

Community Control and Pricing Patterns of Nonprofit Hospitals: An Antitrust Analysis

Gary J. Young and Kamal R. Desai

Department of Veterans Affairs and
Boston University School of Public Health

Fred J. Hellinger

Agency for Healthcare Research and Quality,
Department of Health and Human Services

Abstract Traditional control of nonprofit hospitals by the communities they serve has been offered as justification for restraining antitrust enforcement of mergers that involve nonprofit hospitals. The community is arguably a constraint on a nonprofit's inclination to exercise market power in the form of higher prices; however, community control is likely to be attenuated for hospitals that through merger or acquisition become members of hospital systems—particularly those that operate on a regional or multiregional basis. We report findings from a study in which we examined empirically the relationship between market concentration and pricing patterns for three types of nonprofit hospitals that are distinguishable based on degree of community control: an independent hospital, a member of a local hospital system, and a member of a nonlocal hospital system. Study results indicated that when conditions existed to create a more concentrated market, (1) all three types of nonprofit hospitals exercised market power in the form of higher prices, and (2) hospitals that were members of nonlocal systems were more aggressive in exercising market power than were either independent or local system hospitals. The results have important implications for antitrust enforcement policy.

In recent years, many health care markets in the United States have undergone consolidation as the number of hospital mergers and acquisitions has accelerated. Between 1994 and 1997, hospital mergers and acquisitions reportedly reached record-setting levels of more than six hundred per year (Japsen 1998).¹ Several forces underlie the high level of

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1. These numbers have been compiled by *Modern Healthcare*, a trade journal that is one of several sources of information on hospital merger and acquisition activity. The American Hospital Association (AHA) also tracks hospital mergers. Another source is Irvin Levin Associates,

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merger and acquisition activity, including growing managed care pressures, tighter Medicare reimbursement rates, and a declining market for inpatient care (Gaynor and Haas-Wilson 1999).

The pace of merger² activity has reignited a long-standing debate over how government antitrust enforcement agencies should approach mergers involving nonprofit hospitals.³ Some commentators believe that mergers involving nonprofit hospitals should be treated in the same way as all other mergers, where competition is likely to be reduced substantially; that is, they should be prohibited unless offsetting efficiencies can be demonstrated (e.g., Metzenbaum 1993; Simpson and Shin 1998).⁴ Others contend that traditional antitrust enforcement policy—which embraces the principle that competition promotes consumer welfare—should not apply to mergers involving nonprofit hospitals because these institutions are not inclined to exercise market power in the form of higher prices (Kopit and McCann 1988; Lynk 1994; AHA 1992).⁵ From this perspective, nonprofit hospital mergers offer potential cost savings from economies of scale without the antitrust risks of higher prices.⁶

a commercial firm that tracks hospital deals that result in mergers, acquisitions, joint ventures, and conversions. Although some differences exist among these sources in the number of mergers and acquisitions reported, they all indicate a strong upward trend in merger and acquisition activity during the mid-1990s. The trend, however, may be reversing, since the number of hospital mergers and acquisitions declined between 1996 and 1997.

2. While legal distinctions exist between mergers and acquisitions, these distinctions are not relevant to the issues and analyses we present in this article. Accordingly, to simplify our prose we often use the term *merger* alone to include both mergers and acquisitions.

3. Before the mid-1990s, the federal government had challenged very few hospital mergers. Indeed, between 1981 and 1993 the federal government reviewed approximately four hundred mergers but only challenged seven (GAO 1994). However, since 1993 the federal government has become more aggressive in challenging hospital mergers.

4. Mergers between nonprofit hospitals are most likely to be challenged under either of two federal antitrust statutes: Section 1 of the Sherman Act (15 U.S.C. sec. 1), which prohibits conspiracies, contracts, and combinations in restraint of trade, or Section 7 of the Clayton Act (15 U.S.C. sec. 18), which prohibits all mergers and acquisitions of stock or assets that “may substantially lessen” competition or “tend to create a monopoly.” The legal analysis of mergers under either of these two antitrust provisions is largely the same. This analysis entails balancing the merger’s anti-competitive effects against its beneficial effects, such as possible lower unit costs due to economies of scale. Although some debate exists as to whether Section 7 of the Clayton Act is applicable to nonprofit hospitals, the practical significance of the debate is not clear, since Section 1 of the Sherman Act is applicable to mergers between nonprofit hospitals (see Kopit and McCann 1988; Meyer and Rule 1994). See also the document entitled *Horizontal Merger Guidelines* where the Department of Justice and the Federal Trade Commission, the two government agencies responsible for enforcing the federal antitrust laws, articulate how they will evaluate mergers for purposes of enforcing the antitrust laws (U.S. Department of Justice/Federal Trade Commission 1992).

5. Market power refers to the ability of a firm to exercise some degree of control over the price and/or quantity of a product or service (McGuigan and Moyer 1983).

6. Recent articles by David Dranove (1998) and William J. Lynk (1995) discuss and analyze the nature and magnitude of such cost savings.

To address this debate, several empirical studies have been undertaken to investigate whether nonprofit hospitals have higher prices in more concentrated markets since such a relationship is indirect evidence of the use of market power.⁷ William J. Lynk (1995) examined the relationship between market concentration and prices among acute-care hospitals in California. According to his analysis, nonprofit hospitals have lower rather than higher prices in more concentrated markets, while the pricing patterns of for-profit hospitals are just the opposite. However, several other investigators, who claim that Lynk’s methodology is flawed, have conducted analyses showing that greater market concentration is related to higher prices among nonprofit hospitals in California (Simpson and Shin 1998; Dranove and Ludwick 1999; Keeler, Melnick, and Zwanziger 1999). In addition, a study by Robert A. Connor, Roger D. Feldman, and Bryan E. Dowd (1998) of over 3,500 hospitals nationwide also points to higher prices in more concentrated hospital markets.⁸

While some evidence suggests that nonprofit hospitals do exercise market power, an important policy consideration is whether this pricing behavior is more attributable to some nonprofit hospitals than others. Existing research does not differentiate among nonprofit hospitals, theoretically or empirically, for purposes of analyzing the antitrust risks associated with mergers. Yet nonprofit hospitals are a highly diverse group of organizations that differ along many attributes that may be relevant to

7. Market concentration and market power are closely related concepts. As markets become more concentrated (i.e., less competitive), firms have more market power. There are two traditional economic models of market behavior that explain how increased market concentration can affect prices: the dominant-firm model and the collusion model. The dominant-firm model contends that a firm with a large share of the market may be able to raise prices due to relatively inelastic demand. The collusion model contends that when a market comprises only few firms of comparable size, those firms may be able to coordinate their behavior so as to obtain prices that are above competitive levels (see Vita et al. 1991; Bazzoli et al. 1995). Although market concentration–price analyses are a standard approach to predicting merger effects on price, these analyses do not address the potential cost savings that mergers may achieve that can ultimately lead to lower prices. Thus such analyses may produce results that are not always consistent with the actual performance of mergers. Several studies have examined the actual impact of hospital mergers on prices and costs, but from an antitrust standpoint their utility is limited because they do not account for levels or changes in market concentration (see HHS 1992; Alexander, Halpern, and Lee 1996). One exception is a study by Connor, Feldman, and Dowd (1998) that accounted for the level of market concentration in an analysis of 122 hospital mergers. Study results suggested that merger overall was associated with slower price growth, though price reductions were smaller in more concentrated markets.

