How Hospitals Compete: A Review of the Literature

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A REVIEW OF THE LITERATURE

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I. INTRODUCTION

As hospital prices continue to surge, commentators increasingly advocate enhanced competition to bring down prices.[1] The traditional antitrust approach suggests that enhanced competition between hospitals increases hospitals' market efficiency,[2] thereby reducing prices.[3]

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1. Pauly, *A Primer in Media Markets*, in HEALTH CARE IN AMERICA: THE POLITICAL ECONOMY OF HOSPITALS AND HEALTH INSURANCE 27 (H. Frech ed. 1988); Noether, *Competition Among Hospitals*, 7 J. HEALTH ECON. 259 (1988); FEDERAL TRADE COMMISSION, BUREAU OF ECONOMICS, COMPETITION AMONG HOSPITALS (1978) (Staff Report prepared by Monica Noether).

2. In economics, efficiency is achieved when resources are utilized over a given time period in such a way as to make it impossible to increase the welfare of one person without decreasing

Other commentators argue that enhanced competition increases costs and thereby increases prices.[4] These conflicting arguments are reconciled by differentiating between price and nonprice competition.[5]

In most markets, price competition dominates. In health care markets, normal price-reducing market pressures are nonexistent or greatly reduced because poorly informed, highly insured consumers are insensitive to price differences. Instead of having incentive to engage in price competition, hospitals have incentive to engage in nonprice competition, resulting in overuse of technology and other resources. Because hospitals may be immune to the price-reducing effects of competition, policymakers are faced with the dilemma of deciding whether to apply the traditional antitrust approach to hospital mergers. The ultimate question becomes whether public policy should promote competition or limit competition among hospitals.[6] In an effort to clarify debate over this issue, this article reviews the literature on the subject.

II. PUBLIC POLICY UNDERLYING HOSPITAL REGULATION

Public policy underlying hospital regulation has pursued contradictory objectives. The older tradition of regulating through local health

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the welfare of another. An action increases efficiency as long as the marginal social benefit exceeds the marginal social cost.

3. *See* A. COURNOT, RECHERCHES SUR LES PRINCIPES MATHEMATIQUES DE LA THEORIE DES RICHESSES (1838); Bertrand, *Revue de la Theorie Mathematique de la Richesses Sociale et des Recherches sur les Principes Mathematiques de la Theorie des Richesses*, J. DES SAVANTS 499 (Sept. 1883); Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).

4. *See* Salkever, *Competition Among Hospitals*, in COMPETITION IN THE HEALTH CARE SECTOR: PAST, PRESENT AND FUTURE 149 (W. Greenberg ed. 1978); Lee, *A Conspicuous Production Theory of Hospital Behavior*, 38 S. ECON. J. 48 (1971); Pauly & Redisch, *The Not-For-Profit Hospital as a Physicians' Cooperative*, 63 AM. ECON. REV. 87 (1973).

5. Nonprice competition includes any avenue of competition other than price. In hospital markets, nonprice competition is usually in the form of factors which affect perceived quality. For example, in an environment of heightened nonprice competition, hospitals might provide more highly trained staff, better technology, and a greater variety of services. Nonprice competition does not imply that prices remain constant. In more competitive markets, it is possible that a rise in quality will be accompanied by a rise in price. Quality-adjusted prices, however, should fall.

6. It is important to account for competition in any study of the hospital industry. Hospital concentration, as a measure of competition, affects estimates of coefficients on other variables of economic interest. Large differences were found in production function estimates for end stage renal disease programs for concentrated versus unconcentrated hospital markets. *See* Held & Pauly, *Competition and Efficiency in the End Stage Renal Disease Program*, 2 J. HEALTH ECON. 95 (1983). Institutional and patient characteristics such as facility profit status, physician capitalization, partial care patients, and non-Medicare patients had coefficient estimates which varied from 24% to 54% depending on whether concentration was accounted for. Therefore, even when it is not the major focus of inquiry, hospital competition cannot be ignored.

and hospital planning boards discouraged hospital competition.[7] Passage of the National Health Planning and Resources Development Act of 1974,[8] an attempt to supplement or replace market forces, reflected this view. Congress, in the early optimistic days of health planning, suggested that,

> [s]ome consolidations (and perhaps some that would violate section 7 of the Clayton Act) may be socially beneficial . . . a court must examine the type and degree of competition among hospitals . . . not only with regard to the present, but also with respect to future developments and trends in health care financing, delivery, and regulation. . . .[9]

Failure of regulation to reduce costs led to renewed interest in competition[10] among hospitals to reduce costs. As faith in regulation faded with experience, the Federal Trade Commission (FTC) and the Department of Justice sought to foster competition by preventing hospital mergers. In court challenges, the FTC and the Department of Justice argued against hospital mergers in order to encourage competition and reduce prices.[11]

III. THE NATURE OF HEALTH CARE COMPETITION

A. *Consumer Information*

One of the causes of imperfect competition among hospitals is that consumers often are uninformed. Consumers are uninformed because of the high cost of obtaining better information. Evaluating health care requires extended consumption experience, making health care

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7. *See* Groose, *The Need for Health Planning*, in REGULATING HEALTH FACILITIES CONSTRUCTION 28 (C. Havighurst ed. 1974).

8. Pub. L. No. 93-641, 88 Stat. 2225 (1975) (codified at 42 U.S.C. §§ 300k-300s (1976)).

9. Miles, *Hospital Mergers and the Antitrust Laws: An Overview*, 39 ANTITRUST BULL. 253 (1984).

10. *See* Frech, *Competition in Medical Care: Research and Policy*, 5 ADVANCES HEALTH ECON. & HEALTH SERVS. RES. 1 (1984); Hersch, *Competition and the Performance of Hospital Markets*, 1 REV. INDUS. ORG. 324 (1984); Joskow, *The Effects of Competition and Regulation on Hospital Bed Supply and the Reservation Quality of the Hospital*, 11 BELL J. ECON. 421 (1980); Nelson, *Information and Consumer Behavior*, 78 J. POL. ECON. 311 (1970); Wilson & Jadlow, *Competition, Profit Incentives, and Technical Efficiency in the Provision of Nuclear Medicine Services*, 13 BELL J. ECON. 472 (1982); Hersch, Competition, Regulation, and Hospital Behavior (1982) (Ph.D. Dissertation, Ohio State University).

