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Which Types Of Hospital Mergers Save Consumers Money?

Overall, horizontal hospital mergers benefit consumers. But more antitrust scrutiny of mergers is needed.

by Robert A. Connor, Roger D. Feldman, Bryan E. Dowd, and Tiffany A. Radcliff

PROLOGUE: Today’s business climate teems with merger activity, from financial institutions to office supply superstores to hospitals and other health care providers. The merger frenzy across economic sectors has attracted attention because of its implications for antitrust—the dominance of a few large providers of a service. Competition, one of the linchpins of a market-based economy, often takes a backseat to the economies of scale that merger advocates claim as a benefit. What does this mean for consumers of health care? Does having fewer choices for hospital care jeopardize patients’ quality of care, or just their freedom of choice? Do particular types of hospital mergers have different implications for consumers? What happens to hospital prices and profits in a region when major hospitals merge horizontally?

This study of more than 3,500 U.S. short-term hospitals, including 122 mergers between 1986 and 1994, attempts to clarify the issues around hospital mergers. Its authors, based at the University of Minnesota, are acknowledged experts in the field. Robert Connor is an associate professor in the Healthcare Management Department, Carlson School of Management. He has a doctorate in health economics, also from the University of Pennsylvania. Roger Feldman is a professor in the Division of Health Services Research and Policy in the School of Public Health; he holds a doctorate in economics from the University of Rochester. Bryan Dowd is a professor in the Division of Health Services Research and Policy. He holds a doctorate in public policy from the University of Pennsylvania. Tiffany Radcliff is a doctoral student in the School of Public Health.
ABSTRACT: This study analyzes the changes in costs and prices from 1986 to 1994 for more than 3,500 U.S. short-term general hospitals, including 122 horizontal mergers. These mergers were generally financially beneficial to consumers, providing average price reductions of approximately 7 percent. Merger-related price reductions were considerably less in market areas with higher market concentration levels. Merger-related price reductions in areas with higher penetration by health maintenance organizations (HMOs) were approximately twice those in areas with lower HMO penetration. Merger-related price reductions were greater for low-occupancy hospitals, nonteaching hospitals, nonsystem hospitals, similar-size hospitals, and hospitals with greater premerger service duplication.

MERGERS IN THE HEALTH CARE SECTOR, particularly horizontal hospital mergers wherein two or more hospitals merge into a single corporation, are increasing in frequency and importance. However, there are sharply divided opinions among both public- and private-sector decisionmakers about whether these mergers benefit the merging organizations, consumers, both, or neither. Some providers believe that only large health care systems can provide their communities with efficient and comprehensive care as required by evolving markets. However, some antitrust advocates are concerned that mergers in concentrated markets erode competition, increase prices, and reduce consumer welfare. Accordingly, hospital mergers have been subjected to increasing antitrust scrutiny.

The main potential benefits from mergers are cost savings from economies of scale and elimination of duplicative services; reduction in unused capacity through pooled staffing; improved management and production processes; better access to capital; quality improvements from higher volumes of specialized procedures; and broader geographic/network coverage. Consumers benefit from cost savings when prices are also reduced. The main potential hazards of mergers are decreased competition, higher prices, and reduced geographic access because of consolidation. The net impact of mergers on consumer welfare depends on whether the benefits exceed the hazards.

In light of these divergent views and opposing effects, it is vital that public policy on mergers be informed by the empirical results of large-scale research. The need for current empirical studies of merger effects in the health care sector is even more acute than in other sectors because of strong debate concerning (1) whether health care markets dominated by not-for-profit organizations behave in accordance with economic theory based on profit maximization; and (2) whether health care market dynamics have changed in the past decade because of prospective payment for Medicare and increased market penetration by managed care organizations. This
study provides some of the largest-scale evidence to date on the effects of horizontal hospital mergers on organizational costs and consumer prices. It analyzes and reports the changes in costs and prices from 1986 to 1994 for more than 3,500 U.S. short-term general hospitals, including 122 horizontal mergers with 244 hospitals, to answer the following key questions. First, did horizontal hospital mergers generally produce cost savings for the merging organizations? If so, were savings passed on to consumers as lower prices? Second, what were the characteristics of market areas in which hospital mergers generally decreased or increased costs for the merging organizations and/or prices for consumers? And third, what were the premerger characteristics of hospitals whose mergers generally decreased or increased costs for the merging organizations and/or prices for consumers?