8. Unlike the previously mentioned studies here, the study by Connor, Feldman, and Dowd (1998) did not examine market concentration–price relationships separately for nonprofit and for-profit hospitals. However, the study included more than two-thirds of the country’s short-term hospitals. Since fewer than 15 percent of hospitals nationwide are for-profit, the study’s results are likely to reflect to a large degree the pricing patterns of nonprofit hospitals.

whether and to what degree they are likely to exercise market power in the form of higher prices. Officials at the Federal Trade Commission, the government agency that shares with the Department of Justice responsibility for enforcing the federal antitrust laws, have commented on the need for research that identifies “distinguishing factors beyond non-profit status itself . . . which also matter to a hospital’s incentive to exploit market power” (Silvia and Leibenluft 1997: 6).

In this article, we report findings from our study that examined relationships between market concentration and pricing patterns for three types of nonprofit hospitals that are distinguishable based on their locus of control: independent hospital, member of a local hospital system, and member of a nonlocal hospital system. As discussed later, the traditional control of nonprofit, independent hospitals by the communities they serve is arguably a justification for restraining antitrust enforcement of nonprofit hospital mergers. However, local community control is likely to be attenuated for hospitals that through merger or acquisition become members of hospital systems, particularly nonlocal systems with a regional or multiregional presence (Gray 1991). The findings indicate that (1) all three types of nonprofit hospitals exercise market power in the form of higher prices, and (2) hospitals that are members of nonlocal systems are more aggressive in exercising market power than are either independent or local system hospitals.

Theoretical Perspectives

Several theoretical perspectives posit that nonprofit hospitals will not exercise market power in the form of higher prices. We discuss three perspectives below; the third of these theoretical perspectives, community control, provides the theoretical foundation for the study’s empirical analysis.

Institutional Characteristics of Hospital Markets

There exists a long-standing argument that nonprofit hospitals will not exercise market power in the form of higher prices because they do not compete with one another on the basis of price (Kopit and McCann 1988; AHA 1992). A central assumption of classical economic theory, which posits that competition leads to lower prices in a market, is that consumers will be motivated to shop for and purchase the least expensive services or products that meet the desired level of quality. However, patients, who are the ultimate consumers of hospital services, appear to lack this motivation because they have third-party insurance. In the absence of consumer sen-

sitivity to hospital prices, hospitals are said to compete on the basis of advanced technology and amenities, which can drive up, rather than lower, prices (AHA 1992; Manheim, Bazzoli, and Sohn 1994).⁹ This style of hospital competition has been labeled the “medical arms race.”¹⁰

However, the nature of competition in hospital markets appears to be changing. The growth of managed care during the past fifteen years has injected some degree of price competition into the hospital industry, at least in some areas of the country. One of the primary features of managed care is selective contracting whereby payers channel patients to those providers who presumably offer the best price discounts and who exhibit the most cost-effective care. David Dranove, Mark Shanley, and William D. White (1993) have argued that managed care is shifting the hospital industry from a patient-driven market to a payer-driven market in which price is a primary competitive factor. Several empirical studies support the position that managed care penetration has brought hospital markets in line with the predictions of economic theory, particularly in states such as California, where managed care organizations have had a strong presence since the mid-1980s.¹¹

Mission of Nonprofit Hospitals

The traditional mission of nonprofit hospitals has also been invoked as a basis for arguing that nonprofit hospitals do not exercise market power (Kopit and McCann 1988). Classical economic theory posits that business organizations seek to maximize profit. Given this assumption, it is

9. There exists empirical research supporting the contention that healthcare markets have historically departed from the predictions of economic theory. Several studies using data from the 1970s and early 1980s reported higher hospital costs in more competitive hospital markets (see, for example, Farley 1985; Robinson and Luft 1985). This perspective proved to be influential in *U.S. v. Carilion Health System* (707 F. Supp. 840 [W.D. Va.], *aff’d*, 892 F.2d 1042 [4th Cir. 1989]), which was one of two cases where the federal government first challenged mergers between nonprofit hospitals. The district court, in ruling for the defendant hospitals, attached considerable weight to the argument that hospitals do not compete on the basis of price. After reviewing expert testimony from the defendants’ economists, the court concluded that “[relative] to other products and services consumers buy, hospital services are not price sensitive in a relevant market” (*ibid.*:849). The other case where the federal government first challenged mergers between nonprofit hospitals was *United States v. Rockford Memorial Corp.* (717 F. Supp. 125 [N.D. Ill. 1989], *aff’d*, 898 F.2d [7th Cir.], *cert. denied*, 498 U.S. 920 [1990]). In this case the federal government prevailed in blocking the proposed merger.

10. For a discussion of the medical arms race from the perspective of economic theory, see Dranove and White 1994.

11. In 1982 California strengthened the role of managed care organizations by enacting legislation that permitted insurance entities to selectively contract with health care providers. For empirical analyses of the impact of managed care in California, see, for example, articles by James C. Robinson (1996) and by Glenn A. Melnick and Jack Zwanziger (1988). In addition, Darrell Gaskin and Jack Hadley (1997) reported, based on a nationwide sample of hospitals, that annual cost inflation was slower in markets with greater managed care penetration.

reasonable to predict that business organizations will raise prices in those circumstances where it will lead to higher profits. However, theoretical models of nonprofit hospitals present these organizations as maximizing objectives, such as patient volume, quality, and charity care (e.g., Hansmann 1980; Gruber 1994; Newhouse 1970) rather than profit. Commentators have also noted that the individuals who manage nonprofit hospitals ostensibly lack an incentive to exercise market power because they do not stand to gain personally from price increases (Blackstone and Fuhr 1992; Kopit and McCann 1988). Both the corporate charter and tax-exempt status of nonprofit hospitals prohibit these organizations from being operated for the financial benefit of their managers.¹² Given this perspective, nonprofit hospitals will price services only to the point necessary to cover their financial requirements.

There are counterarguments to this perspective. Specifically, nonprofit hospitals may still exercise market power even if their primary objective is not to maximize managers' profit. Nonprofits may use the surplus to achieve those objectives that managers do value. Thus they may pursue higher levels of quality than what consumers demand because their managers greatly value quality (Simpson and Shin 1998). Additionally, hospital managers may use the additional revenue to provide themselves with higher salaries and perquisites that to a large degree fall outside the prohibition on personal gain for hospital managers (Blackstone and Fuhr 1992).

Community Control of Nonprofit Hospitals

As previously noted, another theoretical perspective emphasizes the traditional control and accountability structure under which nonprofit hospitals have operated (Kopit and McCann 1988; Lynk 1994). Historically, the control of a typical nonprofit hospital has been vested in community representatives who serve on the hospital's governing board. These community representatives have often been large employers who pay health insurance premiums for their employees and presumably have an incentive to resist price increases for hospital services since higher prices would be passed on to them in the form of higher health insurance premiums. Lynk (1994:

12. This is sometimes referred to as the nondistributional constraint since a nonprofit organization is barred from distributing its net earnings (i.e., revenues in excess of the amounts needed to operate the organization effectively) to individuals involved in its oversight or management (Hansmann 1980). In addition, most nonprofit hospitals are exempt from federal income taxes as a charitable organization under Section 501(c)(3) of the Internal Revenue Code. To qualify for this tax exemption, none of the economic benefits of the organization may be diverted from the charitable objectives they are intended to further into the hands of "insiders." In the case of hospitals, an insider includes managers and members of the medical staff (Colombo 1993).