11. *See In re* American Medical Int'l, Inc., 104 F.T.C. 617 (1984); *see also* Blair & Fesmire, *Antitrust Treatment of Hospital Mergers* 2 U. FLA. J.L. & PUB. POL'Y 25, 45-48 (1988-89) [hereinafter Blair].

what one commentator calls an "experience good."[12] Consumers searching for "experience goods" depend upon recommendations of family, friends, and associates.

Most studies look at physicians as consumers' primary source of information. Several studies of medical shopping behavior and referral networks examined the means consumers use to collect information about medical markets. One study found that patients use recommendations of family and friends seventy-three percent of the time.[13] The study argues that "physicians play a far less important role in the selection of health services than common wisdom and previous research might suggest."[14] Another source cites the importance of social networks and lay referral systems.[15] Analysts conclude that the theory suggesting that physicians play a dominant role in consumers' health care choices "should be expanded to include some measure of both the quantity and quality of the social information networks available to individuals."[16]

Because information is costly to obtain, consumers are aware of only a fraction of available physicians or hospitals. The structure of health insurance both exacerbates consumer information deficiencies and weakens consumers' incentive to respond to known price differentials.

B. *Health Insurance*

Typically, health insurance pays a large proportion of consumers' hospital costs. Low consumer copayment percentages lead to high consumption of health services.[17] This is termed the "moral hazard effect" of health insurance.

Insured consumers with low copayment rates have less incentive to search for lower prices. As a result, hospitals can raise prices above the competitive level without losing many customers. Consequently,

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12. Nelson, *Information and Consumer Behavior*, 78 J. POL. ECON. 311 (1970); *see also* Blair, *supra* note 11, at 42-43 (discussing consumers' lack of information).

13. Booth & Babchuk, *Seeking Health Care From New Resources*, 13 J. HEALTH & SOC. BEHAV. 90 (1972).

14. *Id.* at 94.

15. Wolinsky & Steiber, *Salient Issues in Choosing a New Doctor*, 16 SOC. SCI. & MED. 759 (1982).

16. *Id.* at 765.

17. Some argue that lower copayments raise initial demand for health care which leads to better health, thus reducing future demand for health care. However, the recent Rand Corporation Health Insurance Experiment shows this is not the case. *See* Manning, Newhouse, Duan, Keeler, Leibowitz & Marquis, *Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment*, 77 AM. ECON. REV. 251 (1987) [hereinafter Manning]; *see also* Blair, *supra* note 11, at 42 (discussing effect of third party payments on competition).

even individual hospitals in highly competitive markets have some monopoly power. One commentator argues that as health care prices rise, consumers have greater incentive to insure. This pushes up health care prices even further.[18] This commentator estimates the welfare loss of excess health insurance by balancing the benefit of reduced risk against costs of overconsumption and increased health care prices. The commentator concludes that low consumer copayment rates have caused a welfare loss of more than $4 billion per year since 1973.

A recent study shows that increasing consumers' copayment rates from 0% to 95% causes health care expenditures to fall by over 30%.[19] Increasing consumers' copayment rates from 0% to 25% still reduces expenditures by over 19%. When consumers have insurance with a zero copayment rate, they are only interested in nonprice factors such as health care quality, amenities, and convenience. Consumers with zero copayment rates have no interest in price differences. No matter how high the price of services, a zero copayment rate gives consumers no incentive to switch to other hospitals in search of lower prices.[20]

IV. COMPETITION AMONG HOSPITALS IN THEORY

Because of low copayment rates, hospitals compete on a nonprice basis.[21] Many observers believe that low copayment rates increase health care quality. Quality is high because costly medical tests and procedures are used excessively. This is economically inefficient. Quality is higher than consumers would be willing to pay if required to pay full price.[22] Price competition eliminates this inefficiency.

Essentially, there are three theories of hospital competition. The first is the traditional economic theory of oligopoly.[23] This theory holds

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18. Feldstein, *The Welfare Loss of Excess Health Insurance*, 81 J. POL. ECON. 151 (1973).

19. Manning, *supra* note 17.

20. *See* Frech, *supra* note 10; Newhouse, *The Structure of Health Insurance and the Erosion of Competition in the Medical Marketplace*, in COMPETITION IN THE HEALTH CARE SECTOR: PAST, PRESENT, AND FUTURE, *supra* note 4, at 215.

21. Economists view hospital decisionmakers as maximizing objective functions depending on quantity and quality of service or hospital prestige. Some models posit physician control of the hospital so that physician income is maximized. Hospitals will either maximize profits or at a minimum, break even. Pauly's study shows that hospitals' response to the external environment is similar whether maximizing profits or serving other goals such as prestige or physicians' incomes. Pauly, *Behavior of Nonprofit Hospital Monopolies: Alternative Models of the Hospital*, in REGULATING HEALTH FACILITIES CONSTRUCTION at 143 (C. Havighurst ed. 1974).

22. *See* Olson, *Commentary: Organization and Financing of Medical Care*, 23 MED. CARE 432 (1985).

23. Several standard oligopoly theories state that more competitors lead to more price competition and lower prices for constant-quality output. *See, e.g.,* A. COURNOT, *supra* note 3

that an increase in the number of competitors (less concentration)[24] leads to increased price competition which lowers prices[25] and hospital profits. The traditional theory, however, does not predict whether less concentration increases or decreases quality. Empirical evidence demonstrates that a decrease in concentration leads to increased non-price competition. Since costly nonprice competition is self-defeating from hospitals' perspectives, hospitals have incentive to collude to suppress nonprice competition. Reducing nonprice competition by "reducing wasteful duplication" is one of the main features of local health

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(stressing oligopolistic interaction without collusion); Bertrand, *supra* note 3 (stressing oligopolistic interaction without collusion); Stigler, *supra* note 3 (stressing collusion).

24.   In the field of industrial organization, a long history of research relates concentration of sellers or buyers to various measures of economic performance such as price or profits. The concentration of sellers increases in markets with fewer sellers (holding seller size constant) as each seller supplies a greater portion of the market.