Previous Studies

- **Cross-sectional studies.** Cross-sectional studies generally compare costs and prices across market areas with different degrees of concentration and use the results to infer the probable effects of mergers. Their results are mixed. James Robinson and Harold Luft, Luft and colleagues, the American Hospital Association’s (AHA’s) Hospital Research and Educational Trust, and Larry Manheim and colleagues provide indirect evidence of merger savings by reporting higher hospital costs in areas with more hospitals. These results have been attributed to nonprice competition in the form of a “medical arms race” in which competing hospitals offer duplicative high-technology services. William Lynk used the results of a cross-sectional analysis of California hospitals to project that mergers of not-for-profit hospitals would reduce prices. On the other hand, cross-sectional studies by Glenn Melnick and colleagues, Melnick and Jack Zwanziger, and David Dranove and colleagues provide evidence of lower hospital costs and prices in areas with more hospitals. These results have been cited as evidence that hospitals compete on price and that increased competition leads to lower costs. Zwanziger and Melnick and Dranove and colleagues have reported that health care markets are shifting from nonprice competition to price competition following the growth of price-sensitive managed care organizations.

- **Longitudinal studies.** Longitudinal studies provide a more direct measure of merger effects because they do not rely on cross-sectional differences in market concentration to infer merger effects. They compare organizational performance before and after an actual merger event; their results are also mixed. Jeffrey Alexander and colleagues reported reduced expenses per adjusted admission in a
study of ninety-two mergers from 1982 to 1989. Richard Bogue and colleagues reported reduced duplication of services in seventy-four mergers from 1983 to 1988. A study of eleven mergers by the U.S. Department of Health and Human Services reported approximately 9 percent cost savings and no price increases. A case study of Massachusetts mergers found some cost savings. Lynk documented merger savings achieved by reduced variation in service demand by pooling services. However, Ross Mullner and Ronald Andersen found no significant financial effects from thirty-two hospital mergers from 1980 to 1985, and a study of fourteen hospital mergers from 1985 to 1990 by Health Care Investment Analysts (HCIA) showed lower growth in cost per case but increased prices. Initial findings from a study of twenty-three California mergers reported fewer beds but higher prices.

Overall, the empirical evidence on hospital merger savings is mixed. One explanation for these mixed results is that hospital markets are moving toward less nonprice competition and more price competition, causing study results to shift over time. Another explanation is that only certain types of hospital mergers produce savings, and the merger groups that have been studied have differed. For these reasons, longitudinal studies with a large number of mergers, recent data, and analyses of merger effects by type of merger are important.

**Data**

This study includes more than 3,500 U.S. short-term general hospitals for which good longitudinal information is available for 1986 to 1994. For eight mergers, 1994 financial data were missing and were replaced by 1993 data, increased by industry mean inflation. This is approximately two-thirds of all U.S. short-term general hospitals in operation during this entire period. The data set includes 122 within-market-area horizontal hospital sets (involving 244 hospitals) that merged after 1986 and before 1994, as identified by the AHA. The AHA defines a merger as two or more similar corporations coming together into a single surviving entity. Data on each merging hospital set were retroactively combined into a single observation for the premerger period. Mergers involving hospitals in different market areas were excluded. Within-market-area mergers that were not reported by the AHA are in the control group and could have weakened observed merger effects.

For defining hospital market areas, we used the approximately 800 nonoverlapping, relatively self-contained health service areas (HSAs) formed by Diane Makuc and colleagues for the entire coterminous United States. Makuc and colleagues measured the
flow of Medicare hospital stays between counties, used cluster analysis to identify counties linked by high border crossing, and combined linked counties to form HSAs. The median number of counties per HSA is three, and the median number of hospitals per HSA is five. County demographic, economic, and other data came from the Bureau of Health Professions’ 1991 Area Resource File and were combined into HSAs to serve as market-area variables. Financial and statistical data came from the Health Care Financing Administration (HCFA) prospective payment system (PPS) data sets after extensive editing; data on hospital characteristics came from the AHA Annual Hospital Surveys; data on HMO penetration rates came from the work of Douglas Wholey at Carnegie-Mellon; and area wage and case-mix data came from HCFA.