377), who views the nonprofit hospital as a type of consumer cooperative, contends that when employers control the hospital's policies, "then the hospital will serve them by expanding the output of hospital services to the point where price equals long-run marginal cost. In effect, the market gets the competitive outcome regardless of the structure of the market."

Recently, this theoretical perspective was reflected in a federal court's ruling in an antitrust case where the federal government challenged the proposed merger of two Michigan nonprofit hospitals (*Federal Trade Commission v. Butterworth Health Corporation*, 946 F. Supp. 1285 [W.D. Mich. 1996]). Although the court concluded that the government had demonstrated that the proposed merger would significantly decrease competition in the market the hospitals served, it denied the government's motion to enjoin the merger on the ground that the merger would not likely have anti-competitive effects. In reaching its decision, the court referred to several critical factors including that "the involvement of prominent community and business leaders on the boards of [the two hospitals] can be expected to bring real accountability to price structuring" (ibid: 1303).¹³

Given the Butterworth decision, defendants in future merger cases involving nonprofit hospitals will likely invoke some version of the community control perspective to support their claim that the merger in question will not lead to higher prices. What has yet to be considered by either the courts or researchers is whether the community control perspective is broadly applicable to nonprofit hospitals. The key assumption of this perspective is that employers from the community are in a position to control the hospital's policies. This assumption, as Lynk (1994) acknowledges in his own article on the subject, is most likely to hold in the case of the nonprofit hospital with an autonomous governing board. However, during the past twenty-five years hospitals have increasingly consolidated into systems in which there exists a system-level governing board and corporate management structure.¹⁴ Hospital mergers and acquisitions serve as the primary vehicle to form and develop such systems.¹⁵

13. Aside from the merged entity's governance structure, the court also justified its decision on the fact that the merged entity would be a nonprofit hospital with presumably different economic incentives than that of a commercial firm. Prior to the Butterworth case, several courts had explicitly rejected nonprofit status as a relevant factor in an analysis of the potential anti-competitive effects of hospital mergers (see Greaney 1997).

14. A hospital system is defined as two or more hospitals that operate under common ownership or management structure (Shortell 1988). Currently, over 35 percent of U.S. hospitals are part of a system (Ernst and Young 1997). Although hospitals often retain their own governing board after joining a system, the local board is ultimately accountable to the system's board and often accountable to the corporate management.

15. Some systems have also constructed new hospitals, but this has not been the primary strategy for system growth.

Hospitals participating in systems cede at least some control over their operations to the system's governing board and corporate management. While systems appear to vary markedly in terms of the degree to which they centralize decision making (Morlock and Alexander 1986), recent survey data suggest that most systems maintain some degree of central oversight over the financial decision making of member hospitals (Ernst and Young 1997).¹⁶ In this respect, system membership would appear to shift the locus of control away from the community to the system board and corporate management.

The extent to which system membership attenuates local community control is likely to be related to the geographic scope of the system. Some nonprofit systems have a regional or even multiregional presence, but most such systems have a local focus typically comprising a small number of hospitals that operate within the same or contiguous markets (Luke and Begun 1988).¹⁷ In terms of community control, nonprofit hospitals that belong to local systems would appear to be not much different from their independent counterparts. Since a local system typically focuses on serving a limited geographic area, its corporate office is usually located physically near member hospitals within the same community the system serves. Thus representatives of the community can influence system-level decision making through board representation and participation in other oversight mechanisms.

By contrast, in the case of a hospital that belongs to a regional or otherwise nonlocal system, community control of the hospital can be expected to be relatively weak. In such systems, the board and corporate office typically oversee multiple hospitals located in geographically disparate communities. This geographic dispersion would appear to limit substantially the ability of community representatives to influence policy at the system level, even where a local hospital board exists, since accessing system-level decision-making structures is problematic. It would also appear to limit substantially a system's ability to be responsive to the unique con-

cerns and preferences of the various communities that member hospitals serve. Thus while large, geographically dispersed regional systems offer hospitals, at least in theory, opportunities for productive efficiencies,¹⁸ they also present a constraint on community involvement in hospital policy for those decision areas that are the domain of the system-level board and corporate management. As noted by Bradford H. Gray (1991: 73–74), “larger system size may enable organizations to achieve economies of scale . . . but it may also create a kind of indifference to local needs, particularly if size is accompanied by distance and the existence of multiple organizational levels between institutions and corporate offices.” Accordingly, local community control is likely to be attenuated when a formerly independent hospital is acquired by a hospital system, particularly if the system is spread out geographically.

Where community control is absent or weak, nonprofit hospitals may be inclined to exercise market power in the form of higher prices. We can formalize our line of reasoning by turning to the existing economics literature on nonprofit hospitals. This literature considers a nonprofit hospital's utility function—that is, the primary objectives that the nonprofit hospital seeks to accomplish (Newhouse 1970; Phelps 1992; Gruber 1994; Pauly 1987). A widely cited theoretical model of utility maximization posits that the nonprofit hospital seeks to maximize some combination of the quantity and quality of services provided subject to the constraint of maintaining fiscal viability (Newhouse 1970). Quantity is included in the utility function because society bestows upon nonprofit hospitals special tax and legal advantages based on the belief that the production of more hospital services (than would be provided in a purely competitive market consisting of all profit-maximizing firms) is desirable. To increase the quantity of services provided, nonprofit hospitals are inclined to lower the price of care and to provide care to some individuals at zero price (i.e., charity care).¹⁹ Quality is also included in the utility function because those in control of a nonprofit hospital, namely the board members and senior managers, will place importance on the hospital's prestige and rep-

16. In this survey, responses were obtained from the chief executive officers of 126 hospital systems. More than 95 percent of the respondents indicated that within their respective systems hospitals needed to obtain system-level approval for operating and capital budgets. Thus, even in the absence of central oversight of prices per se, systems can indirectly influence prices at member hospitals through oversight of budgets and through the establishment of financial performance targets.

17. Our analysis of the American Hospital Association's (AHA) annual survey data reveals that as of 1997 approximately 80 percent of nonprofit hospital systems had fewer than eight hospitals, which is approximately the same size distribution that Roice D. Luke and James W. Begun (1988) reported for nonprofit systems based on 1985 AHA data.

18. The empirical literature is mixed as to whether hospital systems actually achieve their promise of productive efficiency. Two recent studies addressing the topic reached somewhat different conclusions (Menke 1997; Dranove, Durkac, and Shanley 1996).

19. This assumes a downward sloping demand curve (i.e., that the hospital is not operating in a purely competitive market). A testable hypothesis derived from this theory is that nonprofit hospitals will set lower prices than will for-profit hospitals, all other things being equal. Several studies offer support for this hypothesis by reporting that nonprofit hospitals set prices below that of for-profit hospitals (see, for example, Renn et al. 1985; Pattison and Katz 1983). The empirical evidence is not entirely consistent on this point, however (e.g., Sloan and Vracui 1983).

utation as a prominent institution of high quality. Since those in control of the hospital do not have financial incentives to earn a profit, quality considerations in the form of prestige and reputation are pursued instead.

While the economics literature offers a plausible rationale why nonprofit hospitals seek to maximize some combination of quantity and quality, it is largely silent as to the factors that may underlie a nonprofit hospital's relative preference for quantity versus quality. The locus of hospital control is possibly an important factor. Hospitals operating under the local control arrangements may be more inclined to emphasize quantity over quality relative to their nonprofit counterparts that operate under nonlocal control arrangements. The basis for this preference is that a greater quantity of hospital services is directly beneficial to the members of local community such as the large employers who traditionally have been in a position to influence the policies of nonprofit hospitals. Since higher prices will decrease the quantity of hospital services consumed, it can be expected that the locally controlled nonprofit hospital will not be inclined to use market power to raise prices.