Economists commonly use two simple measures of concentration. The older measure, the concentration ratio, is the proportion of industry output sold by a given number of the largest firms. Usually four or eight firms' output is analyzed. One objection to the concentration ratio is that it ignores distribution of sales among larger and smaller firms. Furthermore, the number of firms used in the definition is arbitrary.

These objections gave rise to the Herfindahl Index, which yields a measure that considers the entire size distribution. The Herfindahl Index is defined as the sum of squared market shares of the firms in the industry.

In symbols,

Herfindahl Index $= s_1{}^2 + s_2{}^2 + s_3{}^2 + \ldots + s_i{}^2$

where: $s_i =$ the market share of firm i.

Measuring the market shares as proportions, the Herfindahl Index varies from a minimum of zero to a maximum of one (1.00). For example, the Herfindahl Index for a market of three firms of equal size (0.333) is $(0.333^2 + 0.333^2 + 0.333^2) = 0.333$. If two of those firms merge, the Herfindahl Index would be 0.556 $(0.6672 + 0.333^2)$. The difference is about 0.222. This merger shall be the benchmark for examining the quantitative impact of differences in concentration throughout the rest of this paper. The Department of Justice expresses the Herfindahl Index in terms of percentages, rather than proportions. Accordingly, the above values would be 3333, 5556, and 2223.

The 1984 Department of Justice Merger Guidelines call for investigations of mergers that raise the Herfindahl Index, in terms of percentages, by 100 points or more. In the context of hospital markets, application of this threshold requires an investigation of virtually every merger. For example, in a market with five equally sized hospitals, the Herfindahl Index would be 2,000. A merger of two hospitals would raise the Herfindahl Index to 2,800. This would be a less concentrated hospital market than the United States average for SMSAs.

The Herfindahl Index is popular — partly because the Department of Justice adopted it and partly because it seems more scientific than the simple concentration ratio. Appearances, however, are misleading. Oligopoly theories are easily constructed in which either measure is superior. Yet, empirical research in many industries over many years shows that the Herfindahl Index highly correlates to the concentration ratio. Therefore, the measure used makes little difference.

25.   Prices are lowered for a given level of quality.

planning and is, therefore, one of the main features of regulation.[26] This is natural because the complexity of the product makes it difficult for price collusion to be successful. Collusion regarding visible technology and equipment might be expected to be significantly easier to maintain than collusion regarding prices of services. In fact, most known collusions focus on easily observable output features or specific services such as maternity care.[27]

The second theory of hospital competition stresses physicians' influence over consumers' health care choices.[28] Hospitals engage in nonprice competition to attract physicians and thereby attract patients.[29] Examples of nonprice competition include purchasing sophisticated equipment and technology, using excess personnel, and increasing reservation margins.[30] This theory contends that markets with more hospitals engage in more nonprice competition, thereby raising quality and costs. Since consumers with low copayment rates ignore prices, hospitals can raise prices to maintain profits as increased nonprice competition raises their costs. Thus, this theory concludes that increased competition causes quality to rise but does not increase price competition. Consequently, competition does not reduce prices or hospital profits.[31]

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26. Gottlieb, *A Brief History of Health Planning in the United States*, in REGULATING HEALTH SERVICES CONSTRUCTION at 7 (C. Havighurst ed. 1974).

27. For example, a 1975 agreement among the three major Modesto, California hospitals provided for allocation of some services among hospitals. The services allocated were prenatal care, radiation therapy, computerized automated axial tomography scanning, and dialysis. *See* letter and attachment from Saleem Faraq, Chief, Office of Statewide Health Planning & Development, to Harlyn Robinson, Administrator, Modesto City Hospital (May 18, 1977).

28. Salkever, *supra* note 4, at 149.

29. Most analysis to date ignores patient behavior, instead modeling the physician as acting in the patient's best interests. As consumer coinsurance rates and deductibles rise, it will become increasingly important to consider patient behavior. *See* Newhouse, *The Erosion of the Medical Marketplace*, 2 ADVANCES HEALTH ECON. & HEALTH SERVS. RES. 1 (1981) (considering patients' reduced incentive due to low copayment rates to search for lower priced health care); Noether, *Competition Among Hospitals*, 7 J. HEALTH ECON. 259 (1988) (considering both price and nonprice competition and its effect on patients); FEDERA' TRADE COMMISSION, BUREAU OF ECONOMICS, COMPETITION AMONG HOSPITALS (1978) (Staff Report prepared by Monica Noether) (considering both price and nonprice competition and its effect on patients).

30. When a hospital increases reservation margins, it adds beds, reducing the probability of a patient being turned away.

31. Similar results occur when physicians exercise control over the hospital. *See* Pauly & Redisch, *supra* note 4. Increased competition for physicians allows physicians to consume increased levels of inputs which pushes hospital costs upward. Of course, this situation also allows physicians to increase their incomes as well.

The third theory is an application of the increasing monopoly theory to the hospital market.[32] This theory examines the behavior of imperfectly informed consumers searching for an "experience good." By assuming that an overlap in recommendations is necessary for a consumer to have confidence in his information, the theory concludes that information is less perfect where there are more alternatives. With more alternatives, the consumer is less likely to receive overlapping recommendations about any providers. If that happens, the presence of more sellers reduces competition by eroding consumers' reliance on price information, thereby driving up prices and increasing hospital profits.

V.   EMPIRICAL RESULTS

A.   *The Degree of Competition*

How competitive is the market for hospital services? Most studies of hospital competition implicitly answer that competition exists, but only one study provides an explicit answer.[33] The study estimates the price elasticity of demand curves facing individual hospitals.[34] The more elastic a demand curve, the less consumers will purchase when prices rise. The study assumes that if hospitals are perfectly competitive, the demand curves facing individual hospitals would be infinitely elastic in a negative direction. If hospitals did not compete at all, then the price elasticity facing individual hospitals would equal the market price elasticity. Using 1981 data from thirty-one hospitals in a metropolitan area, the study found that individual hospitals' price elasticities varied from -0.799 to -3.94.[35]

Because demand is not infinitely elastic, the study rejects the hypothesis that hospitals are perfectly competitive. While these elasticities are small enough to decisively reject perfect competition, they

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32.   Satterthwaite, *Consumer Information, Equilibrium Industry Price, and the Number of Sellers*, 10 BELL J. ECON. 472 (1979); *see also* Pauly & Satterthwaite, *The Pricing of Primary Care Physicians' Services: A Test of the Role of Consumer Information*, 12 BELL J. ECON. 488 (1981) (applying the increasing monopoly theory to the physician services market).

