although many health plans initially sought to control costs by offering restrictedprovider networks, health plans have found that employers and employees generally prefer more comprehensive networks, even if that increased comprehensiveness comes at the cost of higher premiums. Thus, over time health plan provider networks have become increasingly comprehensive—often to the point where many health plans exclude few of the hospitals in an area.[54]

III. WITHIN-MARKET MERGERS

While the mechanics of how competition can be affected differs between within-market hospital mergers versus cross-market mergers, certain similarities help to explain how cross-market mergers can affect competition.

This Part discusses how within-market hospital mergers can affect competition because the exclusion of one hospital can affect a health plan's valuation and pricing relating to a second hospital. This, in turn, can cause a health plan's profits to be concave in the number of hospitals that are excluded from its network. These two characteristics—inter-hospital linkages and the concavity of the profits—can increase a merged hospital's bargaining leverage vis-à-vis health plans and allow it to raise prices. As discussed in the next section, these same two characteristics also affect whether a cross-market merger is likely to reduce competition.

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[53] This two-stage competition is discussed in more detail in Jessica P. Vistnes, Philip F. Cooper & Gregory S. Vistnes, *Employer Contribution Methods and Health Insurance Premiums: Does Managed Competition Work?*, 1 INT'L J. HEALTH CARE FIN. & ECON. 159 (2001).

[54] *See, e.g.*, Ho, *supra* note 28, at 399 (finding that, on average, managed care organizations contract with over 80% of hospitals).

We make the following assumptions throughout this article. First, we assume that health plans and hospitals bargain with each other over how to split the overall value created by including a hospital in the health plan's network;[55] if negotiations break down then the corresponding hospital is not included in the health plan's network.[56] Second, each health plan bargains with all hospitals belonging to the same system jointly, on an "all-or-nothing" basis; that is if negotiations break down, none of the system's hospitals will be included in the health plan's network. This assumption implies that following a merger of two stand-alone hospitals, the resulting two-hospital system can threaten in the negotiations to deny access to the plan's enrollees from *both* hospitals.[57] Finally, we assume that the outcome of the bargaining game is such that the parties split the overall value created on a "50/50" basis, and a merger of two hospitals does not affect this splitting rule.[58]

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[55] We refer to the resulting transfer payment between the health plan and the hospital as the "price," although we note that this should not be confused with a per-visit price.

[56] The idea that hospital prices are the outcome of a bargaining game between hospitals and health plans is now well recognized in the economics literature. *See, e.g.*, Robert Town & Gregory Vistnes, *Hospital Competition in HMO Networks*, 20 J. HEALTH ECON. 733 (2001); Cory Capps, David Dranove & Mark Satterthwaite, *Competition and Market Power in Option Demand Markets*, 34 RAND J. ECON. 737 (2003); Martin Gaynor & William B. Vogt, *Competition Among Hospitals*, 34 RAND J. ECON. 764 (2003); Ho, *supra* note 28. The methodologies introduced by these articles have also gained traction with the Agencies, as discussed in Joseph Farrell, Janis K. Pappalardo & Howard Shelanski, *Economics at the FTC: Mergers, Dominant-Firm Conduct, and Consumer Behavior*, 37 REV. INDUS. ORG. 263 (2010). These methodologies, however, have also been criticized for not modeling explicitly the bargaining game between hospitals and payers, but rather for adopting a reduced-form approach to bargaining dynamics. *See, e.g.*, Bryan Keating, Paolo Ramezzana, Robert Willig, Margaret Guerin-Calvert & Nauman Illias et al., Comment on Joseph Farrell, David J. Balan, Keith Brand, Brett W. Wendling (June 19, 2012) (unpublished manuscript), *available at* https://sites.google.com/site/paoloramezzana/research. Recent working papers by Lewis and Pflum, *supra* note 31, and Gowrisankaran et al., *supra* note 33, attempt to model explicitly the bargaining game and then estimate empirically the bargaining power parameters of the game. Additionally, another study criticizes this entire line of work, which rests on discrete choice models, by documenting how these models can yield implausible estimates for the opportunity cost of time. Michael J. Doane, Luke Froeb & R. Lawrence Van Horn, How Well Do Travel Cost Models Measure Competition Among Hospitals? (Mar. 10, 2012) (unpublished manuscript), *available at* http://ssrn.com/abstract=1928960.

[57] A health plan can also threaten to "divert" patients to other hospitals without entirely dropping a hospital from the plan's provider network. Such diversion might arise through tiered networks, differential copayments, or other mechanisms. Although we do not attempt to model this aspect of any possible negotiations between plans and hospitals, we do not believe that allowing for such negotiations is likely to change our principal finding—that cross-market hospital mergers may, in some circumstances, reduce health plans' negotiating leverage and reduce competition.

[58] The assumption of a "50/50" split, as opposed to another rule, say "60/40," is not crucial. What is crucial for the subsequent discussion is that the splitting rule is the same across the two separate pre-merger negotiations and that it stays the same in the single post-merger negotiation.

A. LINKAGES ACROSS HOSPITALS

Willingness on the part of patients to substitute between two hospitals in a market provides health plans with an important source of pre-merger bargaining leverage: if one of those hospitals tries to raise its price, a health plan can threaten to drop that hospital from its provider network and instead have its enrollees use the other hospital.[59] The more willing patients are to switch to that other hospital, the greater the health plan's ability to resist hospital price increases.

From the health plan's perspective, the importance of including that first hospital will depend on whether the plan can also contract with the second hospital. If the plan is assured of a contract with the second hospital, the plan puts less value on contracting with the first hospital. That reduced valuation allows the plan to negotiate for a lower price. If, however, the plan is unable to contract with the second hospital and ensure its inclusion in the plan's provider network, the plan's need for the first hospital increases, thus increasing the first hospital's bargaining leverage relative to the health plan. This creates an important linkage between the two hospitals: the amount the plan is willing to pay one hospital depends on whether the plan includes the second hospital.[60] The magnitude of this linkage in turn depends on the extent to which patients are willing to substitute between hospitals, and thus a health plan's willingness to include one hospital but not the other in its provider network. The greater the substitution possibilities, the greater the linkage and the stronger the health plan's negotiating position.

A linkage between hospitals within a market also arises because of health plans' pricing considerations. If two hospitals within a market are good substitutes from the perspective of individuals, then the overall attractiveness of the plan's product will be largely unaffected by whether it offers one or both hospitals in its provider network. As a result, a health plan that includes one hospital may not need to adjust its price by much if it fails to include the second hospital, and the plan's overall profits will be largely unaffected by whether or not the second hospital is included in the plan's provider network. Absent a contract with the first hospital, however, excluding the second hospital from the plan's provider network may render the plan so unattractive to employees that the plan would need to significantly reduce its own price. Thus, the effect on a plan's prices and profits from excluding that second

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[59] The health plan might also threaten to keep the hospital in its network, but attempt to engage in "within-network diversion" to steer patients to the other hospital.

[60] In more technical terms, the linkage reflects a non-zero second derivative: $\partial(\partial V/\partial H_1)/\partial H_2 \neq 0$, where dH_i refers to whether hospital i is included in the plan's network, and V refers to the value that the health plan places on including hospital i in its network.

hospital can depend on whether or not the plan excludes the first hospital, thus creating a linkage across the hospitals.[61]

B. The Effect of Excluding One Hospital Increases with the Total Number of Hospitals that Are Excluded

Linkages between hospitals are not a sufficient condition for a merger to result in higher prices: increased bargaining leverage on the part of the merging hospitals also requires that the reduction in a health plan's expected profits from excluding one of the merging hospitals is greater if the plan's provider network already excludes the other merging hospital: that is, the health plan's profits must be concave with respect to the number of excluded hospitals. While not typically referred to in those terms when considering within-market hospital mergers, this concavity condition is implicitly critical to most within-market hospital merger analyses.