By contrast, hospitals operating under nonlocal control arrangements are likely to give more emphasis to quality considerations than will their nonprofit counterparts that operate under local control. Unlike services provided to residents of a community, investment in technology and high-profile services are likely to be beneficial to the overall system for the purpose of contributing to a regional or national reputation. Whereas an increase in the quantity of services is primarily beneficial to the local community, a quality reputation is potentially transportable among hospitals constituting a system. The reputation of one hospital in the system promotes (through word of mouth, media attention, etc.) the quality reputation of other hospitals in the system.²⁰ Accordingly, it can be expected that nonlocally controlled hospitals will be more inclined to use market power to raise prices since higher revenues can be used to fund high-profile quality improvements.

The foregoing discussion of theoretical perspectives raises a number of considerations regarding the inclination of nonprofit hospitals to exercise market power. The community control perspective provides a particularly useful point of departure for examining possible differences

20. For example, Ohio-based Summa Health System recently entered into a collaborative arrangement with the Cleveland Clinic ostensibly in the belief that association with such a prestigious institution would improve the hospital system's own reputation for quality. A local journalist explained, "For Summa, an affiliation with the Cleveland Clinic brings prestige. Marketing is everything in the competitive hospital industry. And there is surely great marketing value in the Clinic's name, which Summa may now capitalize on" (Evans 1999).

among nonprofit hospitals in the use of market power relative to the locus of hospital control. Our empirical investigation addressed the following two questions: (1) Are nonprofit hospitals inclined to exercise market power regardless of whether they are an independent facility, member of a local hospital system, or member of a nonlocal system? (2) Are nonlocal system hospitals more aggressive in exercising market power than are either independent or local system hospitals?

Methods

Our empirical analysis is grounded in the previously discussed economic model of utility maximization for hospitals, where utility is a function of quantity and quality subject to a budget constraint. Charles E. Phelps (1992) expands on this model by using the calculus technique derived by Lagrange. The Lagrangian formulation of this problem is as follows:

$$L = U(N,S) + \lambda[(P(N,S) \times N - C(N,S)]$$

Where: U = utility; N = number of days; S = services; P = price; and C = cost.

To maximize this equation, the derivative of L with respect to U is set to zero and the derivative of L with respect to λ is set to zero. The second condition implies that the hospital breaks even, and the first condition implies that the ratio of marginal utility and marginal cost is equal for both choices of N and S . If we identify these conditions for the optimal levels of N and S , and solve for the equilibrium level of price, we obtain:

$$P = [C_N - U_N/\lambda][\eta/(1 + \eta)]$$

Where: η = price elasticity of demand facing the hospital holding service quality constant

This formulation of the model posits that hospital prices are a function of cost factors (or input prices), demand factors, and utility. Given our premise that the utility a hospital derives from quantity versus quality is related to its locus of control, we estimated the following model:

$$P = f(\text{market concentration, locus of control, other market demand characteristics, input prices})$$

Although most previous studies of market concentration and the pricing patterns of nonprofit hospitals have been conducted as cross-sectional analyses of price levels at a single point in time, for purposes of this

investigation a cross-sectional analysis of price levels is problematic for two reasons.²¹ First, price levels and locus of hospital control are likely to be endogenous. This is the case if, as empirical evidence suggests, nonprofit hospitals respond to increasing market competition (i.e., less-concentrated markets) by either joining or forming hospital systems (see Luke, Ozcan, and Olden 1995), and market competition influences hospital price levels in one direction or the other. In addition, price levels may also be related to other unmeasured characteristics of a hospital's market. For example, hospitals with higher prices may tend to be located in markets with fewer large employers and thus face less resistance to price increases. Second, for purposes of this investigation, price levels may be a biased measure to the extent that less concentrated markets have higher baseline costs due to the residual effects of an abandoned medical arms race (Connor, Feldman, and Dowd 1998).²²

Accordingly, our analysis focused on examining patterns of annual price growth rather than on patterns of price levels. By examining hospital price growth, each hospital in the study served as its own control for the potential confounding factors noted above.²³ Specifically, we used a first-difference model, where hospital price growth was the annual change in price between period t and $t-1$.²⁴ However, our empirical analysis is based on levels (in period $t-1$) rather than changes in a

21. Several of the previously mentioned studies of the relationship between market concentration and hospital prices were conducted as cross-sectional analyses of price levels (Lynk 1995; Dranove and Ludwick 1999; Simpson and Shin 1998). These analyses are possibly biased, since price levels may be correlated with unmeasured characteristics of a hospital's market.

22. As noted, previous research suggests that before the growth of managed care, hospitals competed largely on the basis of technological sophistication and other amenities that translated into higher rather than lower prices in more competitive markets. (i.e., the so-called medical arms race). Accordingly, even in markets where managed care penetration is relatively high, hospital price levels may still reflect some of the residual effects of this style of competition. Emmett B. Keeler, Melnick, and Zwanziger (1999) also make this point in their analysis of pricing patterns and nonprofit hospitals by noting that adjustment to the new world of managed care is not instantaneous and that competition can be hypothesized to affect changes in prices as well as levels of prices.

23. As an alternative analysis, we considered using fixed-effects analysis. However, a key requirement of fixed-effects models is that the values of all continuously measured independent variables change appreciably in each successive time period (Baltagi 1995). Since there is typically little annual change in market concentration for most hospitals in the sample, a fixed-effects analysis was not an appropriate strategy for data analysis. We also considered using a two-stage regression model with an instrument for a hospital's propensity to join or form a system. However, the empirical specifications to develop such an instrument are uncertain, particularly since it would be necessary to distinguish between a hospital's propensity to be a member of a local system and its propensity to be a member of a nonlocal system.

24. In first-difference models, dependent and independent variables are often expressed in logarithmic form. We initially followed this convention but found that results were not sensitive to whether or not variables were expressed in logarithmic form. To facilitate interpretation of regression coefficients, we present results without variables expressed in logarithmic form.

hospital's market concentration. As has been observed by other investigators, the concentration of hospital markets, on average, changes by only negligible amounts over time (Bamezai et al. 1999).²⁵ For most hospital markets in our sample, the annual change in market concentration is too small for investigating its effect on price changes.²⁶ Nevertheless, in a managed care environment the level of market concentration is an important factor relative to price changes. The promise of managed care lies in its ability to restrain the growth in hospital prices through such mechanisms as selective contracting (Zwanziger and Melnick 1992). Selective contracting requires markets in which there is competition among hospitals for the business of managed care organizations; therefore the absolute level of market concentration is essential to the ability of managed care to restrain hospital price growth. A hospital's use of market power can be demonstrated, at least indirectly, through faster price growth than what would be expected in a competitive market. In addition to market concentration, commonly used variables to assess market demand characteristics, such as the distribution of age and income within a population served, also change by only negligible amounts over time. Consequently, we also measured these variables at their levels in period $t-1$ rather than their changes between period t and $t-1$.