33.   Feldman & Dowd, *Is There a Competitive Market for Hospital Services?*, 5 J. HEALTH ECON. 277 (1986).

34.   The price elasticity of demand measures the responsiveness of consumers to price changes. It is defined as percentage change in quantity demanded divided by percentage change in price. Since quantity demanded declines as price rises, this ratio is always negative, although absolute value is sometimes discussed. The price elasticity of demand varies from zero (perfectly inelastic) to negative infinity (perfectly elastic). The closer the price elasticity of demand gets to zero, the less responsive consumers are.

35.   Feldman & Dowd, *supra* note 33. Individual physician price elasticities calculated in a similar manner were slightly higher — ranging from -1.75 to -5.20 for private patients.

are also sufficiently larger than the industry price elasticity average of -.1 to -.3. Therefore, some competition exists. Thus, while hospital competition is imperfect, the market is also far from a perfect monopoly.

B. *Nonprice Competition*

A variety of studies analyze the effects of nonprice competition on hospital services and technology. These studies examine different time periods over the past twenty years. In the early 1970s, consumers had lower copayment rates for more services. Consequently, consumers were less responsive to price differences during the early 1970s than in more recent years.[36]

1. Service Availability and Cost

One study analyzed the effects of competition on reservation margins for hospital beds[37] using data from 1977.[38] The study showed that increased competition results in higher reservation margins. The study used estimates drawn from other studies to argue that higher capacity is inefficient because it results in empty beds. Some studies, however, isolate long-run costs of empty beds to show that costs of empty beds are very low.[39] Thus, the conclusion that empty beds are inefficient is flawed because it relies on studies that were unable to isolate the long-run costs of empty beds.

Another study found that decreased concentration leads to higher levels of nonprice competition as measured by expenditures, registered nurses (RNs), and licensed practical nurses (LPNs) per day of care.[40] This study also found that hospitals in less concentrated markets offer better staff support to attract physicians. Certificate of need legislation was found to prevent concentration decreases.

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36.   Due to the recent trend towards more pro-competitive forms of health insurance like higher consumer copayments, HMOs, and PPOs, the year described by the data is important and interesting. Further, profit-seeking hospitals and hospital chains, which are widely believed to compete more aggressively, have grown rapidly in recent years. More recent studies of competition would reflect these environmental changes and would be expected to find more price competition.

37.   The reservation margin is the ratio of unutilized hospital beds to the total number of beds. The greater this ratio, the greater the likelihood a bed will be available in the future.

38.   Joskow, *supra* note 10.

39.   Friedman & Pauly, *Cost Functions for a Service Firm with Variable Quality and Stochastic Demand: The Case of Hospitals*, 63 REV. ECON. & STATISTICS 620 (1981). The cost of an empty bed is about eight percent the cost of a full bed. *Id.*

40.   Hersch, *Competition and the Performance of Hospital Markets*, 1 REV. INDUS. ORG. 324 (1984); Hersch, Competition, Regulation, and Hospital Behavior (1982) (Ph.D. Dissertation, Ohio State University).

The same study also found that decreases in concentration lead to longer average hospitalization. Nonprice competition was found to lead to higher quality and higher prices. Higher prices deter demand for elective hospital care — at least for consumers whose insurance requires high copayments. This leads to greater than average resource expenditures per patient and longer than average hospitalization.

Still another study related the costs of maintaining nuclear medicine departments to the form of hospital ownership and to the degree of hospital concentration within local markets.[41] The study measured hospital competition by correlating hospital density, referral radius of individual hospitals, and population density. Nuclear medicine department costs were higher in hospitals with less concentrated local markets. Profit-seeking hospitals had substantially lower costs than private nonprofit or government hospitals. This is probably a result of greater efficiency.

A recent study analyzed 1972 hospital data and examined the effect of the number of competitors on patient volume, length of stay, and cost per patient.[42] The study measured concentration by calculating the number of hospitals within a fifteen mile radius.[43] Utilizing the pure distance-oriented market, the study analyzed 5,013 general hospitals nationwide.[44] The study included controls on demand variables but demographic variables were excluded. The study found strong evidence that low concentration in a market area leads to increased hos-

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41. Wilson & Jadlow, *supra* note 10.

42. Robinson & Luft, *The Impact of Hospital Market Structure on Patient Volume, Average Length of Stay, and the Cost of Care*, 4 J. HEALTH ECON. 333 (1985).

43. *See* Luft & Maerki, *Competition Potential of Hospitals and Their Neighbors*, 3 CONTEMP. POL'Y ISSUES 89 (1984-85) (laying the groundwork for a number of future studies utilizing a pure distance-oriented market definition). Beginning with the location of each hospital's post office, Luft and Maerki calculated the number of hospitals within a fifteen mile radius of each hospital. *Id.*

While studies utilizing the number of hospitals in a given radius avoid problems of overestimating the market in large SMSAs, there are shortcomings with this practice. This pure distance-oriented market definition ignores the fact that markets are related to geographic attributes, ease of transport, employment, and shopping patterns. All these factors are considered in SMSA definitions which are designed to reflect local markets. Furthermore, hospitals are not of equal size — a feature not accounted for in the Luft and Maerki measure. Most of the studies reviewed in this paper used the SMSA, county or both as the market area. Exceptions are noted in the text.

44. A smaller sample of 1,084 was also examined which allowed for detailed casemix corrections based on diagnostic data. This study found little change in the coefficients that measured competition. This indicates that other survey variables are reasonable proxies for casemix. These researchers' finding that use of their variables rather than casemix makes little difference, indicates the validity of much of the rest of the research performed by other authors who do not control for casemix.

pital admissions and greater total per capita hospital costs in the affected counties.