The importance of the concavity condition can be seen as follows. The overall attractiveness of a health plan to a particular employer depends both on the health plan's price and on non-price attributes, such as the health plan's medical coverage, its customer service, claims processing, utilization review, and administrative efficiency. The health plan's attractiveness also depends on the scope of the health plan's provider network: a plan that includes more providers is likely to be more attractive than one that includes fewer providers. All else equal, a health plan will realize lower profits if its product becomes less attractive to employers and employees. Thus, the loss of one or more hospitals from a plan's provider panel can be expected to also reduce the plan's profits. This is the source of hospitals' bargaining leverage: the more that a health plan's profits will fall if it is unable to include a given hospital in its network, the greater the hospital's bargaining leverage, and thus the higher the price the hospital can negotiate.

In intuitive terms, one can think of the following question to assess whether the concavity condition holds. Imagine that you represented a health plan in negotiating a contract price with one of the two merging hospitals. Suppose further that during the negotiations you receive word that the health plan you represent failed to reach an agreement with the second merging hospital and that this second hospital would no longer be in your plan's hospital provider network. Would this information affect your desire to reach agreement with the first hospital? If that information would make it more important that you reach agreement, and make you willing to pay a higher price that you were before you realized your network was going to exclude the second hospital,

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[61] Here, the linkage arises either because $\partial(\partial P/\partial H_1)/\partial H_2 \neq 0$, or else $\partial(\partial\pi/\partial H_1)/\partial H_2 \neq 0$, where P refers to the price that the plan sets for its own insurance product and π refers to the plan's profits.

then the concavity condition likely holds: the health plan's incremental reduction in expected profits from excluding a given hospital is greater if other hospitals are also excluded (i.e., the health plan's profits are concave with respect to the number of excluded hospitals).

It follows that the impact of a within-market hospital merger will depend on how the merging hospital's bargaining leverage differs from the bargaining leverage that either of the merging hospitals would individually enjoy.[62] To further illustrate this, consider the following example in which there are several independent hospitals H1, H2, H3, and H4 in a market. Assume that hospitals H1 and H2 are close substitutes to each other so the attractiveness of a health plan's provider network will not be significantly affected if it excludes hospital H1 as long as the network still includes hospital H2 (and vice versa). Consistent with this, assume that failing to include either hospital H1 (creating a provider network of H2, H3, H4) or hospital H2 (creating a provider network of H1, H3, H4) from a plan's network would diminish the attractiveness of the plan's product and thus cause the plan's profits to fall from $100 to $90. Assuming for convenience that hospitals incur no costs in serving a health plan,[63] and assuming that hospitals and the health plan split evenly the surplus associated with their inclusion in the plan's network, then hospital H1 would enjoy a pre-merger price P = $5, and hospital H2 would, as well.[64]

The effect of a merger of hospitals H1 and H2 depends on how the loss of both hospitals will affect the plan's profits relative to the case where the plan was only losing a single hospital. Assume that there are no other good substitutes to H1 and H2. As a result, a plan that excludes the merged hospital H1/H2 system from its network will offer a significantly less attractive plan and will incur significantly lower profits.[65] Consistent with this, assume that excluding both hospitals H1 and H2 would cause the plan's profits to fall from

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[62] Inasmuch as the focus of this article is on how mergers, even when across multiple markets, can potentially reduce competition, we assume for the purposes of this discussion there are no efficiencies associated with those mergers.

[63] This assumption that hospitals incur zero costs in serving the health plan is without loss of generalization, and the "price" can be interpreted as what the hospital receives in excess of its costs.

[64] A "split the surplus" outcome is a common assumption regarding bargaining games. This outcome corresponds to the two bargaining parties sharing equally the total increase in benefits that emerge as a result of reaching agreement. Given the assumption that the plan's profits would increase by $10 if the hospital and plan can agree to join the plan's network, the surplus in this example is $10. The "split the surplus" assumption means that the plan and the hospital will share that surplus equally: $5 each. This means the hospital will receive $5 over its costs. In this simplified example where the hospital's costs are assumed to equal zero, this corresponds to the hospital receiving a price of $5. The price the hospital can extract as its share of the surplus, however, can equivalently be viewed as equal to one-half of the "harm" that it can threaten to impose on the health plan by refusing to reach agreement.

[65] We assume that the merged system contracts on an all-or-nothing basis.

$100 to $40. With a split-the-surplus bargaining outcome, the merged hospitals can then charge a price of $30, equivalent to a per-hospital price of $15.[66] Thus, as shown in Scenario 1 of Table 1, by merging with their close substitute, the hospitals increase their per-hospital price from $5 to $15.

TABLE 1: PRICING WITH WITHIN-MARKET MERGERS

	Health Plan Profits				Surplus from Hospital Inclusion (ΔΠ)			Pre-merger Price		Post-merger Price			Price Increase
	Excluded Hospital(s)				Excluded Hospital(s)								
	None	H1	H2	H1&H2	H1	H2	H1&H2	H1	H2	H1&H2	H1	H2	H1, H2
Scenario 1: Concave	100	90	90	40	10	10	60	5	5	30	15	15	10
Scenario 2: Linear	100	90	90	80	10	10	20	5	5	10	5	5	0
Scenario 3: Convex	100	90	90	84	10	10	16	5	5	8	4	4	-1

In other cases, however, hospital mergers will not increase the hospitals' bargaining leverage. Assume that hospitals H3 and H4 are good alternatives to hospitals H1 and H2 so that even the loss of both hospitals H1 and H2 only reduces the plan's profits from $100 to $80. As shown in Scenario 2 of Table 1, the merged hospital would only receive $10, or $5 per hospital. Thus, in this scenario, the merger has no impact on hospital prices.

Scenario 3 in Table 1 shows a third possible scenario in which a merger could result in lower prices. Assume that the loss of both hospitals H1 and H2 would only reduce the health plan's profits from $100 to $84. In that case, the merged hospital's share of the surplus is only $8, corresponding to a per-hospital price of just $4. Thus, under this set of assumptions, the example shows how a merger can leads to lower hospital prices even in the absence of efficiencies.

This example in Table 1, while highly simplified, illustrates how a hospital's ability to extract a higher post-merger price depends on the relationship between the health plan's profits and how many (and which) hospitals are excluded from the plan's provider network. A merger increases a hospital's bargaining leverage when health plan profits are *concave* in the number of excluded providers (i.e., profits fall at an increasing rate as an increasing number of providers are dropped from the plan's network).[67] This concavity condi-

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[66] Once merged, the hospitals can threaten the plan with a profit loss of $60. That $60 represents the surplus that can be obtained by contracting, and which gets split equally between the hospitals and the plan in a split-the-surplus bargaining outcome.

[67] The concavity condition can also be thought of as a "super-additivity" condition: that the plan's cost from losing two hospitals exceeds the sum of the cost of losing either hospital alone.

tion corresponds to Scenario 1 of Table 1 in which the loss of the first hospital reduced profits by $10 but the incremental profit reduction from losing the second hospital was $50. If, however, profits are *linear* with respect to the number of excluded hospitals, the merger has no impact on hospitals' leverage power. This corresponds to Scenario 2 where the incremental profit loss of the second hospital was $10, the same as the profit loss from the first hospital.[68] And, if the plan's profits are *convex* in the number of excluded hospitals (Scenario 3), the merger reduces hospital bargaining leverage and leads to lower prices. These three scenarios, and their implications for hospitals' bargaining leverage, are summarized in Figure 1.

The intuition embodied in the example in Table 1 is nothing new with respect to how hospital mergers are typically evaluated. Hospital mergers are typically viewed as more likely to reduce competition if health plans would likely be significantly worse off if they are unable to contract with both hospitals than if they were unable to contract with just one of the hospitals. This corresponds to the concave example of Scenario 1 in Table 1. If, however, the harm to the health plan from losing one hospital is largely independent of whether or not it has the other hospital in its network, the merger is unlikely to pose any competitive concerns; this corresponds to the linear example in Scenario 2. And finally, Scenario 3 (convexity) corresponds to the perhaps unlikely situation where the harm to the health plan from losing one of the merging hospitals from its network is actually less if the other hospital is excluded from its network.