Setting

The study setting was California. We chose this state for three reasons. First, California is widely recognized as a leading state in promoting price competition among hospitals. As noted, the state has one of the most extensive managed care industries in the country, and this managed care industry has reportedly created a price competitive environment for hospitals. While price competition among hospitals may not be a reality in all states, it appears to be a reality in California.²⁷ Second, California makes available high-quality hospital data in the form of cost reports that

25. A number of studies have examined changes in hospital prices and costs in relation to levels of concentration in hospital markets (see, for example, Gruber 1994; Bamezai et al. 1999; Zwanziger and Melnick 1992; Connor, Feldman, and Dowd 1998).

26. The average correlation for hospital market concentration (using the Herfindahl-Hirschman index, which is discussed subsequently in the article) between consecutive years (e.g., 1990 and 1991) during the study period was consistently above .95. For the first and last year of the study period the correlation was above .90.

27. As noted, the Lynk 1995 study, as well as the three studies challenging the findings of the Lynk study, are based on California data.

provide information on price. Third, by focusing on a single state we eliminate possible biases from interstate variation in regulatory and economic climate. The time frame for the study was 1990 to 1995.

Data and Sample

We used several data sets to conduct the study. To identify which hospitals were members of hospital systems, we used information from the American Hospital Association's Annual Survey of Hospitals and the AHA Guide to Multihospital Systems databases (1990–1995). As a source of hospital financial and utilization data, we used the hospital cost reports that are available from California's Office of Statewide Health Planning and Development. The cost reports include revenues, expenses, and utilization statistics (e.g., discharges). These reports also identify the hospital's type of ownership (i.e., nonprofit, for-profit, public). Additionally, we used the 1990 Census and the *County and City Data Book* (U.S. Census Bureau 1994) as sources of data for the demographic characteristics of a hospital's market area.

The study sample included all private, acute-care, nonprofit hospitals in California with over thirty beds for which financial data were available.²⁸ We excluded a total of forty-two observations based on the following criteria: the number of private-payer discharges was less than two hundred; the price change over the previous year exceeded 100 percent; and long-term care revenue as a proportion of total patient revenue exceeded .40.²⁹ In addition, we excluded a study hospital as an observation for a given year during the study period if its locus of control changed between that year and the previous year (e.g., by joining a system between 1991 and 1992 after operating independently in 1991).³⁰ Hospitals that closed, converted to for-profit ownership, or changed their basic mission (i.e., from acute care to long-term care or specialty service) were also dropped from the sample in the year in which the transition occurred. The number of observations ranged between 153 and 169 for each year of the study.

28. Hospitals that belonged to Kaiser Permanente (Kaiser) were excluded from the sample because Kaiser fulfills its financial reporting requirement with a consolidated report for its hospitals. However, we did use the market share of Kaiser hospitals to compute our measure of market concentration, which we discuss subsequently in this section of the article.

29. After applying this threshold, less than 10 percent of the sample hospitals had nursing home revenue that comprised more than 5 percent of their total patient revenue. Thus the study sample comprised hospitals with a predominantly acute-care service orientation.

30. We discuss how we classified hospitals by locus of control subsequently in this section of the article.

Key Variables and Measures

Price. Following previous research, we measured price as net inpatient revenue per discharge for private payers (Simpson and Shin 1998; Connor, Feldman, and Dowd 1998).³¹ Net inpatient revenues exclude contractual discounts that hospitals extend to payers. Thus our measure of price is the amount the hospital actually received for the services provided to a patient. We excluded revenue from public payers (i.e., Medicare and Medicaid) because these payers have largely fixed prices. To account for the fact that hospitals admit patients for which all or some payment is never received (and thus would make prices appear lower than they actually are), we adjusted each hospital's number of discharges to reflect its proportion of gross patient revenue attributable to charity care and bad debt.³²

Market Concentration. To measure market concentration, we initially needed to decide on a definition of hospital market. The appropriate definition of hospital market has long been a controversial issue within both the health services research and antitrust fields (Garnick et al. 1987; Elzinga and Hogarty 1973; Morrissey, Sloan, and Valvona 1988; Dranove and Shanley 1989; Manheim, Bazzoli, and Sohn 1994). We defined a hospital market in consideration of the distance that previous research suggests patients are typically willing to travel to access most hospital services (Garnick et al. 1987).³³

To define hospital markets based on travel distance, for each hospital we constructed a unique market that included all zip codes that fell

31. This measure of price, which relies on information contained in hospital cost reports, is the average net price for all hospital inpatient services. As such, the measure will be sensitive to different mixes of services among hospitals. Several of the previously mentioned studies that have examined market concentration–price relationships for nonprofit hospitals have used DRG-level prices from patient discharge summaries. In these studies, price was computed for a common set of DRGs for hospitals in the sample. This approach would seem to be most valuable in the case of cross-sectional analyses of market concentration and price. However, if the analysis, as is true in this study, is annual price growth rather than price levels, service-mix differences would no longer appear to be a significant concern since a hospital's service mix is not likely to change much from year to year.

32. By applying this factor, a hospital's discharges were reduced in accordance with the amount of charity care and bad debt it had proportional to gross patient revenue.

33. We considered but ultimately rejected two common alternative approaches to defining hospital markets: (1) geopolitical boundaries (e.g., the county where a hospital is located), and (2) patient origin, which is the actual geographical locations, usually zip codes, from which a hospital attracts most of its patients. Market definition based on geopolitical boundaries is a convenient approach but lacks any theoretical foundation. Market definition based on patient origin is problematic since a hospital's prices are likely to influence the distance to which patients are willing to travel to obtain care from the hospital. If this is the case, market definition and hospital prices will be endogenous (Dranove and White 1994; Kessler and McClellan 1999).

within a certain radius of the index hospital. We chose radii in accordance with previous research on the distances that patients and physicians are willing to travel to obtain hospital care (*ibid.*). Specifically, for hospitals located in most urban areas within California, we used a radius of fifteen miles. The exception was for hospitals in Los Angeles County, where we used a radius of ten miles because of the large number of hospitals operating in that area. For hospitals in rural areas, which were hospitals located outside of a metropolitan statistical area (MSA), we used a radius of thirty miles. We considered all acute-care hospitals that were in operation within a defined market to be competitors of the index hospital.

We measured market concentration using the Herfindahl-Hirschman index (HHI). The HHI, which is a widely used measure of market concentration, is computed generally as the sum of the square of each firm's market share (Lynk and Morrissey 1987). For our analysis, a hospital's market share was based on its proportion of total acute-care, inpatient admissions for third-party payers.³⁴ The HHI ranges theoretically from zero to one, where one is a monopoly. As the HHI moves away from one, market concentration is decreasing. In the case of two hospitals operating in the same market and owned by the same system, we treated the two hospitals as a single entity (and therefore combined their discharges) for purposes of computing the HHI for that market.³⁵

Classification of Hospitals Based on Locus of Control. In accordance with our theoretical discussion about community control and hospital pricing patterns, we assigned all sample hospitals to one of three control categories based on two dimensions: (1) whether or not the hospital was a member of a system, and (2) the geographic dispersion of hospitals within the system to which a sample hospital belonged. Specifically, one group consisted of hospitals that did not belong to any hospital system— independent hospitals. This group consisted of hospitals where local community control would appear to be strongest and thus where the community control perspective would appear most applicable.

The other two categories consisted of hospitals that belonged to systems classified as either local or nonlocal. To operationalize our concep-

tual distinction between local and nonlocal hospital systems, we drew from research by Luke (1992), who has defined local systems in large part based on the physical distance between member hospitals and their corporate parent. Similarly, we distinguished between local and nonlocal systems based on the average distance between the corporate office of the system to which the focal hospital was a member and all hospitals in the system. Methodologically, this entailed several steps.