The study used hospitals with one competitor as the reference level. Hospitals with two to four competitors reported costs 9% higher than hospitals with one competitor. Hospitals with five to ten competitors reported costs 16% to 17% higher, and hospitals with more than ten competitors reported costs 20% to 21% higher. Competitors' effect on costs supports the theory that an increase in competitors increases nonprice competition for physicians and/or patients. Markets with higher physician-to-population ratios, however, reported significantly higher costs per admission and per inpatient day. These reports dispute the theory that a low supply of physicians increases nonprice competition.

In addition, the study found that hospitals with more inpatient days per capita have lower costs. As a result, by lowering prices, hospitals increase the quantity of hospital care demanded, causing consumers who are less ill to choose hospitalization. Hospitals with more inpatient days per capita reported greater average lengths of stay per admission but lower costs per patient day.[45]

2. Technological Diffusion

Generally, lower concentration causes hospitals to purchase new technologies more quickly than they might in noncompetitive environments. A variety of studies consider the effects of competition on hospitals' new technology purchases. A comprehensive study of this issue considers the effects of concentration, measured by a four-firm concentration ratio, on the speed of hospitals' purchase of various technologies.[46] Analyzing 2,772 short-term nonfederal hospitals, the study analyzed the number of years required before a hospital acquires facilities for respiration therapy, diagnostic radioisotopes, electroencephalography, and intensive care. Additionally, the study examines effects of concentration on the number of intensive care hospital beds. The study also analyzes the effects of concentration on whether a hospital offers cobalt therapy, open heart surgery, and renal dialysis facilities.

The results were mixed, but the study concludes that market concentration has little significant effect on technology purchases. For

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45. Because the first days of care are typically the most input intensive and costly, average cost per day would be expected to decline with increased average length of stay for each individual admission.

46. L. RUSSELL, TECHNOLOGY IN HOSPITALS: MEDICAL ADVANCES AND THEIR DIFFUSION (1979).

example, when using the year of purchase of a specific technology as a dependent variable, hospitals in markets with a concentration ratio between 0.50 and 0.79 delayed the longest in acquiring facilities for respiration therapy, diagnostic radioisotopes, electroencephalography, and intensive care. Markets with both higher *and* lower concentration purchased these technologies more quickly. This result is difficult to reconcile with any conclusion. Also, concentration has no significant effect on the proportion of beds devoted to intensive care or the probability of a hospital offering cobalt therapy or inpatient renal dialysis. Open heart surgery facilities, one of the prestige technologies, were significantly more common in less concentrated markets. This last result is consistent with a high degree of nonprice competition for physicians or patients. Overall, this study raises more questions than it answers.

Another study analyzed only urban market areas and found evidence that nuclear medicine technology spreads faster in states with lower hospital concentration.[47] A third study found a mixed relationship between concentration and technology purchase. A lower concentration reduced the probability that electronic fetal monitoring and centralized management systems technology would be available. Yet, lower concentration increased the probability that volumetric infusion pumps would be available.[48] When performed with an improved estimator, the study found that hospitals purchase only fiberoptic endoscope technology more slowly in less concentrated markets.[49]

In contrast, another study found surgical technology less likely to be available in less concentrated markets.[50] Mixed results were found in yet another study.[51] Hospitals are more likely to have mammography, 24-hour emergency care, and cardiac catheterization if their competitors have them but are less likely to offer cobalt therapy or heart surgery if their competitors offer such services.

The last two technologies' immunity to competition is logical. Only radiation therapy specialists use cobalt equipment. Consequently, a

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47. Rappaport, *Diffusion of Technological Innovation Among Non-Profit Firms: A Case Study of Radioisotopes in U.S. Hospitals*, 30 J. ECON. & BUS. 108 (1978).

48. Romeo, Wagner & Lee, *Prospective Reimbursement and the Diffusion of New Technologies in Hospitals*, 3 J. HEALTH ECON. 1 (1984).

49. Lee & Waldman, *The Diffusion of Innovations in Hospitals*, 4 J. HEALTH ECON. 373 (1985).

50. Sloan, Valvona, Perrin & Adamache, *Diffusion of Surgical Technology* 5 J. HEALTH ECON. 31 (1986).

51. Luft, Maerki, Robinson, Garnick & McPhee, *The Role of Specialized Clinical Services in Competition Among Hospitals*, 23 INQUIRY 83 (1986).

hospital would not use a cobalt therapy facility to attract new physicians. Cobalt therapy equipment may also be prohibitively expensive unless the hospital can expect to obtain a large percentage of the business in the area. Additionally, cobalt therapy is typically performed on an outpatient basis and would not greatly increase patient admissions.

Heart surgery is also likely immune from competition because quality of care is enhanced when performed in high volume settings. Both hospitals and local health care planning agencies favor limiting the number of open heart units in each market area. Only about 10% of the nation's hospitals performed heart surgery in 1972, and these were usually regionally dispersed.

Pursuing the spread of sophisticated heart surgical units into a later time period, a study using 1983 data analyzed the influence of competition and regulation on the availability of heart surgery.[52] The study contained controls for teaching role[53] and population. The study found hospitals with more than twenty competitors were 155% more likely to offer coronary angioplasty and 147% more likely to offer bypass surgery than hospitals with no competitors. The study concludes that competition encourages and regulation discourages proliferation of these cardiac services.

C. Costs and Prices

A recent study using 1982 data examined California markets and corrected concentration measures to account for multi-hospital ownership and management. The study found that concentration increases have a weak negative effect on revenue per patient day.[54] The study

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52. Robinson, Garnick & McPhee, *Market and Regulatory Influences on the Availability of Coronary Angioplasty and Bypass Surgery in U.S. Hospitals*, 317 NEW ENG. J. MED. 85 (July 9, 1987) (percutaneous translominal coronary angioplasties and coronary-artery bypasses were specifically studied).

53. *Id.* A study controlling for teaching role takes into account teaching hospitals and those hospitals affiliated with medical schools. These types of hospitals are more likely to undertake more complex, novel procedures and are thus more likely to have higher costs.