IV. CROSS-MARKET MERGERS

Historically, the prevailing assumption regarding cross-market hospital mergers appears to have been that, absent patient willingness to substitute between hospitals in different markets, there are no linkages between hospitals. Absent such linkages, the effect on a health plan from losing a hospital in

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More formally, if $\Delta\Pi$ (-*i*) represents the reduction in a plan's profits from losing hospital *i* from its network (relative to the case where the network includes all hospitals), and $\Delta\Pi$ (-*i, j*) represents the reduction in the plan's profits if it loses both hospitals *i* and *j*, the super-additivity condition can be expressed as $\Delta\Pi$ (-*i, j*) > $\Delta\Pi$ (-*i*) + $\Delta\Pi$ (-*j*). A merger of hospitals *i* and *j* increases the hospitals' bargaining leverage if there is super-additivity between *i* and *j*, with the health plan forced to increase its total payments to the two merging hospitals by an amount equal to $\Delta P = [\Delta\Pi$ (-*i, j*) – ($\Delta\Pi$ (-*i*) + $\Delta\Pi$ (-*j*))] / 2. The greater the super-additivity (i.e., the greater the concavity of the profit function), the more the merger will increase the hospitals' bargaining leverage and thus allow for a post-merger price increase. Note that in the example illustrated in Scenario 1 of Table 1, there is super-additivity across the two hospitals: $\Delta\Pi$ (-*i, j*) = $60, while $\Delta\Pi$ (-*i*) = $\Delta\Pi$ (-*j*) = $10. Thus, in that example, the price increase across the two merged hospitals will be $\Delta P = [60 – (10+10)] / 2 = $20 (or a per-hospital price increase of $10). In contrast, in Scenario 2 of Table 1, there was no super-additivity, and thus, no price effect: $\Delta P = [20 – (10+10)] / 2 = $0.

[68] Linearity means there is no linkage across the hospitals: $\partial(\partial V/\partial H_1)/\partial H_2 = 0$.

Health
Plan
Profits

*Concave: Increased Hospital
Bargaining Leverage*

*Convex: Reduced Hospital
Bargaining Leverage*

*Linear: No Effect on Hospital
Bargaining Leverage*
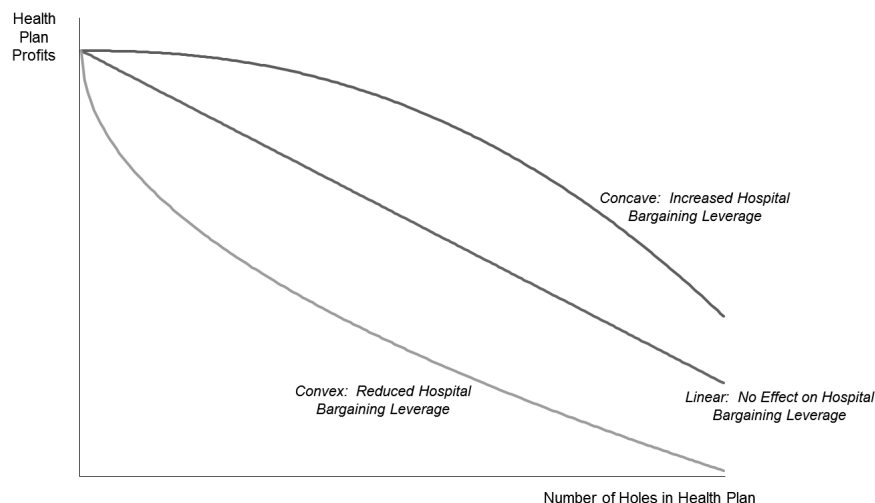
Number of Holes in Health Plan

FIGURE 1: THE SHAPE OF THE HEALTH PLAN'S PROFIT
FUNCTION DETERMINES HOSPITAL BARGAINING LEVERAGE

one market was then assumed to be independent of whether that health plan includes a hospital in a second market. Thus, absent linkages between markets, competition in each market could be viewed as separable, and the formation of a cross-market system was not believed to affect providers' bargaining leverage or result in higher prices.[69]

The conclusion that cross-market mergers will not affect hospitals' bargaining leverage, however, rests on the assumption that patients' willingness to substitute between hospitals is the only way in which linkages across hospitals can arise. Yet linkages can arise for other reasons.

We discuss two possible mechanisms through which cross-market linkages can arise absent patient willingness to substitute between hospitals. First, linkages may arise when the likelihood that an employer chooses a particular plan to offer to its employees depends on the plan's provider coverage across multiple markets. Second, linkages may arise because a health plan's pricing strategy will reflect the plan's appeal to individuals in different markets. In

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[69] An exception can arise if one of the hospitals had significant pre-merger bargaining leverage that, because of regulation or some other constraint, could not be exercised. In that case, a cross-market merger might result in "regulatory evasion" whereby the hospital exercises that bargaining leverage in a different market in which the regulatory (or other) constraints do not exist. A cross-market merger might also result in a price increase if the acquiring hospital is a better negotiator, has superior information than the acquired hospital, or if the acquiring hospital has different incentives (e.g., is more focused on short-run, rather than long-run, profitability) that result in a different (and higher) optimal price.

both cases, the resulting linkages can lead to concavity of the health plan's profit function with respect to the number of system providers it excludes from its provider network. As a result, the formation of cross-market hospital systems can increase providers' bargaining leverage and prices.

A. Employer Choice of Health Plan May Depend on Overall Network Coverage

For an employer seeking to offer plans that are attractive to the majority of its employee base, increasing the number of holes in a health plan's provider network is likely to reduce the plan's attractiveness to the employer. A cross-market merger allows the resulting hospital system to threaten a health plan with more holes, and thus a greater loss in profits. If the loss in profits from losing both hospitals is greater than twice the loss from losing either individual hospital (i.e., there is concavity in profits), the merger provides the hospital system with increased bargaining leverage.

This point is illustrated using the following example. Assume that an employer is willing to offer a health plan that has one or two holes in its provider panel because the employer's other health plans offer coverage in those areas. Thus, having just one or two holes may have little impact on the health plan's profits. If the plan has too many holes in its network, however, employers may opt to drop that plan in favor of competing plans that offer broader provider coverage that appeals to more of their employees. Thus, too many holes may mean a plan can no longer effectively compete, driving the plan's profits to zero so that profits are concave in the number of holes. In that case, a hospital merger that allows hospitals to threaten a health plan with competitive non-viability may provide the merged hospital with significantly greater bargaining leverage even though the merger involves hospitals in distinct geographic markets.

The following model (described in greater detail in Appendix 1) illustrates how the incremental effect of losing a hospital on whether an employer chooses a health plan may depend on the number of pre-existing holes in the plan's provider network. This relationship creates an inter-hospital linkage which potentially allows cross-market hospital mergers to increase hospitals' negotiating leverage.

Assume there is a single employer that seeks health care coverage across several regions where its employees live, but that employees are unwilling to substitute between hospitals in those different regions. That employer is assumed to offer a limited number of health plans to its employees, with the employer choosing whichever health plans offer the best overall combination

of attractiveness and price.[70] Several health plans compete to be chosen by that employer, with the number of competing health plans strictly greater than the number of plans the employer will ultimately choose. Any health plan that the employer chooses will be offered to employees in all markets in which the employer operates, regardless of whether the plan has a hole in its provider network in any particular market(s).[71]

To focus the discussion on the cross-market effects of hospital systems, assume that there is a single hospital in each market. From the employer's perspective, the attractiveness of each health plan depends on the number of holes the plan has in its hospital provider network and its plan-specific characteristics (e.g., the plan's physician network, its claims administration process, its overall reputation, etc.). The amount by which a plan's attractiveness is reduced after losing a particular hospital in its provider network is assumed to be the same across all health plans: no hospital is any more or less important to one plan than another.

Health plans have imperfect information about the employer's preferences across hospitals. Thus, while all hospitals are assumed to have the same *expected* value to the employer, in reality, some hospitals may be more important to a particular employer than other hospitals.[72] Absent perfect information about how an employer values a particular hospital or set of hospitals, the employer's valuation of plan i that has no holes (V_i) is assumed to be randomly distributed with mean μ_i and variance σ_i^2. Thus, although employers' *expected* valuation of plan i (with no holes) is equal to μ_i, a particular employer's actual valuation of that plan may end up higher or lower than μ_i.