Methods

We first conducted bivariate comparisons of the market area and hospital-specific characteristics of AHA-identified merging versus nonmerging hospitals. Market area comparisons included calculation of premerger and postmerger Herfindahl-Hirschman Indexes (HHIs), a measure of market concentration used by economists and antitrust regulators. The higher the HHI, the more concentrated the market; an HHI of 10,000 is a monopoly. When calculating HHIs, we treated hospitals with different AHA identification numbers as separate organizations, which may understate effective market consolidation in areas with jointly owned hospitals with separate identification numbers but should still be correlated with effective market consolidation.

Second, we compared changes in hospital costs and prices from 1986 to 1994 by type of market, hospital, and merger. Estimated reductions in costs and prices associated with mergers are measured relative to nonmerging hospitals.

Cost savings can improve the competitive advantage of hospitals, but consumers gain direct monetary benefits from a merger only when prices are reduced, and thus antitrust regulators pay particular attention to price changes. We used operating expenses and revenues instead of total expenses and total revenues to focus on hospitals’ core business of patient care rather than endowment size or nonoperating subsidies. We used net patient revenue, the amount paid by payers, instead of gross charges because the prices actually paid have more economic meaning than “list” prices. We used admissions as the primary measure of hospital output, but because of the increasing importance of outpatient services, we adjusted admissions to reflect the proportion of outpatient services (by multiplying admissions by the ratio of total to inpatient-only charges).
Prices were computed as net patient revenue divided by adjusted admissions.

**Results**

**Market area and hospital characteristics.** Comparison of the 1986 baseline and 1986-to-1994 changes in market area and hospital characteristics of AHA-identified merging hospitals with non-AHA-identified merging hospitals shows that hospitals tended to merge in areas with less market concentration (HHI of 1,665 versus 2,353), higher HMO penetration (10.5 percent HMO members versus 7.8 percent), and fewer rural characteristics per the Area Resource File measure (2.68 versus 3.55) (Exhibit 1). Comparison of 1986 baseline hospital-specific characteristics for merging versus nonmerging hospitals shows that merging hospitals were less likely to have been government-owned and more likely to have been a member of a system, were larger in terms of numbers of beds and

**EXHIBIT 1**

1986 Baseline And 1986–1994 Change In Characteristics Of AHA Merging And Nonmerging Hospitals

<table>
<thead>
<tr>
<th>Hospital market area</th>
<th>1986 baseline</th>
<th>Merging versus nonmerging</th>
<th>Mean percent change, 1986–1994*a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herfindahl-Hirschman Index</td>
<td>1,665</td>
<td>2,353</td>
<td>-29.3%</td>
</tr>
<tr>
<td>HMO penetration rate</td>
<td>10.5%</td>
<td>7.8%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Group HMO penetration rate</td>
<td>6.2%</td>
<td>4.5%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Urban (0) to most rural (9)</td>
<td>2.68</td>
<td>3.55</td>
<td>-0.87</td>
</tr>
<tr>
<td>For-profit ownership</td>
<td>16.3%</td>
<td>11.0%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Governmental ownership</td>
<td>11.3%</td>
<td>29.3%</td>
<td>-17.9</td>
</tr>
<tr>
<td>Member of system</td>
<td>49.3%</td>
<td>29.4%</td>
<td>19.9</td>
</tr>
<tr>
<td>COTH teaching hospital</td>
<td>11.6%</td>
<td>6.2%</td>
<td>5.4</td>
</tr>
<tr>
<td>Beds (for merging)</td>
<td>226</td>
<td>193</td>
<td>16.9</td>
</tr>
<tr>
<td>Admissions (for merging)</td>
<td>7,110</td>
<td>6,146</td>
<td>15.7</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>57.2%</td>
<td>51.5%</td>
<td>5.7</td>
</tr>
<tr>
<td>Outpatient/total</td>
<td>20.5%</td>
<td>21.3%</td>
<td>-0.8</td>
</tr>
<tr>
<td>Case-mix index (CMI)</td>
<td>1.20</td>
<td>1.13</td>
<td>6.8</td>
</tr>
<tr>
<td>Revenue per outpatient-adjusted admission</td>
<td>$3,419</td>
<td>$2,857</td>
<td>19.7%</td>
</tr>
<tr>
<td>Expense per outpatient-adjusted admission</td>
<td>3,451</td>
<td>2,917</td>
<td>18.3</td>
</tr>
<tr>
<td>Revenue per outpatient and CMI-adjusted admission</td>
<td>2,823</td>
<td>2,498</td>
<td>13.0</td>
</tr>
<tr>
<td>Expense per outpatient and CMI-adjusted admission</td>
<td>2,850</td>
<td>2,559</td>
<td>11.4</td>
</tr>
</tbody>
</table>

**SOURCE:** Authors’ calculations.

**NOTES:** AHA is American Hospital Association. HMO is health maintenance organization. COTH is Council of Teaching Hospitals.