54. H. Zaretsky, Preliminary Results of Analysis of Modesto City Hospital and the Economic Impact of Its Acquisition (unpublished report, 1984) (H. Zaretsky & Associates, Sacramento, California). Hospitals under common ownership or management and located in the same market are treated as a single hospital in order to calculate the concentration index. While adjustment for common ownership is proper, problems arise when all hospitals under management contracts with the same hospital management firm are viewed as if they are one hospital. Different hospitals may not coordinate pricing, quality or amenity decisions in monopolistic ways. A close examination of the role of hospitals' boards of directors, medical staffs, and management contracts is necessary to decide whether to treat hospitals as if they are combined.

found that an increase in concentration of 0.22 on the Herfindahl Index leads to a net revenue reduction per patient day of about 4.5%.[55] Also, high occupancy rates had a positive effect on net revenue, despite the fact that high occupancy rates reduce average costs. This finding is consistent with research from other industries. High occupancy or capacity utilization rates weaken price competition incentives. However, the study is flawed because it fails to adjust data to account for market and hospital distinctions which might have affected the results.

A similar study of the effect concentration has on revenue per patient day was performed in 1985.[56] This study found that a decrease in concentration increases both costs and revenues. Using a sample of 400 short-term, general, nonfederal hospitals in the United States from 1970 to 1977, the study adjusts for variations in demand and demographics by utilizing dummy variables for each of sixty-four different regions. This approach may simplify analysis, but it reduces precision and potentially biases results.[57] For example, this approach ignores the fact that hospitals with a large number of specialized facilities may attract patient mixes that require more costly care, thereby reducing revenues. Thus, ignoring patient mix variations may overstate the negative effect found on both costs and revenues.

The study found that hospitals in less concentrated markets produce more expensive medical care and have higher revenues than hospitals in more concentrated markets. Hospitals in counties with at least four competitors had 27.81% higher operating expenses and earned 17.61% greater gross revenues per adjusted admission than hospitals with a monopoly in their county. Competition raised costs faster than it raised prices. This resulted in lower hospital margins due to higher nonprice competition. Hospitals in less concentrated markets employed more capital and labor, provided more services, performed more procedures, had greater hospitalization periods, and had lower occupancy rates.

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55. *Id.* Most studies define a market area as either the Standard Metropolitan Statistical Area (SMSA) or the county. Zaretsky, however, was able to use the Health Facilities Planning Area (HFPA) to define the market area of his study. The HFPA has a potential advantage over the SMSA market definition because it mimics small SMSAs where the SMSA seems to be a reasonable market areas, while also breaking up larger SMSAs into smaller areas where the SMSA is too large to be truly considered one market. For example, San Francisco and the four surrounding counties contain eleven HFPAs.

56. Farley, *Competition Among Hospitals: Market Structure and Its Relation to Utilization, Costs and Financial Position*, RESEARCH NOTE 7, HOSPITAL STUDIES PROGRAM, UNITED STATES DEP'T HEALTH & HUMAN SERV., NAT'L CENTER HEALTH SERVS RES. & HEALTH CARE TECHNOLOGY ASSESSMENT (1985).

57. Hornbrook & Monheit, *The Contribution of Case-Mix Severity to the Hospital Cost-Output Relation*, 22 INQUIRY 254 (1985).

Hospital services in less concentrated markets are more service-intensive and sophisticated. By these measures, hospitals in less concentrated markets provide higher quality care.

One of the latest studies to consider hospital price competition examined both price and nonprice competition in a study of about 2,800 hospitals located in standard metropolitan statistical areas (SMSAs) in 1977 and 1978.[58] The study used an effective price measure of average hospital charges per admission for eleven disease categories. The data determined average patient charges per admission from a 20% sample of all Medicare hospital inpatient bills. While the price data implicitly controlled for patient mix, it is more effective to hold quality constant as well. Holding quality constant makes the results more meaningful because availability of specialized services correlates with higher costs.

Lower concentration had a positive effect on ten of the eleven disease categories. The results, however, were statistically insignificant in all cases. In addition, the estimated coefficients were relatively small, showing that lower concentration has little impact on lowering hospital prices. In all eleven disease categories, an increase in the Herfindahl Index of 0.22 reduced price by only 0.77% at the SMSA level and by 1.17% at the individual hospital level.[59]

However, hospital costs per admission decreased significantly in more concentrated markets, falling by 3.74% to 5.94% when the Herfindahl Index was increased by 0.22. The study concluded that hospital margins rise and costs fall with increases in concentration. The reduction in costs may reflect a reduction in nonprice competition.

Certificate of need laws were also found to lead to higher prices and costs. States which had these laws for ten years longer than other states had 8.3% higher prices and 7.7% higher costs for hospital services. Additionally, profit-seeking hospitals were found to charge higher prices, although their costs were not significantly different from non-profit hospitals. Furthermore, the study concludes that the presence of profit-seeking hospitals in a market does not increase price competition. This last conclusion is suspect because profit seeking hospitals only enter markets where the greatest profit potential exists. Thus, the study may have mistaken lack of positive correlation between profit-seeking hospitals and higher prices for lack of effect on price competition.

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58. *See* Noether, *supra* note 1.

59. *Id.* at 69. An increase in the Herfindahl Index of 0.22 was the benchmark merger of two among three equally sized hospitals.

Lastly, the study found that health maintenance organization (HMO) membership does not significantly affect hospital prices or costs, although the study noted this result is expected to change. The study also found that the presence of more physicians in a given hospital, either per bed or per capita, raises hospital prices and costs. This finding disproves the view that competition for relatively scarce physicians drives up costs.

A recent study of hospital competition, prices, and costs is unique in its dual focus on consumer information as a major source of hospital market power and the effects of competition on hospital service avail-ability.[60] This study essentially confirms the prior-mentioned study's results regarding prices and costs.[61] Greater concentration reduced costs, quality, and hospital daily room prices. Interestingly, greater concentration raised prices for laboratory services. In an analysis com-parable to the prior- mentioned study, a 0.22 increase in the Herfindahl Index reduced costs by 2.9%, while the increase reduced daily room prices[62] by 1.5%.[63] The effect on the prices of six laboratory services, however, was decidedly different. Here, higher concentration resulted in significantly higher prices. On average, the standard merger raised prices by 2.5%.

