A REVIEW OF THE ECONOMIC LITERATURE ON CROSS-MARKET HEALTH CARE MERGERS

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Several recent studies in the economics literature examine the price effects of "cross-market" mergers between health care providers in non-proximate geographies.[1] These studies consider whether such mergers lead to higher prices even though the providers are not substitutes for patients at the point of service.[2] Especially when taken together, the empirical analyses in this literature provide credible evidence that prices have increased following such mergers.[3] Given these findings, some have suggested that a broadened antitrust enforcement agenda may be warranted.[4]

In general, recent merger enforcement in this area has focused on whether the health care providers involved in the merger are substitutes for patients at the point of service. Therefore, the analysis has primarily focused on whether a significant amount of patients at one of the parties would divert to the other party in the event of a network exclusion, and vice-versa.[5] Under this analysis,

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[1] Matthew S. Lewis & Kevin E. Pflum, *Hospital Systems and Bargaining Power: Evidence from Out-of-Market Acquisitions*, 48 RAND J. ECON. 579 (2017); Matt Schmitt, *Multimarket Contact in the Hospital Industry*, 10 AM. ECON. J.: ECON. POL'Y 361 (2018); Gregory S. Vistnes & Yianis Sarafidis, *Cross-Market Hospital Mergers: A Holistic Approach*, 79 ANTITRUST L.J. 253 (2013); Leemore Dafny, Kate Ho & Robin S. Lee, *The Price Effects of Cross-Market Hospital Mergers* (Nat'l Bureau of Econ. Research, Working Paper No. 22106, 2017) (forthcoming RAND J. ECON.).

[2] While some of the theoretical issues we discuss here are also relevant for the combination of providers providing separate services (e.g., a pediatric hospital and a rehabilitation hospital), we do not focus on that type of cross-market merger in this article.

[3] Dafny et al., *supra* note 1; Lewis & Pflum, *supra* note 1.

[4] Dafny et al., *supra* note 1, at 31.

[5] In many applications, substitution between suppliers is measured by diversion ratios, which give the percentage of volume lost by one supplier under a small price increase that would be

most cross-market mergers between health care providers in distinct geographic areas do not raise significant antitrust concerns because there is minimal patient diversion between them.[6]

In this article, we first summarize the empirical analyses that economists have used to test for price effects following the mergers of providers in different geographic regions. Second, we outline the main mechanisms that could explain these findings. We highlight three mechanisms: (1) mergers change providers' bargaining sophistication, (2) for some high value services, providers are substitutes at the point of service for patients over a wider geographic area than assumed in the cross-market studies, and (3) providers are substitutes for inclusion in an insurer's network, even if they are not substitutes for patients at the point of service.[7] Our review finds that some empirical evidence can help distinguish between these mechanisms, but further study is needed to disentangle these three factors. Likely, this will require a deeper understanding of how provider and insurer incentives change post-merger.[8]

I. EMPIRICAL FINDINGS

A series of recent articles have documented higher hospital prices following the merger of two hospitals that, at a first glance, are not substitutes for patients at the point of service.[9] Further, some of this research also documents higher prices for hospitals that are not direct parties to the transaction after this type of merger.[10] All of these articles use reasonable control groups in standard difference-in-differences approaches to identifying merger effects,

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captured by another supplier. In health care markets, consumers are largely insulated from the direct effect of changes in price negotiated between providers and insurers because of insurance. For example, for some types of health care services, consumers may pay a fixed copayment, as opposed to a coinsurance rate. Therefore, diversion ratios between providers are usually measured as the percentage of volume lost by one provider under a hypothetical exclusion from the network of an insurer that would be captured by another provider. *See, e.g.*, Joseph Farrell, David J. Balan, Keith Brand & Brett W. Wendling, *Economics at the FTC: Hospital Mergers, Authorized Generic Drugs, and Consumer Credit Markets*, 39 REV. INDUS. ORG. 271, 272–73 (2011).

[6] *Id.*

[7] Craig Peters also outlines a "recapture effect," which illustrates how the merger of providers that are not substitutes for patients at the point of service could affect prices. Craig T. Peters, *Bargaining Power and the Effects of Joint Negotiation: The "Recapture Effect"* (Econ. Analysis Grp. Discussion Paper, EAG 14-3, Sept. 2014), www.justice.gov/atr/abstract-43. While he intuitively explains how this mechanism could work in a case of a physician group and a hospital or, by extension, different types of providers in the same region (i.e., mergers across product markets), this mechanism is likely less relevant for hospitals in far-flung geographic areas. Therefore, we do not address this mechanism in this article.

[8] Some recent academic literature already touches on these types of issues. *See, e.g.*, Kate Ho & Robin S. Lee, *Insurer Competition in Healthcare Markets*, 85 ECONOMETRICA 379 (2017).

[9] Dafny et al., *supra* note 1; Lewis & Pflum, *supra* note 1; Schmitt, *supra* note 1.