Assume that there are two plans: A and B. With the expected attractiveness of those two plans denoted μ_A and μ_B, respectively, the extent to which the expected attractiveness of Plan A exceeds the attractiveness of Plan B can be denoted $D = \mu_A - \mu_B$. A high value for D means that Plan A is a generally more attractive plan than B, while if $D = 0$, then both health plans are expected to be equally attractive.

We assume that the expected value of including any particular hospital in a health plan's network is independent of what other hospitals the health plan may have in its network. More formally, denoting the attractiveness of plan i

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[70] An employer may limit the number of plans it offers its employees in order to reduce risk-selection problems, to lower administrative costs, or to increase first-stage competition among health plans. (For a discussion of the relationship between first-stage competition among health plans and the number of plans chosen by an employer, see Vistnes et al., *supra* note 53.)

[71] For convenience, we assume that each health plan offers a single health insurance product.

[72] This might be the case, for example, if the employer has greater information about where its employees live or what types of hospital services the employees typically seek out and thus which hospitals are important providers of those services.

to an employer as U_i, and the number of holes in the plan i's network as h, then $U_i = V_i - c*h$, where V_i represents the value of the plan if it has no holes, and c is the amount by which each hole reduces the attractiveness of the plan.[73] Modeling the employer's valuation in this way ensures that the model does not "build in" the result that a second hole in a plan's network is more costly than the first hole. Rather, the model explicitly assumes that the amount by which the plan's attractiveness is reduced is the same for the first hole and, for example, the fourth hole.

An employer chooses Plan A over Plan B if $U_B > U_A$. Employer-specific preferences mean that, even if the two plans have the same provider network and even if $D = 0$, an individual employer may prefer one health plan over another for reasons that are unobservable to the health plan. Similarly, if an employer's preferences for one plan are sufficiently strong, the employer may choose that plan even if that plan has more holes in its network than does its rival plan.

Assume without loss of generality that Plan B has no holes in its network, but that Plan A faces the threat of having one or more holes. Figure 2 shows how the probability that the employer chooses Plan A depends on the number of holes in A's network.[74] Figure 2 also shows how this relationship depends on D, the extent to which Plan A is more attractive than Plan B.[75]

Figure 2 shows that, when Plan A is sufficiently more attractive than Plan B (i.e., $D > 0$), the likelihood that an employer offers a particular health plan to its employees can be concave in the number of holes in the plan's provider network. Thus, increasing the number of holes in the plan's provider network can reduce the likelihood, *at an increasing rate*, that the employer will offer the plan to its employees. It follows that, while a single hospital may realize little bargaining leverage from its threat to create the first hole in the plan's provider network, that hospital may enjoy significant bargaining leverage if it

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[73] As noted, we are assuming for convenience that there is a single hospital in each market. Alternatively, one could instead assume that there were multiple hospitals in each market, and that the incremental value of any individual hospital in a market was equal to c where the value of c would be decreasing in the number of hospitals in each market. Thus, the model readily extends to consider both the case where all hospitals are "monopoly" providers and where all hospitals face at least some competition within their own market. We believe that the general intuitions from this simple model would also emerge in a more complex model in which the number of competing hospitals in each market was allowed to differ.

[74] In calculating this probability, we assume that both plans charge the same price, thus avoiding the need to introduce additional assumptions about the nature of the pricing game that may exist between the two plans. For details behind the derivation of Figure 2, see Appendix 1, *available at* http://www.americanbar.org/content/dam/aba/publishing/antitrust_law_journal/at_alj_vistnes_sarafidis.pdf.

[75] Although the relationship is also dependent on other parameters (e.g., c and σ_i^2), it appears that D has the most interesting effect with respect to whether the probability function shown in Figure 2 is concave in the number of holes in Plan A's network.

can threaten to impose, for example, a second, third, or fourth hole in the plan's provider network. As a result, a merger of those two hospitals in distinct geographic markets can increase the hospitals' bargaining leverage.[76]
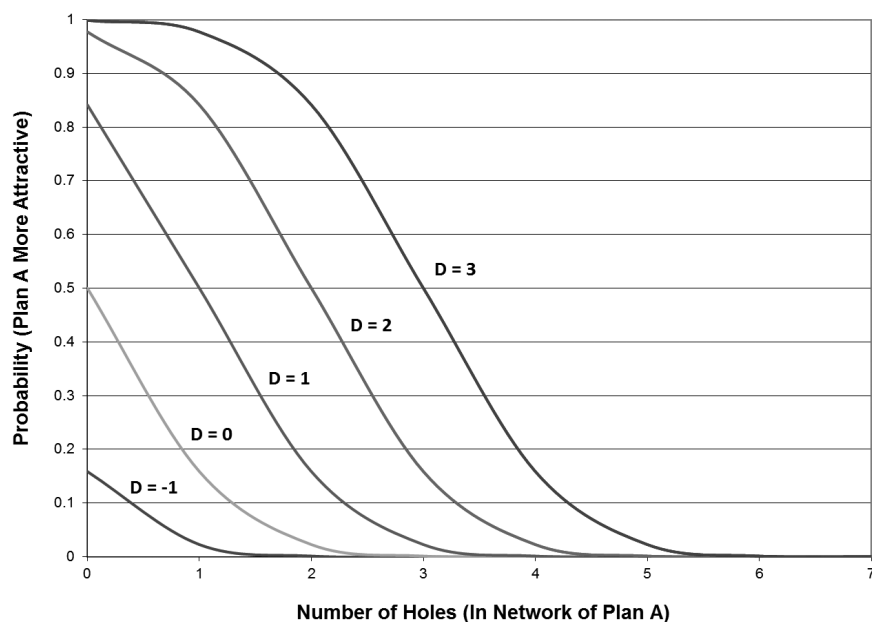

FIGURE 2: RELATIONSHIP BETWEEN NUMBER OF HOLES AND PROBABILITY OF PLAN A BEING CHOSEN

This model suggests that concavity with respect to the number of holes in a particular health plan's provider network and the likelihood that an employer will choose that plan may be more likely when that plan is more attractive than competing health plans. The intuition for this result is as follows. Consider a situation in which initially neither of two competing health plans has any holes so that both are equally attractive to the employer. In that case, the first hole has the biggest impact on the likelihood of winning a contract with the employer since the first hole is what changes the competition from a close race to an unequal race. A second hole then has much less impact on the

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[76] Figure 2 shows concavity in the probability that a plan is chosen, not concavity in profits. Showing concavity of profits would require additional assumptions about the nature of the pricing game between the two plans so that one could calculate how each plan's prices would change in response to one or more holes in Plan A's network. Yet, regardless of whether the pricing game is such that profits are concave in the number of holes does not affect the finding that there exists a cross-market linkage between hospitals—a plan's profits are not separable with respect to its hospital coverage between the two markets.

probability of winning the contract—in essence, the first hole already ensured that the contract would likely be lost.

In contrast, consider a health plan that is significantly advantaged relative to its rival. For that plan, the first hole in its network may have little effect on the plan's likelihood of winning the contract—in essence, the plan may be so much more preferred that one hole will not significantly affect its chance of winning the contract. But as the health plan incurs more holes, it is no longer so clearly advantaged, and thus the additional holes make it increasingly likely that the health plan could turn from the front-runner to actually losing the contract. Thus, additional holes can be increasingly important to the plan.[77]

Of interest, Figure 2 also shows that the probability of Plan A being chosen might be *convex* in the number of holes: at some point, threatening to impose an additional hole in a provider's network may have relatively little incremental effect on the likelihood that the employer chooses that plan.[78] Consistent with the discussion in the previous section on within-market mergers, this suggests the possibility that the acquisition of a hospital by a large multi-hospital system could actually reduce that acquired hospital's bargaining leverage. The intuition is straightforward: if a hospital system already has so many hospitals that employers would never choose a plan that excluded that system, then acquiring one more hospital has little impact on the hospital system's bargaining leverage since it can already threaten to "break" the health plan.[79] That acquired hospital, however, may have enjoyed bargaining leverage of its own. Accordingly, the bargaining leverage of the new, larger system will be less than the sum of the bargaining leverage of the old system and the acquired hospital.[80]

Convexity in the profit function may actually cause a merged hospital to *lower* its prices.[81] To illustrate this, assume that a health plan can realize prof-

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[77] Firms may optimally set price in a way that partially offsets these advantages. But as long as firms do not fully offset any inherent advantage through higher prices, the first hole may be less important to a very attractive health plan than is the second hole.