The study analyzed the effect of consumer information on prices by using variables such as proportion of female-headed households, proportion of households with a telephone, and proportion of house-holds that recently moved. These variables were more important in influencing hospital prices than costs. Overall the consumer informa-tion variables were statistically significant at the 84% level in the daily charges regression. The consumer information variables exceeded the 99% level for four of the six laboratory fee regressions. As ex-pected, the presence of a greater proportion of female-headed house-holds[64] had a positive effect on price,[65] and the presence of a greater proportion of households with a telephone had a negative effect on price.

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60. Woolley, Consumer Information and Competition Among Hospitals (Nov. 1987) (Ph.D. dissertation, University of California, Santa Barbara).

61. *Id.* The year 1970 was chosen as the year of least price competition; 1970 was close to the peak of the completeness of hospital insurance (the proportion of hospital bills paid by third parties), and it predated the recent explosive growth of HMOs and PPOs.

62. *Id.* Like Noether, this portion of Woolley's study did not adjust for variation in services and technology availability in the market.

63. *Id.* The 2.9% cost reduction was statistically significant at the 95% level, and the 1.5% cost reduction was statistically significant at the 70% level.

64. *Id.* Presumably, one-parent headed households have less time to gather information and to shop.

65. *Id.* A positive effect on prices is caused by a variable that increases prices.

Also, the presence of a greater proportion of households who move consistently has a negative effect on price. Moving, much like higher education, is a costly investment in a better future. Moving is often an investment in human capital. Thus, consumers who have recently moved are likely to be younger and better educated than those who have not moved. Consequently, movers may search more efficiently for health care providers in spite of the disadvantage of having recently moved, thereby accounting for the negative impact on prices.

The study estimated the effects of concentration on nonprice competition directly by measuring an index of available services. Each service was weighted by a coefficient derived from a regression of hospital charges. The services which had a greater price impact (presumably the more highly valued services) were given greater weights. The study found significant evidence that nonprice competition abates as concentration increases. This suggests, as the prior study also concluded, that quality adjusted prices may be higher in more concentrated markets even though the price of the average hospital day may be lower.

The study tested this assumption by including service availability variables in price regressions. This technique is better than the prior study's method of measuring effect of concentration on price because the prior study ignores service variation with the market. With service availability held constant, concentration accounted for half of its former negative effect on daily room prices and average cost and about three-fourths of its positive effect on laboratory service prices.[66] Thus, nonprice competition seems to play a reduced role in the market for laboratory services.

Occupancy rates were inversely correlated to both average costs and prices.[67] Also, the negative effect of higher occupancy rates on costs was about three times the effect of higher occupancy rates on price. High occupancy rates negatively affect costs and prices for two reasons. First, higher occupancy rates discourage competition since a high occupancy hospital can increase its sales by only a limited amount by dropping its price. Second, higher occupancy rates reduce average costs and raise marginal costs. The study's finding that occupancy rates negatively correlate with prices suggests that average cost pricing exists. For some hospitals this may imply existence of unexploited market power. The study's finding, that only about one-third of the savings in average costs is passed on to consumers, suggests that

66.   *Id.* at 165-66.
67.   *Id.* at 130-32.

hospital pricing cannot totally be explained by an average cost plus markup model.

Closely related to the effect of occupancy rates on pricing is the effect of bed supply on pricing. An increase in the number of beds raises total hospital costs and reduces optimal price by reducing marginal costs. The study also found evidence that average costs per day decline as bed supply rises. This finding is statistically significant at only the 78% level, and the estimated magnitude is small.[68]

The latest series of studies of hospital competition analyzes the competitive effects of state government regulations regarding selective contracting.[69] In 1982, the California Assembly passed legislation permitting both Medicaid and private third-party payers to selectively contract with HMOs and preferred provider organizations (PPOs) to provide health care services. Payers were allowed to negotiate with providers to perform services and then favor select groups of these providers[70] without significant antitrust concerns. Thus, competition for payer contracts would be expected to lead to greater hospital discounting in more competitive hospital markets.

Two of the studies examined the effect of selective contracting on competition in California hospital markets.[71] The rates of change in hospital costs, use, and revenues from 1983 to 1985 were less than the rates of change from 1980 to 1982. Hospitals in more competitive markets experience significantly less inflation than those in less competitive markets. Controlling for the effects of the Medicare prospective payment system, the cost per discharge inflation rate was 3.53% less in more competitive markets. It appears that PPOs increase price compe-

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68. *Id.* Doubling bed supply would reduce costs about five percent.

69. Melnick & Zwanziger, *Hospital Behavior Under Competition and Cost-Containment Policies*, 260 J. AM. MED. ASS'N 2669 (1988); Robinson & Luft, *Competition, Regulation, and Hospital Costs, 1982 to 1986*, 260 J. AM. MED. ASS'N 2676 (1988); Zwanziger & Melnick, *The Effects of Hospital Competition and the Medicare PPS Program on Hospital Cost Behavior in California*, 7 J. HEALTH ECON. 301 (1988).

70. Payers usually favor providers who offer the most cost-effective plans.

71. *See* Melnick & Zwanziger, *supra* note 69. Utilizing patient-origin data, this study defines relevant markets as zip code areas (ZCAs) from which hospitals draw at least three percent of their patients. The study then calculates Herfindahl Indices for each ZCA and estimates each hospital's Herfindahl Index as a weighted average of the ZCA indices (where the weights are the proportion of patients attracted from that ZCA). Hospitals are then ranked by their Herfindahl Index. Hospitals falling within the top quartile are defined to be in low competitive markets, and hospitals falling in the bottom quartile are defined to be in high competitive markets. This method of defining market areas is a significant improvement over the pure distance definition because it accounts for actual shopping behavior rather than ignoring geographic and social boundaries. Besides weighting competitors by size, it is also superior to the SMSA definition since it avoids the problem of overly large market areas and allows for analysis of non-SMSA hospitals.

tition, although the effect on nonprice competition is unclear. With increased popularity of HMOs and PPOs, it is likely that competition will further affect prices in the future.