[10] Lewis & Pflum, *supra* note 1, at 579.

and most of them look at data from across the United States.[11] We begin by summarizing the main findings from this literature and then offer some comments. In our view, the findings in the empirical literature provide credible evidence that cross-market mergers systematically lead to higher prices.[12]

A. OVERVIEW OF RESULTS

Matt Lewis and Kevin Pflum[13] and Leemore Dafny et al.[14] study the price effect of mergers between non-geographically proximate hospitals. However, they approach the question in different ways. In addition to using different data, the studies differ in how they define cross-market mergers, the treatment group they analyze, and how they define control groups.

Lewis and Pflum define a cross-market merger as an acquisition in which an independent hospital is acquired by a hospital system that does not include a hospital located within 45 miles of the acquired hospital.[15] Their treatment group consists of any independent hospital that was acquired by an out-of-market system, and their control group consists of any hospital that did not join a system during their sample period. Using data from 2000–2010, they find that following this type of merger, the price of services at the acquired hospitals increased by 17 percent, on average.[16] This qualitative conclusion remains when using distance cutoffs that define the treatment group of 75 and 90 miles.[17] In addition to these effects on acquired hospitals, they find that prices increase by about 8 percent at third-party competitor hospitals that are within seven miles of the acquired hospital.[18]

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[11] For a review of "difference-in-differences" methodologies in merger retrospectives, see Daniel Greenfield, *Guide to Merger Analysis Using Difference in Differences*, *in* JOHN KWOKA MERGERS, MERGER CONTROL, AND REMEDIES: A RETROSPECTIVE ANALYSIS OF U.S. POLICY 57–70 (2015). For a more general treatment, see JOSH ANGRIST & JORN-STEFFEN PISCHKE, MASTERING 'METRICS: THE PATH FROM CAUSE TO EFFECT 178–208 (2014).

[12] In one of the first articles to document higher prices among hospital systems, Glenn Melnick and Emmett Keeler examine price trends among California hospitals over the period 1999–2003. Glenn Melnick & Emmett Keeler, *The Effects of Multi-Hospital Systems on Hospital Prices*, 26 J. HEALTH ECON. 400 (2007). Looking at price trends over time, they find that hospitals in large systems raised prices, relative to independent hospitals, by 34%, and that hospitals in small systems raised prices, relative to independent hospitals, by 17%. Importantly, they find that this effect is not limited to hospitals that are geographically proximal to other members of its system, and that the effect is still present after controlling for measures of local competition.

[13] Lewis & Pflum, *supra* note 1.

[14] Dafny et al., *supra* note 1.

[15] Lewis & Pflum, *supra* note 1, at 585. This is referred to in the article as the "Group 1" set of hospitals. The "Group 2" hospitals are geographically proximate to a hospital in the acquiring system, and therefore, not the focus of our article.

[16] *Id.* at 588 tbl.2.

[17] *Id.* at 601.

[18] *Id.* at 579.

Using data from 1998–2012, Dafny et al. define two different types of cross-market mergers, and therefore two types of treatment groups.[19] The first treatment group consists of hospitals involved in a merger in which at least one hospital on each side of the merger is located in the same state but none of the hospitals on the opposite side of the transaction are closer than 30 minutes by car (the "in-state" treatment group). The second treatment group consists of hospitals involved in a merger in which none of the hospitals on opposite sides of the transaction are: (1) located in the same state; or (2) closer than 30 minutes by car (the "out-of-state" treatment group).[20] For both treatment groups, they exclude hospitals that are the major hospitals in the acquired system, so called crown jewel hospitals.[21] They use two different control groups of hospitals outside of the markets where the acquisitions took place. In one, they look at only hospitals that are part of a system, and in the other, they look at all hospitals in those markets.

For the in-state treatment group, they find that prices increase by approximately 10 percent.[22] This result remains after dropping all acquired hospitals from the in-state treatment group.[23] However, they do not find any impact on the prices of services at hospitals in the out-of-state treatment group.[24]

In a related, but distinct, finding, Matt Schmitt finds that mergers that increase multimarket contact between two hospitals systems raise prices by 6 percent in the markets in which no merger took place.[25] That is to say, imagine system *B*'s acquisition of *C* in market 2, where system *A* has a hospital. Due to the acquisition, *A* and *B* now overlap in market 2. However, in market 1, where *A* and *B* previously had hospitals, there is no change in market structure from the merger. Schmitt finds that prices in market 1 increase by 6 percent on average from the increase in multimarket contact between the firms.[26]

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[19] Dafny et al., *supra* note 1, at 20–21.

[20] We focus here on their "Broad Sample," which is based upon the Irving Levin Associates' reports on hospital acquisition activity. *See id.* at 18. In their working paper, they also include a separate specification using data from FTC investigations. *See id.* at 17. Since the qualitative conclusions from these two datasets are largely similar, we focus on the "Broad Sample" in our discussion.

[21] They only exclude the major hospitals in the system for their "Broad Sample," and not for their smaller treatment group of hospitals that were part of an FTC investigation. *See id.* at 17–18.

[22] *Id.* at 43 tbl.5. The analogous result from the FTC sample is approximately 7%. *Id.* at 42 tbl.4.

[23] *Id.* at 20–21.

[24] *Id.* at 23.

[25] Schmitt, *supra* note 1, at 377 tbl.2.