[78] This is the case, for example, for D = −1 in Figure 2.

[79] Consistent with this, note from Figure 2 that probability function generally becomes convex only for low probability values.

[80] Notably, however, the hospital system's own bargaining leverage would still increase relative to its pre-merger bargaining leverage. Thus, a merger might still make sense from the perspective of the acquiring hospital system if the other hospital was ineffective at extracting its bargaining leverage.

[81] Of course, even if the probability function is convex in the number of holes, this should not be interpreted as a type of free pass for large hospital systems to grow even larger. In particular, even though a larger hospital system may see little increase in its bargaining leverage from threatening to pull all of its hospitals out of a plan's network, a larger hospital system will have more flexibility in deciding which hospitals to threaten to pull from that plan's network. By

its of $100 if it can market a plan that includes a hospital in two distinct markets, but that the plan cannot successfully market its product if either hospital is absent. With a "split the surplus" bargaining outcome, it follows that each hospital will be paid $50. If the two hospitals merge, however, the merged system can still only threaten the health plan with a loss of $100, and thus they will still only be able to negotiate a total price of $50.[82] Thus, in this example, the merger causes prices to fall by $25 per hospital.[83]

Convexity of the profit function may be more likely for health plans that, even before the possible loss of a hospital, are less attractive to employers. For a health plan that is already unlikely to be chosen by an employer, the loss of additional hospitals from its network simply makes a likely competitive loss almost certain. The incremental effect of those hospital losses on the health plan's probability of winning, however, becomes increasingly small as more and more hospitals are lost. This suggests that a cross-market merger may increase hospitals' bargaining leverage vis-à-vis more attractive plans, while reducing hospitals' bargaining leverage vis-à-vis less attractive plans.[84] If so, under these special circumstances, a cross-market hospital merger may result in a leveling of the playing field between competing health plans.[85] Yet, while this leveling of the playing field may benefit less attractive plans, it may come at the expense of consumers who will face higher prices.

Assessing whether a health plan's profits are likely concave, convex, or linear in the number of excluded hospitals is unlikely to be easy, and trying to ask that question of a health plan representative is unlikely to yield a meaningful response. A more meaningful reply, however, might be obtainable by

threatening to pull less than its entire system from the plan's network, the system may be able to maximize the impact of its threat.

[82] The effect of the merger could be very different if the pre-merger bargaining leverage of the two hospitals differed. If the acquired hospital's share of the surplus increases after the merger, then the health plan could still end up worse off.

[83] This price-reducing incentive reflects what economists refer to as a "Cournot effect." This example also helps to highlight how a hospital merger might generate efficiencies by eliminating a significant contracting problem. Assume that there were three hospitals in the previous example. In that case, with each individual hospital able to threaten the health plan with the loss of $100, each individual plan might seek a price of $50. With profits of just $100, however, the plan could not afford to pay all three hospitals $50, and thus there may be a failure to contract. If two hospitals merge, then rather than seek $50 each, they might seek only $50 collectively, thus making it more likely that the health plan and the hospitals could reach an acceptable bargaining outcome.

[84] This will be true even if the merged hospital can discriminate between health plans and thus contract on a bundled basis when dealing with the attractive health plan while contracting on an unbundled basis when dealing with the less attractive health plan. In that situation, even though the less attractive plan does not benefit from the merger, it is not harmed (as the more attractive plan is).

[85] Whether or not this leveling of the playing field across health plans would likely result in further benefits to the merging hospitals is, at this point, unclear.

returning to the previously mentioned hypothetical: imagine that you (the health plan) are negotiating contract prices with one of the two merging hospitals and that, in the middle of those negotiations, you receive word that negotiations with the second hospital have broken down and that the hospital will no longer participate in your plan's provider network. If that new information makes it *more* important to contract with the first hospital, and leaves you willing to pay a *higher* price, then the concavity condition likely holds, i.e., the hospital's bargaining leverage increases. Conversely, if that new information made you a more aggressive negotiator and less concerned about not reaching agreement with the first hospital, then profits are more likely to be convex, i.e., the hospital's bargaining leverage decreases. And if the new information had no impact on your desire to reach agreement with the first hospital, and had no effect on how much you were willing to pay that hospital, then profits are more likely to be linear in the number of excluded hospitals.

The incentive to lower prices, however, may only come about if the hospital system markets its hospitals on a bundled basis. This suggests that a merged hospital might price discriminate between health plans according to the plan's perceived attractiveness to employers. When contracting with plans that are likely to be very attractive to employers (where a plan's profits may be more likely to be concave with respect to the number of holes in its network), a hospital system might find it profitable to contract on a bundled basis. For plans perceived to be less attractive to employers (where a plan's profits may be more likely to be convex with respect to the number of holes in its network), however, a hospital system might instead contract on an unbundled basis. By doing so, each of the hospital system's individual hospitals may have greater negotiating strength (on average) than they would have if the system negotiated a single price for the entire system.

B. HEALTH PLAN PRICING AND PROFITS MAY DEPEND ON OVERALL NETWORK COVERAGE

A second possible cause for cross-market linkages stems from health plans' typical practice of charging a common price to a given employer's employees who live in different markets.[86] This form of pricing can create cross-hospital linkages because a health plan's decision on how to modify price in response to a hole in one market may depend on how that price change will affect demand in other markets, which in turn depends on whether the plan has holes in those other markets.

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[86] This is generally true within reasonably sized geographic regions (e.g., across several adjacent counties). Plans typically charge different prices across more disparate geographic regions, however—e.g., the northern part of a state vs. the southern part.

Consider an employer that seeks to offer health insurance to its employees in several distinct geographic markets, where each market includes one hospital. Assume that the employer offers two competing health plans to its employees, with individual employees choosing between those two plans based on their relative prices and provider coverage. Finally, assume that each plan must charge all employees the same price regardless of where the employee lives.

All else equal, a plan that incurs a hole in one market will suffer reduced enrollment in that market (but not in any other markets). If plans could price on a market-by-market basis, this means that a plan would likely compensate for a hole in one market by dropping its price in that market. Absent that ability to price discriminate, however, a plan suffering a hole in one market will have to determine whether that same price reduction (or any price reduction at all) is warranted since that price reduction must also be extended to markets where there were no changes in the plan's network coverage.

In deciding how to adjust price in response to a hole in one market, a plan will take into account how price changes affect its profits in all markets, not just the market with the hole. If the plan has no holes in other markets, dropping price in compensate for a hole in one market may be very costly since that price reduction must also be extended to employees in all the other markets where no compensating price reduction was necessary. If, however, the plan has holes in several markets, a price reduction may be desirable since the price reduction helps compensate for the holes in those other markets. In considering a price reduction, the plan will also need to consider how the competing health plan might adjust its own price.

The inter-hospital linkages that result from these pricing considerations are illustrated with the following model.[87] Assume two health plans A and B are competing to offer coverage to a single employer's employees, where those employees are equally split between two distinct geographic markets. As before, assume that there exists a single hospital in each market. From the health plans' perspective, all employees in a market view the two competing plans as comparable, subject to both plans charging the same price and having the same provider network. Employees care about whether a plan has a hole in the market in which they are located, but are indifferent about holes in other markets. Denoting an employee's perceived quality of plan i in market r as q_i^r, then let $q_i^r = 1$ for an employee in market r if there are no holes in that employee's market, while $q_i^r < 1$ if there is a hole in the employee's market. Individual employees, however, have idiosyncratic (but unobservable) prefer-

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[87] This model is described in greater detail in Appendix 2, *available at* http://www.american bar.org/content/dam/aba/publishing/antitrust_law_journal/at_alj_vistnes_sarafidis.pdf.

ences that cause them to prefer one plan over the other. Let z_i denote an individual employee i's preference for Plan A over Plan B, where z_i is normally distributed with the same mean 0 and variance σ^2.[88]

Denote the price that plan i sets as p_i. For simplicity, assume that employees pay the full price that the health plan charges. Individual employees choose Plan A over Plan B as long as the amount by which Plan A's quality-adjusted price exceeds Plan B's quality-adjusted price is no greater than z. Thus, the employee chooses Plan A as long as $p_A/q_A{}^r - z_i < p_B/q_B{}^r$. Knowing the hospitals in each plan's network and the structure of employees' preferences, plans simultaneously set a price that is common across both markets.