First, we used AHA data to determine for each system hospital in the sample the number and location of other hospitals that were members of the same system for each year in the study period. Second, we computed the straight-line distance between system hospitals and the corporate office of the system to which they were members. These distances were summed within systems and an average distance measure was computed for each system hospital in the sample.

Third, we examined the distribution of distance values for the system hospitals. Based on this examination, we concluded that an average distance of seventy miles (between corporate office and system hospitals) was an appropriate cut-off point for distinguishing between local and nonlocal systems.³⁶ Accordingly, we assigned a hospital to the local system category if it belonged to a system where the average intrastate distance of each member hospital to the system's corporate office was less than seventy miles. All other system hospitals were assigned to the nonlocal category. These hospitals were typically members of systems with a strong regional or multiregional presence. A descriptive comparison between hospitals in each of the two system categories (*i.e.*, local system and nonlocal system) reveals that they were members of very different systems in terms of size and geographic configuration. Hospitals assigned to the local system category were members of systems that had, on average, 6.4 hospitals and a distance measure (*i.e.*, between the corporate office and member hospitals) of 12.6 miles. By comparison, hospitals assigned to the nonlocal system category were members of systems that had, on average, 15.1 hospitals and a distance measure of over five hundred miles.³⁷

34. This includes acute-care admissions to for-profit and public hospitals.

35. We adopted this approach given that merger by definition is the consolidation of separately owned firms into commonly owned firms regardless of whether postmerger the firms continue to operate in individual facilities or plants (see Lynk and Neumann 1999).

36. Above approximately seventy miles, there was a cluster of hospitals with average distance measures of well over one hundred miles.

37. Most of the hospitals assigned to the nonlocal system category were members of systems that owned hospitals outside of California.

Analysis

We used multivariate regression as our primary analytic procedure. To perform the analysis, we constructed a pooled, cross-sectional data set. The hospital was the unit of observation. The dependent variable was annual percentage change in hospital price.

The primary independent variables were three interaction terms that we used to assess the relationship between market concentration and price changes for hospitals in each control category (i.e., independent, local system, nonlocal system). The interaction terms were the product of each control category and HHI. We suppressed the model intercept to allow for the direct presentation and comparison of the regression coefficients for the interaction terms. Dummy variables were used to indicate control category.

As noted, several factors other than market concentration may also be associated with hospital price changes. One such factor is a change in the basic unit of output for inpatient care: namely, discharges. Although our measure of price reflects the volume of hospital discharges, discharges are not a uniform output measure since patients differ in terms of type and severity of clinical condition. To account for possible changes at the hospital level in the mix of patients treated, we included in the regression model annual changes (i.e., between period t and $t-1$) in average length of stay, in the Medicare case mix, and in residents per bed.³⁸ We used the Medicare wage index to account for changes in input prices. For local market demand characteristics, we accounted for the following demographic characteristics: age distribution (i.e., percentage of population under age five and percentage over age sixty-five) and percentage of population living in poverty. As noted, these demographic variables were all measured at their levels in period $t-1$. We also accounted for changes in a hospital's percentage of total patient revenue from outpatient services since this may also affect market demand for the hospital's inpatient services.

In addition, we accounted for managed care penetration by using HMO enrollment figures within the MSA in which the focal hospital was located. This information was obtained from Douglas Wholey of the University of Minnesota, who has assembled a multiyear, national data set on HMO enrollment. The data set has been described in detail elsewhere (Wholey, Feldman, and Christianson 1995). Since HMO penetration as a continuously measured variable was highly correlated with hospital market concentration (and thus multicollinearity would have been a problem), we included in the regression model a dummy variable for

38. Although we exceeded Medicare revenue from hospital price, a hospital's Medicare case mix is typically highly correlated with its overall case mix. We included change in residents per bed because the variable itself has a strong association with severity of illness of hospital patients.

high HMO penetration (i.e., HMO penetration in the top quartile of the distribution among sample hospitals). Finally, we included a set of time dummies for each year of the study period. The empirical model we estimated is of the general form:

$$G_{it} = \sum_{j=1}^J (\alpha_j CON_{j(t-1)} + \beta_j (CON_j \times HHI_i)_{(t-1)}) + \sum_{k=1}^K \gamma_{ik} Y_{ik(t-1)} + \sum_{m=1}^M \mu_{im} \Delta Z_{im(t)} + \sum_{n=1}^N \omega_{in} W_{in} + \epsilon_{it}$$

Where:

$G_{it} = (P_{it} - P_{i(t-1)}) \times 100 / (P_{i(t-1)})$ is price growth rate for hospital i in period t

P_{it} is price per discharge for hospital i in period t

α_j is vector of coefficients

$CON_{j(t-1)}$ is dummy for control status j in period $t-1$ ($J = 3$; independent, local system, nonlocal system)

β_j is vector of coefficients

$HHI_{i(t-1)}$ is Herfindahl-Hirschman Index for i^{th} hospital in period $t-1$

γ_{ik} is vector of coefficients

$Y_{ik(t-1)}$ is matrix of k confounders for hospital i in period $t-1$

μ_{im} is vector of coefficients

$\Delta Z_{im(t)}$ is matrix of m confounders (change over previous time period) for hospital i in period t

ω_{in} is vector of coefficients

W_{in} are n time dummies

ϵ_{it} is error term for hospital i in period t and it follows normal distribution - $N(0, \sigma^2)$.

The structure of the data set—pooled, cross-sectional—is vulnerable to problems of autocorrelation and heteroscedasticity. Consequently, we estimated the regression equation by using generalized estimating equation (GEE), a statistical procedure that corrects for the problem of autocorrelation (Liang and Zeger 1986). We also used Halbert White's (1980) general approach to correct for the problem of heteroscedasticity.

Results

Table 1 presents descriptive data for the study sample. Table 2 presents results from the regression analysis.³⁹ The dummy variables for control status, which indicate theoretical change in hospital prices where the HHI is approaching zero, were not statistically significant. In addition, chi square

39. GEE does not produce a statistic that assesses the overall fit of the model such as an R^2 . We also estimated the model using ordinary least squares (OLS) regression and found that the model produced an R^2 (intercept centered) of .42. We present the results using GEE because as noted it offers advantages for pooled, cross-sectional data sets.

Table 1 Descriptive Statistics

Variable	Mean	Standard Deviation
% annual change in price*	1.45	17.79
Independent hospitals	.404	–
Local system hospitals	.261	–
Nonlocal system hospitals	.334	–
HHI	.273	.247
% annual change in LOS	–2.05	15.94
Annual change in case mix	–.013	.056
% annual change in residents per bed	1.45	8.04
Annual change in wage index	–.004	.053
% annual change in outpatient revenue	2.02	6.15
% population < 5	6.22	1.51
% population > 65	11.12	2.87
% population below poverty level	13.41	4.57

*The price for 1990 was \$6,181.

tests revealed no significant differences among the coefficients for these dummy variables. Thus, as might be expected, under competitive conditions the pricing patterns of each type of hospital appear comparable. Other than the interaction terms, three variables were statistically significant in the model. Two of the three variables pertain to a hospital's output and have expected effects. Specifically, increases in length of stay and case mix were both associated with price growth. The other variable was percentage change in patient revenue from outpatient services. An increase in the percentage of revenue from outpatient services was negatively associated with price growth for inpatient care, perhaps because in such situations hospitals are less reliant on inpatient services for their financial viability. Both change in residents per bed and high HMO penetration, though not statistically significant, have coefficients with signs that are in the expected direction (i.e., positive for residents per bed; negative for high HMO penetration). The time dummies indicate for each year of the study period the rate of price growth relative to the rate of price growth for the reference year, 1991 (that is, the rate of growth between 1990 and 1991). The coefficients for the time dummies indicate that prices rose at a decreasing rate in California during the study period.