[26] *Id.*

To sum up this empirical work, consider Figure 1—taken from Schmitt.[27] This figure depicts three hospital systems (*A*, *B*, *C*) in two markets (1 and 2). Consider a case where hospital system *B* acquires hospital *C* in market 2 (*C2* => *B2*).[28] Lewis and Pflum show that prices should increase on average by 17 percent at *B2* and 8 percent at *A2*. Dafny et al. show that prices at *B2* and *B1* increase by an average of 7–10 percent if markets 1 and 2 are in the same state, and not at all if they are in different states. Finally, Schmitt shows that prices increase by an average of 6 percent at *A1* and *B1*.[29]

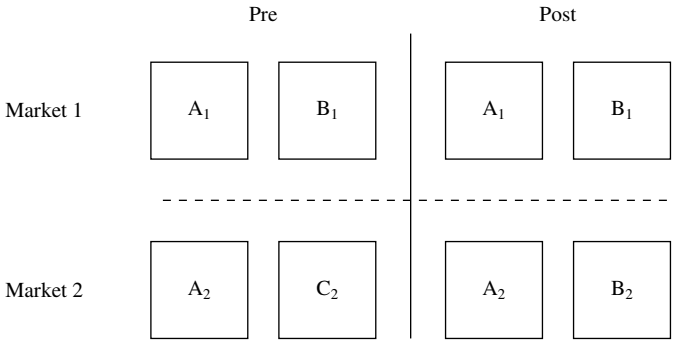

FIGURE 1: EXAMPLE MARKET STRUCTURE[30]

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[27] *Id.* at 363 fig.1.

[28] Note that Lewis and Pflum and Dafny et al. do not assume anything about whether *A1* and *A2* are owned by the same firm (in other words, instead of *A2* it could be *D2*). Lewis & Pflum, *supra* note 1; Dafny et al., *supra* note 1.

[29] To compare these estimated price effects to those of "within market" mergers, we summarize the findings of the FTC Hospital Merger Retrospective studies. Estimating the price effect of the 1998 New Hanover-Cape Fear acquisition in Wilmington, North Carolina, Aileen Thompson estimates price effects for four insurers of -30%, 7.2%, 56.5%, and 65.3%. Aileen Thompson, *The Effects of Hospital Mergers on Inpatient Prices: A Case Study of the New Hanover-Cape Fear Transaction*, 18 INT'L J. ECON. BUS. 91, 97 tbl. 4 (2011). Estimating the price effect of the 1999 Sutter-Summit acquisition in the San Francisco Bay area, Steven Tenn estimates price effects for three insurers of 28.4%, 28.7%, and 44.2%. Steven Tenn, *The Price Effects of Hospital Mergers: A Case Study of the Sutter-Summit Transaction*, 18 INT'L J. ECON. BUS. 65, 76 tbl. 2 (2011). Estimating the price effect of the 2000 Evanston-Highland Park acquisition in Evanston, Illinois, Deborah Haas-Wilson and Chris Garmon estimate price effects using claims data provided by five insurers ranging from 11% to 80% for four insurers and near zero or in low single digits for the fifth insurer. Deborah Haas-Wilson & Christopher Garmon, *Hospital Mergers and Competitive Effects: Two Retrospective Analyses*, 18 INT'L J. ECON. BUS. 17, 27 tbl. 2 (2011). Using patient discharge data provided by the Illinois Department of Public Health and CMS Cost Reports, they estimate price effects across all commercial insurers in the 12% to 17% range. *Id.* at 29 tbl.4 Estimating the price effect of the 2000 St. Theresa-Victory acquisition in Waukegan Illinois, Haas-Wilson and Garmon estimate price effects using claims data provided by five insurers ranging from -23% to 29%. *Id.* at 28 tbl.3. Using patient discharge data provided by the Illinois Department of Public Health, they estimate price effects across all commercial insurers in the -7.5% to -2% range. *Id.* at 29 tbl.5.

[30] Schmitt, *supra* note 1, at 363.

As noted by all of these articles, the conventional analytical framework that relies upon hospitals being substitutes for patients at the point of service cannot explain these patterns.[31]

B. COMMENTS

In evaluating the empirical results of these articles, we consider three factors that could undermine their findings: data quality, selection into mergers, and the institutional details of contract negotiations. In our view, these factors in the aggregate do not raise serious concerns about the research's empirical conclusions. We consider each in turn.

1. *Data Quality*

There are two major concerns with data quality—the measurement of prices and the measurement of system affiliation. There often is error in measuring prices for hospital services. In some instances, the prices of services at hospitals can be measured using inpatient claims data obtained from insurers.[32] Since the studies in the cross-market literature did not have access to such data, they used HCRIS (Medicare Cost Reports) data to estimate prices. As discussed by Christopher Garmon, this approach may be problematic because, among other things, Medicaid reimbursements are not deducted and the contractual discounts used to deflate inpatient revenues reflect both inpatient and outpatient events.[33] Nonetheless, Garmon finds evidence that this approach produces unbiased estimates of within-hospital price changes across time.[34] Since these studies examine changes in hospital prices across time, we do not think that the use of HCRIS data instead of prices measured using claims data can explain the observed increase in prices following cross-market mergers.