Table 2 shows how equilibrium prices and profits for Plan A and B depend on the number of holes in Plan A's network when Plan B has no holes in its network. Significantly, Table 2 shows that a health plan's profits can be concave in the number of holes, even though those holes are in distinct markets.[89] This concavity means that, in this example, a multi-market hospital system can threaten a health plan with a greater profit loss than the systems' individual hospitals could threaten on their own. As a result, the formation of such a multi-market hospital system will increase the hospitals' bargaining leverage.

The observed cross-market linkage and concavity of profits in this model emerges for the following reason. Absent a need to set a common price across all markets, Plan A would typically lower its price in response to a hole in a particular market. When forced to set a common price across all markets, however, Plan A reduces its price by less than it would if it could target the price reduction solely to the market in which it incurred the hole. Thus, Plan A is forced to set a "compromise" price that is higher than desired in the market with the hole, and lower than desired in the market without the hole. Plan A's hole also creates an incentive for Plan B to raise its own price to take advantage of the reduced quality of Plan A's network. This "accommodating" price increase by Plan B means that Plan A does not need to reduce its own price by as much as it would have if Plan B had left its prices unchanged. As shown in Table 2, this accommodation by Plan B also affects the plans' market shares: when Plan A incurs a hole in one market, Plan A gives up significant share in that market while Plan B gives up significant share in the other

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[88] By assuming that z_i is distributed with mean zero, the model assumes that individual employees have no predisposition toward choosing Plan A over Plan B. If Plan A was, on average, a more attractive plan than Plan B, then the mean of that distribution would instead be positive.

[89] In particular, the reduction in the plan's profits from a hole in one market can be greater if the plan also has a hole in the other market. For example, as shown in Table 2 for $q_A{}^r = 0.8$, Plan A's profits fall by 0.095 if it loses just one hospital from its network, but its profits fall by an additional 0.149 if it loses a second hospital in the other market.

TABLE 2: OUTCOMES AS A FUNCTION OF THE NUMBER OF
NETWORK HOLES

		Number of Holes in Plan A's Network: $q_A = 0.9$		
		0	1	2
Price	Plan A	3.253	3.172	3.064
	Plan B	3.253	3.311	3.331
Profit	Plan A	0.627	0.569	0.501
	Plan B	0.627	0.675	0.705
Profit Loss from an Incremental Hole	Plan A		-0.058	-0.068
	Plan B		0.048	0.03
Plan A's Mkt Share	hole mkt		41%	47%
	no hole mkt	50%	55%	
		Number of Holes in Plan A's Network: $q_A = 0.8$		
		0	1	2
Price	Plan A	3.253	3.135	2.883
	Plan B	3.253	3.442	3.438
Profit	Plan A	0.627	0.532	0.383
	Plan B	0.627	0.766	0.813
Profit Loss from an Incremental Hole	Plan A		-0.095	-0.149
	Plan B		0.139	0.047
Plan A's Mkt Share	hole mkt		32%	43%
	no hole mkt	50%	62%	
		Number of Holes in Plan A's Network: $q_A = 0.7$		
		0	1	2
Price	Plan A	3.253	3.213	2.711
	Plan B	3.253	3.750	3.592
Profit	Plan A	0.627	0.549	0.277
	Plan B	0.627	0.958	0.972
Profit Loss from an Incremental Hole	Plan A		-0.078	-0.272
	Plan B		0.331	0.014
Plan A's Mkt Share	hole mkt		20%	39%
	no hole mkt	50%	70%	

Model parameters: c = 2, mean (z) = 0, std dev (z) = 1.

market.[90] This accommodation on Plan B's part mitigates the reduction in profits that Plan A suffers when it incurs a hole in one of the two markets.

A second hole for Plan A changes pricing incentives. With that second hole, Plan A no longer needs to choose a "compromise" price: now Plan A's optimal unconstrained price is the same in both markets. With Plan A no longer forced to choose a compromise price, Plan B is forced to price more aggressively, and thus no longer accommodates Plan A. This switch from accommodation to more aggressive pricing on Plan B's part causes an incremental reduction in Plan A's profits. We also see from Table 2 that the two plans no longer segment demand with one plan largely serving one market and the other plan largely serving the other market. Instead, the two plans' market shares are the same in both markets. As a result of this more aggressive pricing on Plan B's part, as well as the move away from segmenting markets, Plan A's incremental profit loss from the second hole is greater than its profit loss from the first hole. That is, Plan A's profits become concave with respect to the number of holes in its network.

The model can be readily extended to consider the effect of holes when plans and employers operate in more than two markets. Figure 3 shows how equilibrium prices for Plan A and B depend on the number of holes in Plan A's network, assuming that Plan B has no holes in its network. Similarly, Figure 4 shows how profits of Plan A and B depend on the number of holes in A's network. Once again, the health plans' need to set a common price across distinct markets can create a cross-market linkage between hospitals in which the effect of losing a hospital in one market is greater if the plan has already lost a hospital in one or more other markets.

Tables 3 and 4 also illustrate how cross-market linkages arise because plans strategically react to a competing plan's holes by moving towards a more segmented market. Here, we see that with its first hole in Market 1, Plan A chooses to almost abandon that market rather than significantly drop prices in the other four markets where it suffered no reduction in quality. This allows Plan B to substantially increase its share in that market while simultaneously increasing its price in all markets. As Plan A incurs holes in more of its markets, however, it implements additional price reductions to better compete in those markets (see Figure 3 and Table 4). As a result, Plan A becomes a more aggressive competitor in markets where it has holes and it regains share. Also of interest, in some cases, Plan B can be harmed when Plan A incurs additional holes. As shown in Table 4 for the case of $q_A = 0.7$, when Plan A moves

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[90] By segmenting shares in this way, the two plans mitigate the extent to which the uniform pricing constraint is binding: at the extreme where a plan largely stops serving employees of one market, the plan can set the optimal price in the other market as if it were able to price discriminate between markets.