Mean change as percentage of 1986 value, except for change in percentage variables, which is the simple difference.

Not available.
admissions, had higher occupancy rates and case-mix indexes, and had higher expenses and revenues per adjusted admission.  

- **Prices and costs.** Both mean price and cost increases were approximately seven percentage points lower over the 1986–1994 period for merging hospitals than for nonmerging hospitals (Exhibit 1). For example, revenue per outpatient-adjusted admission increased 68.4 percent for merging hospitals, approximately seven percentage points less than the 75.5 percent increase for nonmerging hospitals. This result, substantiated by multivariate analysis, provides evidence that horizontal hospital mergers during 1987–1994 produced savings in annual operating expenses for the merging organizations and that these savings largely were passed on to consumers as lower prices. Also, adjusting for differences in case-mix index increased merger-associated price savings from 7 percent to 13 percent. However, we believe that the 13 percent figure is misleadingly high, and we did not use case-mix adjustment in the following detailed analyses because (1) the bivariate results using outpatient-adjusted admissions are generally more consistent with the multivariate results, which include other effects (such as regression to the mean), resulting in lower estimates of merger-associated savings; and (2) expenses and revenue are not 100 percent variable with changes in case-mix index.

Our results indicate that horizontal hospital mergers, on average, save consumers money. Exhibit 2 shows which types of hospital mergers are likely to save money and which are not. Such identification is useful for public-sector direction of antitrust scrutiny and private-sector projection of merger-related benefits.

The HHI analysis shows that mergers in more concentrated market areas (1986 HHI 1,800 or higher) had merger-related cost savings (−2.7 percent) that were less than half those of mergers in less concentrated market areas (−7.3 percent). More importantly, mergers in more concentrated market areas had a slight price increase (1.4 percent) instead of a price decrease. These findings indicate that cost savings and consumer benefits from hospital mergers in more concentrated market areas are marginal or even negative. This provides empirical justification for closer antitrust review of hospital mergers in more concentrated market areas.

- **HMO penetration and merger effects.** Several studies have documented significant interactions among HMO market penetra-
tion, hospital market concentration, and hospital cost inflation. Group-model HMOs in particular have been more aggressive in seeking lower prices. Accordingly, it is worthwhile to investigate the interaction between group-model HMO penetration and merger effects. Our findings indicate that mergers in areas with higher membership in group-model HMOs were accompanied by price savings that were approximately four percentage points greater (–8.4 percent) than those in areas with lower group-model HMO penetration (–3.9 percent) (Exhibit 2).

### Hospital type and merger effects

Merger-associated cost and price savings are greater for mergers involving low-occupancy hospitals, nonteaching hospitals, nonsystem hospitals, and not-for-profit hospitals (Exhibit 2). Merging hospitals with combined pre-merger occupancies of less than 55 percent (the approximate me-
Median 1986 occupancy for merging hospitals) produced price savings that were approximately five percentage points greater (–9.7 percent) than was the case for hospitals with higher premerger occupancies (–4.9 percent), which confirms earlier reports on occupancy and mergers.\(^\text{26}\) Merger-associated price reductions appear to be twice as great for not-for-profit mergers (–4.7 percent) as for for-profit mergers (–2.4 percent). Although this result is consistent with some earlier studies on this subject, we cannot report it as conclusive because it was not confirmed by multivariate analysis.\(^\text{27}\) Additional research is required to resolve this important question.

Mergers and duplicative services. The last two comparisons in Exhibit 2 are measures of the potential for merger-related consolidation of duplicative services. These measures apply to merging hospitals only. Previous studies have shown the importance of the relative size of the merging organizations.\(^\text{28}\) There should be greater opportunities for consolidation and savings in combined expenses when merging hospitals are similar in size than when one is large and the other is small. The first measure indicates whether the merging hospitals are of similar size. It is calculated by dividing the 1986 expenses of the smaller hospital by the 1986 expenses of both merging hospitals and expressing the result as a percentage (with a maximum value of 50 percent). The second measure is an estimate of premerger service duplication. It is calculated by dividing the number of AHA-listed services (for example, x-ray, laboratory, and so forth) provided by both merging hospitals by the number of services provided by the hospital with the most services. The results in Exhibit 2 show greater merger-related savings for hospitals of similar size and for hospitals with greater premerger service duplication.