For system affiliation, some of these studies use data from the American Hospital Association (AHA) to detect mergers using observed changes in system affiliation. For example, Lewis and Pflum rely on AHA data, but Dafny et al. use public data from the FTC and proprietary data from the Irving Levin reports that list hospital merger activity.[35] Schmitt uses a combination of the

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[31] Dafny et al., *supra* note 1, at 2; Lewis & Pflum, *supra* note 1, at 580; Schmitt, *supra* note 1, at 1.

[32] Zack Cooper, Stuart V. Craig, Martin Gaynor & John Van Reenen, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured* (Nat'l Bureau of Econ. Research, Working Paper No. 21815, 2018).

[33] Christopher Garmon, *The Accuracy of Hospital Merger Screening Methods*, 48 RAND J. ECON. 1068, 1081 (2017).

[34] Garmon, *supra* note 33, at 1081–82. However, we note that Cooper et al. find that there is only a 0.45 correlation between prices estimated using HCRIS data and prices estimated from the Health Care Cost Institute database. Cooper et al., *supra* note 32, at 14.

[35] *See* Lewis & Pflum, *supra* note 1, at 582; Dafny et al., *supra* note 1, at 16–18.

AHA and the Irving Levin reports.[36] Using the AHA data to detect mergers may lead to errors in transaction dates since the relevant fields do not necessarily reflect the current system affiliation.[37] However, such errors would likely bias the estimated price effects in these studies towards zero. Hence, in our view the empirical findings are not undermined by the possibility that transaction dates are measured with error.

2. *Selection Bias*

The data encompass mergers that firms chose to undertake. There is obviously selection of which firms are acquired, which firms acquire, and which markets are affected. This is both because of antitrust enforcement and because of market and firm fundamentals. Therefore, these results do not necessarily suggest that a set of mergers comprised of two randomly determined (non-proximate) firms would yield similar price effects.

This issue raises two concerns. First, non-random assignment into mergers may confound estimating the effect of those mergers on prices. Specifically, the estimated price effects may be biased if mergers are correlated with the unobserved determinants of prices. For example, hospitals may be more likely to merge if they are rapidly expanding their service lines. This may generate higher prices for the average service in the hospital over time, and not be accounted for in the data used in the regressions. This is generally referred to as "endogeneity bias."[38]

Second, the treated group of hospitals during the period covered by the existing literature may not necessarily be similar to the treatment population going forward. For example, changes in public policy may induce a large number of mergers among hospitals that would not have otherwise merged. If so, then the attributes of the treatment population may change across time, suggesting that the existing results may be meaningfully different from the effect going forward.

Regarding the first concern, Dafny et al. address endogeneity bias by focusing on "bystander" hospitals.[39] They argue that such hospitals, by virtue of

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[36] *See* Schmitt, *supra* note 1, at 364.

[37] *See id.* online Appendix at 7, assets.aeaweb.org/assets/production/files/7553.pdf.

[38] *See, e.g.*, PETER DAVIS & ELIANA GARCES, QUANTITATIVE TECHNIQUES FOR COMPETITION AND ANTITRUST ANALYSIS 82 (2010).

[39] The authors define a "bystander" hospital as one that is a system member of one side of the transaction but not proximate to any hospital on the other side of the transaction. Hospitals that are members of acquired systems rarely satisfy this definition. Dafny et al., *supra* note 1, at 16–19.

their location, are less likely to be key drivers of mergers.[40] If so, then the mergers are less likely to be correlated with unobserved determinants of price of the "bystander" hospitals. In contrast, Lewis and Pflum examine the price effects on acquired hospitals.[41] However, they argue that the panel data approach, in which they control for observed trends in prices, mitigates concerns about endogeneity bias since their results only rely on the assumption that the exact timing of the merger is uncorrelated with the remaining unobserved determinants of price.[42] In our view, concerns about the potential correlation between the merger and unobserved determinants of price are not sufficient to disregard the results of either paper.

Regarding the second concern, Lewis and Pflum acknowledge their results should not be interpreted as the average treatment effects on the population of possible cross-market hospital mergers. Nonetheless, estimating average treatment effects on the treated (i.e., the hospitals involved in the observed cross-market mergers) is an important first step in estimating cross-market price effects for a broader range of hospitals.

3. *Contract Structure and Timing*

The details of the contracting process between insurers and providers could confound these studies' results for three reasons: the spacing between contract negotiations, the temporary nature of contract changes immediately following a merger, and hospitals' and insurers' potential indifference to how payments to hospitals are allocated across service lines. Regarding the spacing of negotiations, meaningful lags may exist between the date of a merger and the next round of contract negotiations between the hospitals involved in the merger and insurers. However, such lags would likely bias the estimated price effects in these studies towards zero.[43] Hence, better accounting for contract timing would only bolster the existing empirical results.

Relatedly, the empirical results may be driven in part by contract terms that allow a provider to bring in a newly acquired hospital or physician group into

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[40] *Id.* at 3 ("To minimize concerns about the exogeneity of which hospitals are parties to transactions, we focus on hospitals that are likely to be 'bystanders' rather than the drivers of transactions.").