from having holes in most of its markets to having holes in all of its markets, profits for *both* Plan A and Plan B fall. This unusual result in which a quality reduction in Plan A's product causes Plan B's profits to fall reflects the fact that, once Plan A incurs holes in all of its markets, the constraint that it needs to set the same price in each market is no longer binding: Plan A *prefers* setting the same price in each market. As a result, Plan A becomes a more aggressive competitor and causes Plan B's profits to fall.
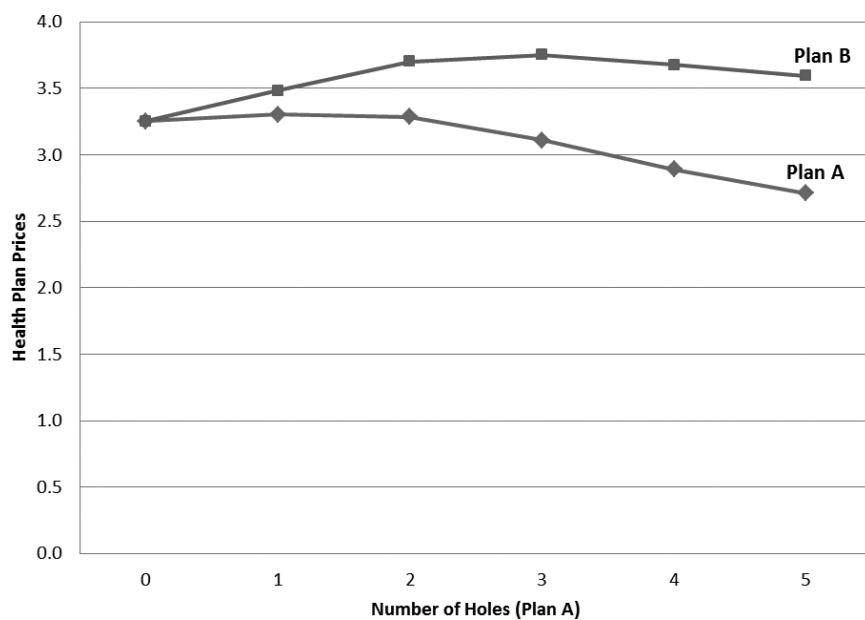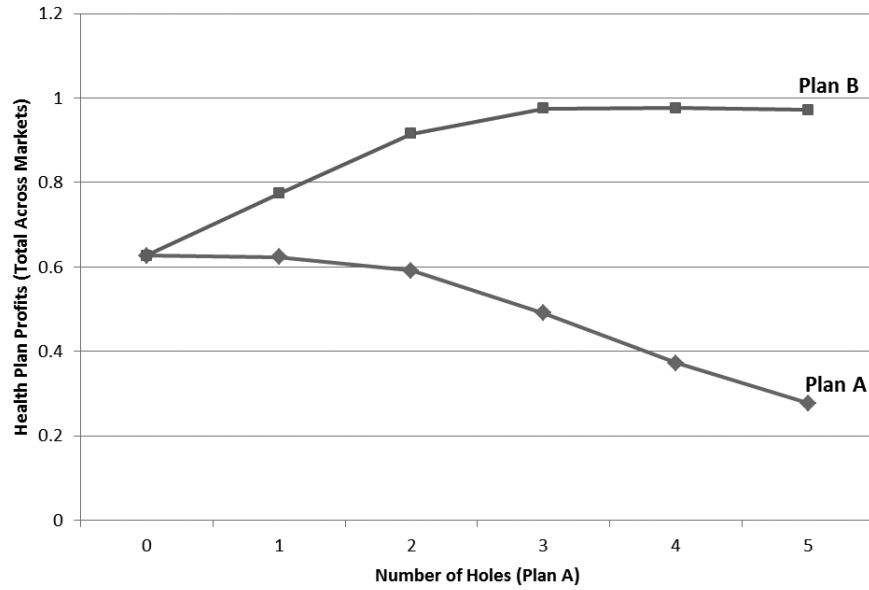

Model parameters: $q_A = 0.7$, $c = 2$, mean(z) = 0, std dev(z) = 1.

FIGURE 3: PRICE AS A FUNCTION OF THE NUMBER OF HOLES—
MULTIPLE MARKETS

V. EXTENSIONS AND IMPLICATIONS

While discussed principally in the context of hospital mergers across different geographic markets, the idea of cross-market linkages extends to other situations.

Model parameters: $q_A = 0.7$, c = 2, mean(z) = 0, std dev(z) = 1.

FIGURE 4: PROFITS AS A FUNCTION OF THE NUMBER OF
HOLES—MULTIPLE MARKETS

TABLE 3: MARKET SHARES OF PLAN A AND PLAN B

| Market | Number of Holes in Plan A | | | | | | | | | | | |
| | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | |
	A	B	A	B	A	B	A	B	A	B	A	B
1	50%	50%	11%	89%	16%	84%	25%	76%	33%	67%	39%	61%
2	50%	50%	57%	43%	16%	84%	25%	76%	33%	67%	39%	61%
3	50%	50%	57%	43%	66%	34%	25%	76%	33%	67%	39%	61%
4	50%	50%	57%	43%	66%	34%	74%	26%	33%	67%	39%	61%
5	50%	50%	57%	43%	66%	34%	74%	26%	79%	22%	39%	61%

A. Cross-Market Merger Effects May Have Both Vertical and Horizontal Elements

To simplify, the preceding discussion assumed that there were no substitution opportunities between merging hospitals in the different markets. Thus, any post-merger ability to increase price did not stem from what might be viewed as a traditional, or direct horizontal, reduction in competition for patients. Instead, merger-related effects flowed solely from other types of linkages between hospitals that might be viewed as vertical (or more generally, non-horizontal) effects.

TABLE 4: OUTCOMES AS A FUNCTION OF THE NUMBER OF NETWORK HOLES

		$q_A = 0.8$					
		Number of holes in Plan A's network					
		0	1	2	3	4	5
Price	Plan A	3.253	3.231	3.176	3.089	2.986	2.883
	Plan B	3.253	3.35	3.421	3.454	3.455	3.438
Profit	Plan A	0.627	0.600	0.558	0.503	0.443	0.383
	Plan B	0.627	0.693	0.746	0.782	0.802	0.813
Profit Loss from an	Plan A		−0.027	−0.042	−0.055	−0.060	−0.060
Incremental Hole	Plan B		0.066	0.053	0.036	0.020	0.011
Plan A's Mkt Share	hole mkt		25%	29%	34%	39%	43%
	no hole mkt	50%	55%	60%	64%	68%	

		$q_A = 0.7$					
		Number of holes in Plan A's network					
		0	1	2	3	4	5
Price	Plan A	3.253	3.304	3.284	3.109	2.889	2.711
	Plan B	3.253	3.484	3.700	3.750	3.677	3.592
Profit	Plan A	0.627	0.624	0.592	0.491	0.372	0.277
	Plan B	0.627	0.774	0.916	0.975	0.976	0.972
Profit Loss from an	Plan A		−0.003	−0.032	−0.101	−0.119	−0.095
Incremental Hole	Plan B		0.147	0.142	0.059	0.001	−0.004
Plan A's Mkt Share	hole mkt		11%	16%	25%	33%	39%
	no hole mkt	50%	57%	66%	74%	79%	

Model parameters: c = 2, mean (z) = 0, std dev (z) = 1.

Outside the construct of the models in this article, however, there may be at least a small number of patients who might be willing to substitute between hospitals in the same general geographic region, even if the magnitude of that substitution is not so great that one might view the hospitals as competing in the same relevant antitrust market. In such cases, there may be linkages across hospitals that are attributable both to patient substitution opportunities and the types of non-patient focused linkages that were discussed above.

This situation in which at least some patients may be willing to substitute between hospitals exists in the case that Gowrisankaran et al. study.[91] Not surprisingly, they find that patients' willingness to substitute between hospitals creates a risk that merger between those hospitals can reduce competition. They also find, however, that even in the extreme case where there is no willingness on the part of patients to substitute between hospitals, a merger can affect competition. This cross-market merger effect appears to be attributable to the same type of inter-hospital linkages at the health plan level that are the focus of this article. In Gowrisankaran et al., however, the possibility of these inter-hospital linkages appears to emerge for yet a different reason: cross-market mergers might affect a hospital system's incentives with respect to its relative reliance on each member hospital to extract rents from health plans.[92]

B. Cross-Product Mergers May Also Affect Negotiating Power of Other Types of Providers

Nothing in the preceding discussion necessarily limits the analysis to hospital mergers. Rather, the discussion may be equally apt in assessing mergers of geographically dispersed physicians, specialty hospitals, or other types of providers. Similarly, the discussion may also apply to mergers across providers in different *product* markets, such as mergers (or partnerships) between different types of hospitals (e.g., general acute care hospitals, children's hospitals, and specialty care hospitals), or the formation of multi-specialty physician groups or hospital/physician entities.

To date, the empirical evidence is mixed regarding the effect of mergers across providers in different markets. In one study of the effects of hospital/

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[91] Gowrisankaran et al., *supra* note 33.

[92] These incentives can arise because of the authors' assumption that individual hospitals are constrained to charge linear prices. By allowing prices to be negotiated across a portfolio of hospitals, the negotiator can adjust individual hospitals' prices in a way that effectively allows for some pricing non-linearities. This can increase the hospitals' overall revenues. Similar to our own results, and consistent with the general economic finding that non-linear pricing can increase overall efficiency, Gowrisankaran et al. find in their model that, when a merger has a cross-market effect, it can create incentives either to increase or decrease price relative to the pre-merger situation. Gowrisankaran et al., *supra* note 33, at 14.

physician integration in three states from 1994–1998, Allison Evans Cuellar and Paul J. Gertler concluded that "integration [between hospitals and physicians] has little effect on efficiency, but is associated with an increase in prices."[93] Two other economists, however, reach the opposite conclusion in their study of hospital/physician integration in California, finding that, "neither [hospital/physician] integration nor disintegration is associated with significant changes in prices."[94] Further empirical work appears warranted to better understand the historical effects of such integration.