One of two primary research questions we addressed is whether each category of nonprofit hospitals exercises market power in the form of higher prices. As noted, we used interaction terms (i.e., control category multiplied by HHI) to assess the market concentration–price relationship

Table 2 Multivariate Results: Effects of Control Status on the Pricing Patterns of Nonprofit Hospitals

Variable	Parameter Estimate	Standard Error	P Value
Independent	5.061	8.121	.53
Local system	4.176	7.138	.55
Nonlocal system	3.236	6.727	.62
Independent x HHI	6.360	2.694	.019
Local system x HHI	6.478	2.985	.03
Nonlocal System x HHI	15.861	4.03	.0001
% change length of stay	.462	.031	.0001
Change in case mix	11.970	5.845	.040
Change in residents per bed	1.036	.767	.171
% change in wage index	3.663	7.318	.61
High HMO	–1.01	1.09	.35
% change outpatient revenue	–.950	.097	.0001
% population < 5	–.364	.462	.43
% population > 65	–.249	.183	.17
% population below poverty level	.008	.109	.939
1992	–.865	1.67	.605
1993	–3.941	1.53	.010
1994	–10.640	1.516	.0001
1995	–14.533	1.625	.0001
Observations = 802			

for hospitals in each of the three control categories. For each control category, a statistically significant and positive interaction term would indicate that hospitals assigned to that category, on average, did exhibit faster price growth in more concentrated markets (i.e., exercised market power). As the results in Table 2 reveal, each interaction term was statistically significant at $p < .05$, positive, and of substantial magnitude.⁴⁰ Thus the results indicated that hospitals in each of the three categories exercised market power in the form of higher prices.

The other research question we addressed is whether nonprofit hospitals that are members of nonlocal systems are more aggressive than independent and local system hospitals in exercising market power. A significantly larger interaction term for the nonlocal system category relative to the interaction terms of the other two control categories would indicate that nonlocal system hospitals, on average, were more

40. We discuss the magnitude of the coefficients in the final section of this article.

Table 3 Comparison of Market Concentration–Price Relationship among Hospitals Based on Control Status

Comparison	Chi Square Statistic	<i>P</i> Value
Nonlocal system v. independent	4.03	.043
Nonlocal system v. local system	3.96	.049
Local system v. independent	.22	.64

aggressive in exercising market power. Descriptively, the coefficient for nonlocal-system hospitals was approximately twice the size of the coefficient for independent hospitals as well as for local system hospitals. The chi square tests (see Table 3) we computed indicated that the interaction term for the nonlocal system category was significantly larger than the interaction terms of the two other control categories. Thus the results indicated that hospitals that were members of nonlocal systems more aggressively exercised market power than did either independent or local system hospitals. No significant difference existed between the interaction terms for the local system category and the independent category.

In light of the results, an important consideration is that approximately half the hospitals assigned to the nonlocal system category were members of church-owned systems. There has been speculation that church-owned hospitals behave differently from other nonprofit hospitals (White and Begun 1998). Consequently, we repeated the regression analysis after removing church-owned hospitals from the nonlocal system category and assigning them to a fourth control category. The regression analysis included an interaction term that was the product of this fourth control category and HHI. The estimated coefficient for the interaction term was no different from the interaction term for nonsecular, nonlocal system hospitals.

We also conducted several other sensitivity analyses. First, since our reported empirical analysis examined changes in hospital prices without accounting for the possibility that the different types of hospitals started from different price levels, we repeated the analysis with the baseline price value for each observation as an independent variable (i.e., P_{it}). The addition of this variable did not change the pattern of results. Second, to test the sensitivity of our results to market definition, we repeated the regression analysis after redefining hospital markets with different radii than those previously noted (i.e., twenty and twenty-five miles for urban hospitals; thirty-five and forty miles for rural hospitals). These changes in market definition also did not materially alter the results previously presented. Third, given that a large number of California hospi-

tals are located in Los Angeles, where market competition is very high, we repeated the analysis after removing from the sample all observations for hospitals located in Los Angeles. This analysis also did not change substantively the results presented earlier in this article.

Discussion

Our investigation resulted in two primary findings. First, hospitals that were members of nonlocal systems appear to have priced their services more aggressively in the presence of market power than did either hospitals operating independently or hospitals operating as members of local systems. This finding suggests that local community control is a factor influencing a nonprofit hospital's use of market power. Many health policy analysts have long been concerned that the formation of hospital systems, by shifting the locus of hospital control outside local communities, would result in less sensitivity on the part of hospitals to local community priorities and needs (e.g., Gray 1991; Starr 1982). Our study provides evidence, albeit indirect, that in the case of geographically dispersed systems this shift in the locus of control translates into more aggressive pricing practices.

A second finding, consistent with several previous studies, is that among all nonprofit hospitals there appears to be a marked tendency to exercise market power in the form of higher prices. In more concentrated markets, hospital prices increased at a faster rate. Our study extends the extant literature on this topic by showing that the tendency to exercise market power holds across different types of nonprofit hospitals that, at least conceptually, can be expected to vary in the degree to which they are subject to community control. Moreover, this finding indicates that the level of hospital competition in a market is an important factor underlying hospital price inflation. In the absence of a competitive market, managed care organizations cannot effectively restrain price growth through selective contracting arrangements.

Given that even independent hospitals appear to exercise some degree of market power, nonprofit hospitals generally may be subject to weaker levels of community control than some advocates of hospital merger currently believe. As previously discussed, the boards of independent hospitals have historically comprised employers in the community who presumably should be motivated and empowered to resist price increases that exceed their hospital's financing requirements. Why are these boards perhaps not more successful in resisting hospital price increases under conditions of low competition? Two possible explanations are the following.

One is that board members may lack the ability to effectively oversee the decision making and actions of hospital managers. The general business literature suggests that governing boards, both within for-profit and nonprofit organizations, typically do not provide effective oversight of top managers creating a so-called agency problem (e.g., Fama and Jensen 1983; Daily and Dalton 1994).⁴¹ The top managers of an organization can take various steps to either limit or undermine board oversight of their decisions and actions. For example, top managers are often in a position to control the types and amounts of information board members receive or to which they have access. By controlling information flow, top managers can manipulate board members so that they do not constrain their decisions and actions.⁴²

Another explanation is an apparent trend among nonprofit hospitals toward greater insider representation on the governing board (Young 1997).⁴³ Hospitals have reportedly been filling board positions with hospital insiders, such as senior managers and medical staff members, to improve the board's ability to address complex strategic issues. However, as insiders increase their proportional representation on hospital boards, the community's influence over hospital decisions can be expected to decline.