[41] *See supra* Part I.A.

[42] Lewis & Pflum, *supra* note 1, at 582.

> In contrast, by using a panel, our difference-in-differences approach relies more heavily on the timing of the merger. This allows price trends to be correlated with the likelihood of a merger and instead requires only that the exact timing of the merger is uncorrelated with any remaining unobserved factors that influence prices.

[43] The previous contract would be at the pre-merger price. Therefore, if the pre-merger contract was still in effect post-merger, the measured post-merger price would be below the post-merger price that will come into effect after renegotiation. Therefore, the short-run measured effect of the merger would be below the expected long-run effect.

the existing contract reimbursement terms. If the reimbursement rates for the acquiring provider exceed those of the acquired provider, this arrangement has the effect of raising the prices at the newly acquired provider to the former level. If such a transaction does not in fact lessen competition, the reimbursements should be adjusted at the next round of negotiations so that total payments to the merged system return to roughly the level that would have obtained but for the merger. Hence, such effects, across the post-merger system, should be transitory. Moreover, to the extent that the acquiring provider has greater pre-merger market power than the acquired provider, such effects should be manifested primarily in payments to the acquired providers.

While this contracting mechanism may be an important explanation for cross-market effects, the empirical results are somewhat at odds with it. First, the cross-market effects estimated in Dafny et al. focus on bystander hospitals on the acquiring side of the merger. Second, the cross-market effects in Lewis and Pflum are found up to four years after the transaction,[44] which exceeds the term of many hospital-insurer contracts.[45] While the intuition behind the contracting effect explanation does not suggest that price effects at the acquired hospitals should completely dissipate over time, it does suggest that price effects should diminish to some degree. Therefore, it seems unlikely that this mechanism drives the empirical results.

Another possibility is that the price increases estimated in Dafny et al. are the result of the merger of two hospitals that are geographically proximate, but where the price increase was spread out over all of the hospitals in the system. For example, consider a hospital system with two hospitals (*A*, *B*) that purchases an independently owned facility (*C*) that is proximate to one of its hospitals (e.g., *A*). In the Dafny et al., analysis, while *A* and *C* would be dropped from the treated group of hospitals, *B* would not be. Therefore, a price increase from the loss of competition between *A* and *C* could manifest itself through a price increase at *B*.

While this is possible, it again seems unlikely to drive the results. First, if this were the driving force, the price increase from the loss of competition would likely be diluted across all of the hospitals in the system due to the spreading out of the price increase. Given the large magnitude of the price increases from Dafny et al., this seems unlikely to be the main explanation. Second, this explanation is not relevant for Lewis and Pflum's findings, since they drop any acquired hospital where there is an acquiring party's hospital within 45 miles.

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[44] Lewis & Pflum, *supra* note 1, at 595 fig 2.

[45] *E.g.*, Katherine Ho, *Insurer-Provider Networks in the Medical Care Market*, 99 AM. ECON. REV. 393, 396 n.11 (2009).

II. EXPLANATIONS FOR CROSS-MARKET EFFECTS

In this Part, we outline three main explanations for the cross-market merger effects estimated in Dafny et al. and Lewis and Pflum:

(1) Mergers change hospitals' bargaining sophistication.
(2) The hospitals are not in different "markets," since for some high-value services, patients consider the hospitals substitutes.
(3) Even though the hospitals are not considered substitutes by patients at the point of service, they are substitutes for insurers in constructing a network.

Additionally, we evaluate whether coordinated effects driven by increased multi-market contact could explain Schmitt's related results and contribute to an explanation of the results in Dafny et al. and Lewis and Pflum.[46]

A. MERGERS CHANGE HOSPITALS' BARGAINING SOPHISTICATION

As outlined above, prices for hospital services are set by negotiations between hospitals and insurers. In this setting, each of the players, the hospital and insurer, negotiate to obtain a greater share of the value from an agreement between the two parties. For example, suppose that hospital *A* is negotiating with insurer *I* over whether *A* will be included in *I*'s network. If *A* joins *I*'s network, *I*'s network may be more attractive to customers and therefore *I* may be able to earn higher profits.

In this type of bilateral negotiation, *A* can walk away and deny *I* the additional profits ("surplus") that it would obtain from including *A* in its network. Therefore, *I* offers *A* money to persuade *A* to join its network.[47] However, the share of those profits that *I* needs to offer *A* will depend on several factors, including *I*'s and *A*'s negotiating skills and *I*'s and *A*'s relative tolerance for

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[46] Dafny et al. also briefly discuss the possibility that their findings can be explained by a political or regulatory constraints on hospitals that prevents them from fully utilizing their bargaining leverage in a given market. Dafny et al., *supra* note 1, at 12. For example, consider a monopolist hospital that purchases a hospital in another market that is not bound by such a constraint. This second hospital may not be bound because the two hospitals are under different regulatory regimes or because the second hospital's prices were not high enough to have the constraint bind on it. Pre-merger, the monopolist would be constrained from raising price to the monopoly level. However, post-merger, since the merged hospitals are unconstrained in the second market, they can negotiate higher prices to insurers common to both markets due to the unexploited market power in the first. The plausibility of this mechanism depends upon the existence of these constraints and the specifics of contracts between providers and insurers. *See id.*