Implications For Public And Private Policy

The results of this study have significant implications for public policy. They also may provide guidance for more accurate private-sector projections of merger-related cost savings, which are often overly optimistic.\(^\text{29}\)

First, this study provides some quantitative answers concerning which types of horizontal hospital mergers generally save consumers money and which do not. Horizontal hospital mergers during 1986–1994 were generally financially beneficial to consumers, pro-
viding average price reductions of approximately 7 percent. However, merger-related price reductions were considerably less (or even negative) in market areas with higher market concentration levels (HHI above 1,800).

Merger-related price reductions in areas with higher penetration by group-model HMOs were about twice those in areas with lower penetration. This is evidence of greater pressure for merger-related price reductions in areas with greater managed care penetration. The higher merger-related savings that we found from low-occupancy hospitals probably reflect greater postmerger consolidation and efficiencies. The lack of savings for mergers involving teaching hospitals may reflect the complexity and already-large size of these institutions, or higher prices because of their unique products and market power when negotiating with buyers. Further investigation is required to learn whether the multiple missions or other characteristics of Council of Teaching Hospitals (COTH) hospitals impede merger-related efficiencies. Merger-related cost savings and price reductions for members of hospital systems are approximately one-third and one-half, respectively, those of independent hospitals, perhaps because system members are already further along the continuum of consolidation.

Overall, these results suggest that horizontal consolidation of hospital markets can be beneficial. However, these results also provide empirical justification for antitrust scrutiny of mergers in more consolidated areas, which may result in price increases instead of decreases.

Second, this study provides insight into which market and hospital characteristics are associated with hospital mergers. Merging hospitals tended to occur in less-concentrated market areas and areas with higher HMO penetration. This suggests that mergers occur partly in response to multiple competitors and pressure from price-sensitive managed care organizations. Further, merging hospitals were less likely to have been government-owned and more likely to have been a member of a system, were larger, had higher occupancy rates and case-mix indexes, and had higher premerger expenses and revenues per outpatient-adjusted admission. One explanation for higher average occupancies is that merger may substitute for closure and that hospitals with the lowest occupancies were more likely to close or to be converted to noninpatient facilities than to merge.

These results also can be applied to current trends in health care markets to speculate on future trends in merger efficiency and price effects. Trends toward increased penetration by managed care organizations and consolidation of buying power, such as in large...
purchaser coalitions, should help to ensure that potential cost savings and price reductions from hospital mergers actually materialize. These forces suggest a trend toward increasing consumer benefits from health care mergers. On the other hand, as mergers continue, health care markets may become increasingly consolidated and have higher HHI levels. Also, hospital occupancy levels may begin to increase after the “industry shakeout” of mergers and closures. These forces could cause a trend toward decreasing consumer benefits from hospital mergers. Considering these two opposing trends, health care markets with a balance of market power between providers and purchasers, either with a few large providers who face aggressive price negotiation from a few large buyers or with many smaller providers competing for the business of many smaller buyers, may have lower prices than those markets where providers’ market power exceeds buyers’ market power. Future studies and antitrust investigations should carefully explore measures of buyer market consolidation and managed care penetration as well as provider market HHI.

There are limitations to this study, and further large-scale merger research is needed. Although 122 mergers is a relatively large number compared with previous studies on this topic, it is only a portion of the total mergers reported in the trade press. Additional longitudinal studies should be conducted using all mergers reported in the press. Additional research also is needed to develop better methods of characterizing merging hospitals, their markets (including HHI), and merger/market interactions; investigate the lack of savings in teaching hospital mergers; and resolve whether there are greater price reductions following mergers of not-for-profit hospitals. As this stream of research improves our understanding of which types of health care mergers produce savings, parties on both sides of the merger debate may find a growing common ground based on the results of large-scale empirical studies.

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NOTES


19. For information on the full multivariate analysis upon which our analyses were based, contact Robert Connor, Healthcare Management Department, Carlson School of Management, University of Minnesota, 420 Delaware Street, SE, Minneapolis, Minnesota 55455-0381.


21. Dranove et al., “Price and Concentration in Hospital Markets.”


23. Bogue et al., “Hospital Reorganization after Merger.”


27. Ibid.


32. Barro and Cutler, *Consolidation in the Medical Care Marketplace*. 