Study findings need to be considered in relation to several caveats. First, this study examined nonprofit hospitals from one state, California, which has a much more developed managed care industry than do other states in the country. In the absence of a strong managed care industry, market concentration may be related to lower rather than higher hospital prices. Obviously, in markets where hospitals compete predominantly on quality-related factors, mergers would not appear to pose significant antitrust risks of higher prices. Research is needed to replicate our findings in hospital markets outside of California. Still, if managed care continues to spread

41. The basis for this so-called agency problem is that in a given organization the priorities of top managers are likely to differ from the priorities of those constituents the organization is intended to serve (the "owners"). Whereas the owners are interested in maximizing the value of the organization, managers are likely to be interested in job security, high salaries, and generous perquisites. As a result, managers, in the absence of effective oversight by the governing board or other "agents" of the owners, are likely to manage the organization in a way that does not maximize its value from the perspective of the owners (Fama and Jensen 1983).

42. See also Thomas Greaney's (1997) discussion of the possible limitations of governing board oversight in controlling hospital price hikes following mergers.

43. Young (1997) examined insider representation among a large sample of nonprofit hospitals in California for years 1981 through 1991. In 1981 approximately 20 percent of the sample hospitals had boards where more than one-third of the members had insider status as either senior managers or physicians from the medical staff. By comparison, in 1991 approximately 35 percent of the hospitals had boards where more than one-third of the members had insider status. While this study focused on hospitals in California only, anecdotal reports indicate that there has been a strong national trend among hospitals toward greater insider representation on governing boards.

throughout the country, studies of California may offer an important preview of future hospital pricing patterns in relation to competitive conditions.

Second, we measured community control indirectly based on two possible dimensions of this construct: whether or not a hospital is a member of a system and the geographic dispersion of hospitals within the system to which the focal hospital belongs. Our reliance on an indirect measure of community control increases the importance of considering alternative explanations for study findings. In particular, the faster price growth of nonlocal system hospitals may reflect that these hospitals, as part of systems with a broad geographic presence, obtain better terms of reimbursement from managed care organizations and other payers than do either independent hospitals or local system hospitals. Such favorable reimbursement terms might be secured, for example, where the corporate office of a hospital system negotiates reimbursement rates with a national managed care company on behalf of the hospitals in the system. However, rate negotiations of this nature appear to occur infrequently (Robinson 1999). Moreover, to the extent that they do occur, it would seem likely that the negotiated rates would vary for hospitals within a system that reflect the characteristics of the hospitals' local markets.

In addition, our measurement approach for community control does not capture many possible dimensions of the construct itself. For a hospital that is a member of a system, such possible dimensions include whether a local governance structure exists with some degree of authority for financial decisions. Indicators of such authority might be the existence of reserved powers to the hospital as stipulated in the corporate bylaws. For an independent hospital, an important dimension of community control is the actual proportion of board members that represents the local community. We would encourage the development of detailed measures of community control that can be used in future studies of hospital pricing patterns.

Third, the study focused on prices for inpatient care when, in fact, hospitals are providing an increasingly larger percentage of their total care on the outpatient side. Although a hospital's pricing patterns (in terms of price increases) for outpatient care may closely parallel its pricing patterns for inpatient care, there is little available evidence from which to draw a firm conclusion on this point.

The study's findings carry implications for antitrust enforcement policy as it relates to nonprofit hospitals. According to a leading health care forecasting firm, hospital mergers and acquisitions will continue at a steady pace through the next five to ten years (Institute for the Future 1999). Since obtaining market share appears to be a primary motivation for such transactions (Luke, Ozcan, and Olden 1995; Bogue et al. 1995; Brooks

and Jones 1997), it is likely that many hospital mergers in the future will have an impact on competition. Based on the results of our study, mergers or acquisitions involving nonprofit hospitals do pose antitrust risks if they reduce competition substantially in a market. These risks are in the form of higher hospital prices for consumers.⁴⁴ Our study does not address whether nonprofit hospitals channel the additional revenues they earn from exercising market power back into the community through the provision of uncompensated care and community-oriented services. Although this behavior would be consistent with some economic models of nonprofit hospitals (e.g., Gruber 1994), little empirical evidence addresses the question directly.⁴⁵ Moreover, the legal implications of such behavior from an antitrust standpoint are also not clear.⁴⁶

While study results point to the need for some degree of antitrust oversight for mergers and acquisitions involving nonprofit hospitals, the need for such oversight would seem to be heightened where there will be relatively weak community control over the hospital in question. The regression results indicate that antitrust risks may be particularly great when a merger that will have a substantial impact on competition involves a nonlocal system. Consider, for example, two scenarios in a market comprised of four hospitals and each hospital has a 25 percent share of the market. In the first scenario, two of the four hospitals merge to form an independent facility with two campuses. In the second scenario, a nonlocal system acquires two of the four hospitals. For both scenarios, the change in market concentration, as measured by the HHI, is identical.⁴⁷ However, the regression results imply that in the first scenario price growth would be approximately 50 percent greater than the average annual growth rate observed during the study period (1.45 percent).⁴⁸ By contrast, in the second scenario price

growth following the transaction would be approximately double the average annual growth rate observed during the study period.⁴⁹

Thus our results indicate that antitrust officials should consider, as part of their enforcement strategy for mergers involving nonprofit hospitals, not only the merger's impact on competition but also its impact on the merged entity's locus of control. Indeed, it appears that regional hospital systems are placing increasing emphasis on building market share in selected geographic areas through strategic acquisitions of independent hospitals and small, local hospital systems.⁵⁰ There is also speculation that many local systems may attempt to expand into regional systems that could also lead to the attenuation or elimination of local governance arrangements (Luke 1992; Institute for the Future 1999).⁵¹ Antitrust officials will need to watch for these and other possible trends that may shift the locus of a hospital's control outside the community it serves while at the same time leaving the community vulnerable to the hospital's use of market power.

44. These risks may already be materializing if there is any merit to the claims of some HMO executives that recent increases in HMO premiums are due to hospital mergers reducing their ability to negotiate for hospital price discounts (Franczyk 1998).

45. Simpson and Shin (1998) provide some limited evidence that nonprofits exercise market power against privately insured patients to pay for the care of uninsured patients.

46. Neither the federal antitrust statutes nor corresponding case law speak definitively to the appropriate treatment of a defendant with a "Robin Hood" motive for exercising market power.

47. In each scenario the change in HHI is .125 since the HHI for the four-hospital market is $.25 (4 \times .25^2)$ and the HHI for the three-hospital market (or where two of the four hospitals are under the same ownership) is $.375 (.50^2 + [3 \times .25^2])$.

48. We arrived at this estimate by multiplying the change in HHI (.125) with the coefficient for the interaction term corresponding to independent hospitals (6.360). We note a similar result would be obtained for a scenario involving hospital mergers to form a local system since the regression coefficient (for the interaction terms) for local system hospitals was comparable to the regression coefficient for the independent hospitals.

49. We arrived at this estimate by multiplying the change in HHI (.125) with the coefficient for the interaction term corresponding to hospitals in nonlocal systems (15.861).

50. There are no readily available data from which to assess systematically trends in this area, but many anecdotal reports exist. For example, California-based Sutter Health, a regional system, recently initiated a merger between one of its hospitals and another hospital that both serve the Berkeley, California, area (Rauber 1998). Regional systems appear to be focusing on such mergers and acquisitions to increase market share and strengthen their negotiating leverage with payers.

51. Such shifts in governance arrangements have already triggered legal posturing among policy makers and law enforcement officials. For example, the attorney general of Rhode Island filed suit to prevent a Rhode Island-based regional hospital system from reorganizing its governing board in such a way that it would allegedly diminish representation from those local communities that member hospitals serve (Pham 1998). In response, the system proposed an alternative governance model that met the approval of the attorney general.

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