[47] For simplicity in this discussion, we assume that hospitals earn zero incremental profit from each patient, aside from the lump sum payment by the insurer. It is important to relax that assumption if one is analyzing the "recapture effect" referenced in Peters, *supra* note 7. However, since as noted above, that mechanism is unimportant for understanding cross-geographic market health care mergers, we maintain the assumption here for simplicity.

prolonged negotiations.[48] In the economic literature, the share of the surplus paid to the hospital is called the hospital's Nash bargaining weight (NBW).[49]

As discussed above, Lewis and Pflum show that when an independent hospital was acquired by a hospital system outside of the immediate geographic area, the stand-alone hospital's price increased 17 percent.[50] This finding suggests that when a (likely) less sophisticated stand-alone hospital is acquired by a (likely) more sophisticated hospital system, prices in the less sophisticated one typically increase. This is consistent with the less sophisticated system extracting less of the surplus from a bilateral negotiation than the more sophisticated system could. Lewis and Pflum also find that these effects are larger when larger systems are acquiring and when smaller hospitals are being acquired.[51] If sophistication increases with system and hospital size, then these findings are also consistent with the theory that much of the price increase comes from an increase in sophistication. However, in our view, these results should be interpreted with caution because their results may not reject the hypothesis that the effect on hospital service prices is the same across all of these acquired and acquiring hospital sizes.[52]

In their 2015 article, Lewis and Pflum provide further support that system size enhances bargaining sophistication by estimating a model of the bilateral negotiations between hospitals and insurers.[53] Using California data from 2007 and 2008, they aim to recover the determinants of hospitals' NBW. Across their specifications, they find that hospitals' NBWs are higher if they are members of a hospital system or physician group.[54] However, these results rely heavily upon specific modeling assumptions to separate bargaining weights from changes in surplus. If either the demand model or the computations for surplus the model they estimate is misspecified, then what they estimate as an increase in NBW may actually reflect a change in the surplus from the merger.

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[48] *See, e.g.*, Ariel Rubinstein, *Perfect Equilibrium in a Bargaining Model*, 50 ECONOMETRICA 97 (1982).

[49] *See, e.g.*, Gautam Gowrisankaran, Aviv Nevo & Robert Town, *Mergers When Prices Are Negotiated: Evidence from the Hospital Industry*, 105 AM. ECON. REV. 172, 181 (2015); Dafny et al., *supra* note 1, at 6.

[50] Lewis & Pflum, *supra* note 1, at 579.

[51] *Id.* at 603 tbl. 9.

[52] They do not formally perform this test, so we base our conjecture on the results they do present. Performing the statistical test on this hypothesis requires knowledge of both the standard errors associated with the reported estimates and the covariance of the reported estimates. However, if one assumes the covariance is zero (or small relative to the standard errors), then one can perform the test just based on the reported standard errors and find that one cannot reject (at a 95% confidence level) that the effects are the same across all hospital sizes.

[53] Matthew S. Lewis & Kevin E. Pflum, *Diagnosing Hospital System Bargaining Power in Managed Care Networks*, 7 AM. ECON. J.: ECON. POL'Y 243, 263 (2015).

[54] *Id.* at 264 tbl. 3.

Even if these results did identify a post-merger increase in NBW, this mechanism is unlikely to explain the results of Dafny et al. First, even if there is an increase in price at an *acquired* hospital, these results are unlikely to explain their finding of price increases at the *acquiring* hospital.[55] Second, Dafny et al. do not find price increases for cross-market mergers between hospitals in different states.[56] This is inconsistent with most explanations of what the NBW represents, since those should be invariant to hospital location.[57]

B. Consumers Travel Farther for Some High Value Services

Consider a family in their 30s shopping for health insurance. In their city are hospital *A*, a large academic medical center, and hospital *B*, a small community hospital. Hospital *C*, another large academic medical center, is located in the next city over. There are no other hospitals within many miles.

Now suppose that *A* merges with *C*. Each hospital is a sophisticated academic medical center. For most services, people will not travel from hospital *A*'s city to hospital *C*'s city because they have a perfectly good substitute close by in hospital *B*. However, for some high value services, people will travel from *A* to *C*. Therefore, hospitals *A* and *C* may be substitutes at the point of service for many patients for these high-value services even though they are not for other services.[58]

In this example, hospital *B* would likely be a good substitute for *A* for the vast majority of services. As long as *B* remains in-network, consumers would have local access to low-value services, regardless of whether *A* or *C* is in the network. However, *B* is not a substitute for high- value services. Therefore, *A* and *C* compete to provide high-value services for patients in the city. Due to this competition, *A* and *C* can function as substitutes for an insurer in constructing its network.

If these services are sufficiently important to consumers, then the merger between *A* and *C* could significantly raise prices at the hospitals. "Importance" is defined not only by the frequency with which the hospital is used for

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[55] Dafny et al., *supra* note 1, at 22–23.