C. Alternative Bargaining Models

This article has assumed a very simple bargaining model in order to demonstrate how cross-market linkages across hospitals may emerge even when there is no patient substitution. One of the model's simplifying assumptions has been that health plans engage in all-or-nothing contracting with hospitals: either a hospital is in the plan's network or it is out.

In fact, health plans sometimes attempt to "steer" patients away from high-priced hospitals even while keeping those hospitals as part of their provider network. This steering might be done by introducing "tiered networks" in which patients face higher copays or deductibles if they use higher-priced hospitals, by discouraging physicians from admitting to those high-priced network hospitals, or by introducing other financial inducements for patients to avoid high-priced network hospitals.[95]

Although modeling this richer bargaining environment goes beyond the scope of this article, we do not believe that our restriction to the simpler bargaining model comes at any significant cost. In particular, we believe this simple bargaining model usefully demonstrates how there exist mechanisms by which inter-hospital linkages can arise even when there is no patient substitution. In fact, we suspect that even richer bargaining models are likely to create additional opportunities for inter-hospital linkages through different contracting and bargaining mechanisms.[96]

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[93] Alison Evans Cuellar & Paul J. Gertler, *Strategic Integration of Hospitals and Physicians,* 25 J. Health Econ. 1, 1 (2006).

[94] Federico Ciliberto & David Dranove, *The Effect of Physician-Hospital Affiliations on Hospital Prices in California*, 25 J. Health Econ. 29, 29 (2006).

[95] The extent to which these strategies are successful in steering patients is, however, unclear and may differ by geography and the identity of the particular hospitals from which health plans are attempting to steer patients.

[96] This is consistent with our understanding that, by considering a more formalized bargaining model, Gowrisankaran et al. find yet another means by which inter-hospital linkages can emerge. Gowrisankaran et al., *supra* note 33.

D. IMPLICATIONS FOR MARKET DEFINITION

In recent years, the federal antitrust agencies have increasingly adopted the perspective of health plans as the relevant customers when analyzing hospital mergers. This focus on the substitution options facing health plans, rather than individual patients, has similarly meant that relevant antitrust markets have been defined from the perspective of health plans.

The analysis in this article suggests that even greater attention to health plans' substitution options may be warranted when assessing competitive effects and defining markets. In particular, health plans' views on whether individual hospitals are good alternatives to each other, and whether the importance of losing one hospital from their provider network depends on whether they have a second hospital in their network, may depend on factors other than patients' substitution options. Rather, there may be other factors, albeit more complicated, that cause a health plan to conclude that there exist linkages between hospitals, even when there are no patient-level linkages.

The implications of these findings for market definition are unclear. Consider a health plan that believes that it can effectively market its health plan with a hole in either the northern suburbs or in the southern suburbs, but not with a hole in both the northern and southern suburbs. Further assume that there is no patient substitution between the northern and southern suburbs. One might then argue that the health plan is willing to substitute between hospitals in those two areas—in essence, the health plan is willing to substitute between where it offers a hole in its network. Thus, one could argue that the proper geographic market—from that plan's perspective—encompasses both the northern and southern suburbs.[97] This market definition might then be a useful way of articulating competitive concerns with a merger of hospitals in those two areas.[98]

In our view, however, this approach to market definition is not the preferred economic approach to analyzing what we refer to as cross-market hospital merger effects. Putting aside questions as to how readily this approach would accord with existing case law regarding market definition,[99] trying to reclassify what we believe is best viewed as a cross-market effect by defining mar-

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[97] By extension, the product market might then be viewed as hospitals competing to "fill the hole" in the plan's network.

[98] Defining the market in this way might also be consistent with a traditional SSNIP test under the U.S. DOJ/FTC 2010 Horizontal Merger Guidelines inasmuch as a hypothetical monopolist of hospitals in those two distinct areas might choose to impose a post-merger price increase, despite the assumed lack of patient substitution between those areas. U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines (2010), *available at* http://www.ftc.gov/os/2010/08/100819hmg.pdf.

[99] We also put aside possible strategic considerations, such as whether it would be easier to litigate a case based on this more expansive view of the relevant market or to instead deal with

kets so that it is instead becomes a within-market effect runs a serious risk of trying to over-simplify complicated economic incentives. In our opinion, it is better to acknowledge the lack of any *traditional* means (i.e., patient-level substitution) through which health plans might substitute between hospitals in order to focus the inquiry on whether and why those health plans might believe there to be other forms of substitution that give rise to competitive concerns.[100]

E. "Regional" vs. "National" Cross-Market Mergers

To the best of our knowledge, competitive concerns regarding cross-market mergers have so far been limited to mergers in the same general geographic region, e.g., mergers of hospitals in Northern California, or hospitals in Eastern Massachusetts. In contrast, we are aware of few concerns being expressed about cross-market mergers involving hospitals in very geographically disparate regions, e.g., a merger that combines California hospitals with Texas hospitals. This raises the question of what importance (if any) geographic proximity of hospitals plays when there is arguably enough geographic separation that the hospitals are assumed to lie in separate geographic markets. In other words, is there a reason to believe that cross-market effects are more likely when considering a merger between hospitals in different (neighboring) counties, but not likely when the hospitals are in different (non-adjacent) states?

While we cannot rule out the potential for concerns from such "national" cross-market mergers, the two mechanisms we have identified in this article for creating a possible linkage between markets are unlikely to apply in the case of "national" mergers. The first mechanism we discuss in this article relies on the existence of an employer who is present in both markets.[101] The second mechanism also relies (in addition to an employer who is present in

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issues such as whether the theory is properly characterized as a variant of a European conglomerate effects theory.

[100] This approach of treating the firms as falling in distinct markets rather than articulating some broader market and treating the merger as horizontal seems to be generally consistent with the approach advocated in the European Merger Guidelines regarding "conglomerate mergers" (a merger between firms that "are in a relationship which is neither purely horizontal . . . nor vertical (as supplier and customer)." *See, e.g.*, European Comm'n, EU Competition Law: Rules Applicable to Merger Control 207 (2010), *available at* http://ec.europa.eu/competition/mergers/legislation/merger_compilation.pdf.

[101] We further assume that, when considering the attractiveness of competing plans, the employer looks at the plans' attractiveness across the entire region rather than assessing each plan's attractiveness in particular sub-regions. This assumption of a single region over which plans are assessed strikes us as more likely to occur when the regions are geographically proximate to each other (e.g., regions in Northern California). In contrast, an employer that is present in both California and New York strikes us as more likely to consider those regions individually when assessing the attractiveness of health plans, thus likely eliminating any possible linkage identified in this article.

both markets) on the condition that the health plan offers the same price to all employees of this employer who live in these two markets. Both are less likely to be met in practice as one expands the geographic area, especially in cases where the two affected areas are separated by one or more states.

VI. CONCLUSION

For years, purchasers of health care services have complained that cross-market hospital mergers have increased hospitals' negotiating power. To date, however, there has been little indication by the federal or state antitrust agencies that they viewed those mergers as problematic. This general lack of antitrust enforcement is likely attributable to a prevailing view that as long as the hospitals involved in those mergers were not good alternatives to patients and health plans, they were unlikely to pose competitive concerns.

The article discusses two mechanisms unrelated to patient substitution that may give rise to inter-hospital linkages. The models used to illustrate these two mechanisms highlight the complexity of the bargaining game between hospitals and health plans and how those negotiations may reflect preferences or pricing strategies that create cross-market linkages even where there are no linkages attributable to patients' willingness to substitute between hospitals. These linkages mean that health plans may not be able to separate their conduct or their need for particular hospitals with respect to individual geographic markets. As a consequence, cross-market mergers may increase hospitals' bargaining leverage.

In demonstrating the potential for cross-market linkages between hospitals, this article suggests that health plans' often-heard complaint that cross-market hospital mergers increase hospitals' negotiating power should not be summarily dismissed as economically implausible. Rather, health plans' concerns may reflect cross-market linkages across hospitals that, while important, have not yet been carefully considered by the antitrust agencies. Further empirical and theoretical work is warranted to determine whether, and under what conditions, these linkages may represent a basis for antitrust concern.