[56] *Id.*

[57] Conceivably, a hospital could obtain a higher bargaining weight due to state-specific information about the local market. This possibility could explain the discrepancy between the empirical results of Dafny et al. and Lewis and Pflum's 2017 article and be consistent with the NBW mechanism.

[58] Formally, by "substitutes," we mean that the inclusion of hospital *A* in an insurer's network lowers the incremental value for the insurer of hospital *C*'s inclusion in its network and vice-versa.

high-value services, but also by the amount that individuals are willing to pay to have better access to more attractive hospitals for such services.[59]

Competition for a limited number of services could explain some of the price increases following the merger of hospitals that are more than 30 minutes apart found by Dafny et al. In their paper, they find that, among this set of mergers, the largest merger impacts are when the hospitals are between 30–60 minutes apart.[60] Therefore, many of the mergers that they consider "out-of-market" may actually be "in-market"—for at least some services.[61] In particular, for some high value services, the relevant geographic market may be broader than a 30-minute drive between facilities.

C. SUBSTITUTES IN CONSTRUCTION OF INSURERS' NETWORK, BUT NOT AT THE POINT OF SERVICE

Dafny et al. and Vistnes and Sarafidis highlight how hospitals might be substitutes for inclusion in an insurer's network, even though they are not substitutes for any patients at the point of service.[62] If the two hospitals are close substitutes for inclusion in the insurer's network without other close substitutes, then the loss of the second hospital would incentivize the insurer to pay more money to reach an agreement with the first. This may be true regardless of whether the hospitals are substitutes for patients at the point of service.

Where hospitals are substitutes for patients at the point of service, even for a limited subset of services, they would be substitutes in the construction of a network. The key question though is the reverse: why would hospitals be substitutes for inclusion in insurers' networks if they are not substitutes for any patients at the point of service?

According to Dafny et al. and Vistnes and Sarafidis, the reason may be the existence of "common customers."[63] In other words, there are entities purchasing insurance—most likely employers, families, or individuals—who

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[59] This distinction tends to be overlooked in the empirical literature because independent information on the value of different services is hard to observe.

[60] These travel times are measured using driving distances.

[61] While they test the robustness of their results to a 45-minute drive time, hospitals can be substitutes for some services even beyond 45 minutes.

[62] Dafny et al., *supra* note 1; Vistnes & Sarafidis, *supra* note 1. The articles do not refer to the hospitals as "substitutes." Instead, they discuss the shape of the insurers' profit function, and note that concavity of insurers' value function in the inclusion of the merging parties in the network is a necessary and sufficient condition for whether prices increase following the merger. For consistency with conventional antitrust language, we refer to these hospitals as substitutes. *If* insurers' value function is concave, then these hospitals are substitutes in the traditional usage of the word (without other close substitutes).

[63] Dafny et al., *supra* note 1, at 26; Vistnes & Sarafidis, *supra* note 1, at 275.

value both hospitals' inclusion in their insurers' network, even if the hospitals are not substitutes for patients at the point of service.[64]

For example, consider a merger between hospital *A* and hospital *B*, where *A* and *B* are located in cities at the opposite ends of a state (e.g., Philadelphia and Pittsburgh). Suppose that there are employers with employees in both cities. Such an employer may value having both *A* and *B* in the network even though no individual employee values having both *A* and *B* in network. If the employer has strong preferences to have at least one of *A* and *B* in network, then *A* and *B* potentially could be substitutes in constructing the insurer's network. This could occur if an insurer would lose would lose a very large number of such employers if the insurer omitted both *A* and *B*, but only a few if the insurer omitted *A* or *B* from its network. Under these conditions, *A* and *B* could be substitutes for the insurer in constructing its provider network even though *A* and *B* are not substitutes at the point of service for individual patients. Therefore, a merger between *A* and *B* could lead to a price increase even though they are not proximate geographically.

As of now, there is little evidence supporting this mechanism. Part of the reason is the lack of understanding regarding how insurers' profits vary with the composition of their network. The closest thing to an empirical test of whether these hospitals are likely to be substitutes for insurers, even when they are not substitutes for patients at the point of service, is a suggested line of questioning by Vistnes and Sarafidis:[65]

> 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?[66]

Therefore, a critical area for future research is to go beyond possibility results and recover how insurer profits change with network composition. Building on the existing research on the topic (e.g., two articles by Katherine

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[64] This is relevant for individuals too, since individuals will experience different medical conditions during their life. For example, there may be an excellent oncology hospital in city *A* and an excellent rehab hospital in city *B*. While a patient would not choose between them for the same condition (i.e., at the point of service), they can both be substitutes for inclusion in the insurers' network.

[65] Dafny et al. and Vistnes & Sarafidis implicitly assume that concave demand implies concave profits and then provide a few cases where one may observe concavity in insurer demand. While these examples illustrate that this concavity is possible even if the providers are not substitutes at the point of service, they do not illustrate how to detect it. *See* Dafny et al., *supra* note 1; Vistnes & Sarafidis, *supra* note 1.

[66] Vistnes & Sarafidis, *supra* note 1, at 270.

Ho[67] and a third by Ho and Lee[68]), determining how insurer profits shift with the inclusion and exclusion of different types of hospitals should be a priority.

Additionally, we suggest caution in viewing the existence of common customers between merging parties as evidence these hospitals are substitutes. While this is a necessary condition, it is far from sufficient. The existence of common customers is equally consistent with the hospitals being complements.[69] Using the framework from the example above, if an insurer would lose a large number of employers as customers if the insurer omitted either *A* or *B* from its network, then *A* and *B* could be complements for the insurer in constructing its provider network. In this scenario, omitting *A and B* is not much worse than omitting *A or B* for the insurer's sales to such employers since most of these employers will have already switched away from the insurer if it omitted either *A* or *B*. As noted above, whether or not these hospitals are substitutes, complements, or neither depends on how insurers' profits would change with the inclusion or exclusion of a given hospital in the network.

D. COORDINATION

On the surface, hospital markets seem like an unlikely place for tacit collusion to be sustainable. There are many prices and price adjustments via contracting happen relatively infrequently. Further, since many prices are negotiated via private contracts, it may be difficult to detect cheating from any collusive regime.

Nevertheless, as noted above, Schmitt documents an increase in prices following an increase in multimarket contact.[70] Increases in multimarket contact have been associated in the theoretical literature with increased ease of tacit collusion. While some recent work discusses other ways in with multimarket contact could soften competition without collusion,[71] its proposed mechanism involves transferring capacity across markets—a difficult task in health care.

III. BROADER RELEVANCE

In principle, many of the effects outlined above could be observed in non-hospital mergers, both in health care and beyond. In health care, many of the

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[67] *See* Katherine Ho, *supra* note 45; Katherine Ho, *The Welfare Effects of Restricted Hospital Choice in the US Medical Care Market*, 21 J. APPLIED ECONOMETRICS 1039, 1068 (2006).

[68] *See* Ho & Lee, *supra* note 8.

[69] Formally, by "complements," we mean that the inclusion of hospital *A* in an insurer's network raises the incremental value for the insurer of hospital *B*'s inclusion in its network and vice-versa.

[70] *See supra* Part I.A.

[71] *See* Guy Arie, Sarit Markovich & Mauricio Varela, *On the Competitive Effects of Multimarket Contact*, 100 EUR. ECON. REV. 116–42 (2017).

mechanisms above could affect mergers of providers in different *product markets.* The existing empirical literature has not focused on that issue. However, the explanations outlined above that are potentially relevant for cross-geographic market mergers, in our view, are also potentially relevant for cross-product market mergers. While a broader set of issues needs to be accounted for in those cases (e.g., referral patterns), the basic mechanisms outlined here may also be relevant.

Beyond health care, there are possible implications for any setting where an intermediary bundles products for sale to consumers. These settings include cable TV and retail. While two products in the bundle (e.g., peanut butter and bathroom tissue or Animal Planet and The Weather Channel) may not be substitutes at the point of consumption—demand for the bundle is impacted by consumers' cost of accessing them through the bundle (including whether they are in the bundle at all). Just as in the geographic cross-market mergers examined above, conceptually the bundling of products may sometimes lead two goods that are independent in demand at the point of sale to be substitutes and sometimes to be complements.

To our knowledge, there is no body of empirical evidence outlining these kinds of effects outside the specific type of hospital mergers discussed here. However, the conceptual issues we outline are likely germane for other types of markets as well.[72]

IV. IMPLICATIONS

Given the empirical evidence in Lewis and Pflum's 2017 article and Dafny et al., it seems likely that hospital prices have increased following mergers that would not be flagged by widely used analytical methods for predicting harm. There are multiple plausible mechanisms for why this could be occurring. However, there is not yet good evidence on which mechanisms are most relevant and, therefore, how to best predict ex ante which mergers are likely to be problematic. Further, cross-market mergers can be procompetitive in some circumstances because of cost efficiencies, and so it is important to understand the circumstances for which price increases are most likely.[73]

To better understand the likelihood and sources of price changes from cross-market hospital mergers (and the appropriate policy response, if any), it

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[72] For example, recent work by Stephen Berry, Philip Haile, Mark Israel, and Michael Katz shows that when two goods are sold in a store together they can become complements in demand as a result of being combined in a single store. Further, the authors show that this can also make other goods complements as well. Stephen Berry, Philip Haile, Mark Israel & Michael Katz, *Complementarity Without Superadditivity*, 151 ECON. LETTERS 28–30 (2017).

[73] For evidence that hospital mergers—particularly non-geographically proximate ones—can lower hospitals' costs, see Matthew Schmitt, *Do Hospital Mergers Reduce Costs?*, 52 J. HEALTH ECON. 74 (2017).

is critical to understand how insurers' networks impact consumers' demand for their insurance products. Specifically, we need to understand what provider characteristics are important to consumers (e.g., families, individuals, or businesses) when they choose their insurance. In particular, our review highlights two major research questions meriting further study: (1) when are providers substitutes for insurers but not for patients; and (2) do consumers differentially value services in a way that meaningfully affects competition. We hope that further study in these two areas will shed further light on the correct policy response to cross-market hospital mergers and improve our understanding of health care pricing more broadly.