The third study uses the pure distance-oriented market definition to examine hospital markets nationwide.[72] Hospitals in markets with more competitors had higher costs per admission in both 1982 and 1986, indicating that nonprice competition may still dominate in hospital markets. However, the difference in costs between more and less competitive markets lessened in 1986, possibly reflecting cost-control strategies of third-party payers attempting to reduce nonprice competition. Interestingly, while the number of competitors in a market raised costs per admission in California in 1982, it had no significant effect in 1986. This is likely a result of California's enactment of a market-oriented program of selective contracting. The study notes that California's more market-oriented strategy will likely be less successful in reducing expenditures in less competitive hospital markets.

In sum, research on hospital competition shows that greater concentration reduces nonprice competition. Costs and quality decline. At the same time, higher concentration reduces price competition. The cost savings from reduced nonprice competition are not fully passed on to consumers. This suggests that hospital mergers decrease hospital competition and thereby increase the quality-adjusted prices and profits of all hospitals in the market.

D. *Mergers and Monopoly: Financial Market Evidence*

Studies that rely on accounting data are potentially biased due to the variety of accounting approaches available.[73] Studies that rely on stock prices to indicate whether mergers positively affect revenues are preferable to studies that rely on accounting statistics since stock prices reflect the judgment of expert investors about the long-run effects of increases in concentration. Studies relying on stock prices also more accurately portray the effects of future events. For example, a merger may be expected to lead to less price and nonprice competition in the future but little or no immediate changes are expected. Typically, the stock price will immediately rise to reflect higher expected future profits. Accounting data reflect an historical perspective view and thus do not immediately reflect reduced prospects for competition.

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72. *See* Robinson & Luft, *supra* note 69.

73. *See* Fisher & McGowan, *On the Misuse of Accounting Rates of Return to Infer Monopoly Profits*, 3 AM. ECON. REV. 82 (1973) (discussing examples of methods which can bias results including variation in capital intensity and methods of depreciation). All studies discussed in this paper that examine hospital costs and revenues rely on accounting data.

Many theories explain why hospitals merge, such as desire for greater efficiency because of better management or in an attempt to reduce competition. Most theories imply that mergers increase the value of merging hospitals. Consequently, it may be inaccurate to infer that changes in stock prices signify greater revenues as a result of competitive effects. But, analysis of nonmerging competitors' stock prices can show which mergers result from desire for efficiency and which for monopoly. If mergers reduce competition, then all hospital stock prices would rise since increased concentration leads to increased profits for competitor hospitals as well as for merged hospitals. A merger motivated by increased efficiency, however, would likely lower stock prices of competitor firms.

One study that covered the years 1969 through 1985 used the stock price approach to examine the effects of twenty-nine related merger events on the stock prices of profit-seeking hospitals.[74] Using the standard capital asset pricing model to control for the effects of the stock market as a whole, the study found that mergers increase profits of nonmerging competitors. In fourteen of the twenty pro-merger events, the stock price of competing hospitals rose.[75] In eight of the nine anti-merger events, the stock price of the nonmerging hospitals fell. Furthermore, the greater the merger impact on local hospital markets, the stronger the effect on competitor profits. Statistical tests show these results are statistically significant at levels ranging from 95% to 99%. Evidently, investors perceive hospital mergers as increasing the profits of competitor hospitals. This is consistent with the theory that mergers reduce price competition and nonprice competition among hospitals.

E.   *Insurance Innovations: PPOs and HMOs*

The increasing popularity of HMOs and PPOs over the past decade should increase hospital competition dramatically.[76] Some commentators show that HMOs have strong negative effects on hospital utilization rates and, therefore, increase hospital service competition in general. One commentator describes how PPOs can improve competition

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74.   Woolley, *The Competitive Effects of Horizontal Mergers in the Hospital Industry*, 8 J. HEALTH ECON. (1989) (forthcoming article).

75.   *Id.* Promerger events increase the likelihood of a merger. An example is a public announcement of merger intention. Antimerger events decrease the likelihood of a merger. An example is an announcement that a merger will be contested by the Justice Department or the Federal Trade Commission.

76.   FEDERAL TRADE COMMISSION, BUREAU OF ECONOMICS., THE HEALTH MAINTENANCE ORGANIZATION AND ITS EFFECTS ON COMPETITION (1977) (Staff Report prepared by Lawrence G. Goldberg and Warren Greenberg).

by providing more consumer information.[77] Other studies demonstrate that the 1982 California state legislation that permitted selective contracting reduced hospital cost inflation in the state — evidence that PPOs and HMOs increase price competition among hospitals.[78]

One series of studies on HMOs effects on competition conducted in the late 1970s and early 1980s found that HMOs failed to reduce hospital use and appeared to raise employer costs.[79] However, this latter result is inconclusive because of data limitations. Another study also found that HMO growth through 1981 did not significantly reduce hospital costs, revenues or profits. The study argued that efforts to promote competition fail if "the major buyers of hospital care, HMOs included, do not reward cost-contained hospitals instead of shopping for discounts."[80] The study asserted that shopping for discounts merely shifts higher prices to other payers. This is a very curious assertion. Buyers are not concerned about sellers' costs. It is irrelevant to buyers whether a hospital is cost-effective. Buyers are concerned about the price of services. The conclusion that hospitals that aggressively discount price do not have the lowest costs is surprising, but it has nothing to do with price competition.

A second study also found that hospitals that gave large HMO discounts did not have lower costs per admission.[81] The study found that these discounts do not force hospitals to act more efficiently. Also, the size of the HMO market share had no significant effect on hospital profits. These conclusions may be suspect because HMOs, like profit-seeking hospitals, only tend to enter markets with the greatest profit potential. This result potentially offsets the competitive influence of HMOs, altering the presumed relationship between HMO market share and average hospital profits.

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77. Frech, *Preferred Provider Organizations and Health Care Competition*, in HEALTH CARE IN AMERICA: THE POLITICAL ECONOMY OF HOSPITALS AND HEALTH INSURANCE, *supra* note 1, at 353.

78. *See* Robinson & Luft, *supra* note 69.

79. Feldman, Dowd, McCann & Johnson, *The Competitive Impact of Health Maintenance Organization on Hospital Finances: An Exploratory Study*, 10 J. HEALTH POL., POL'Y & LAW 675 (1986) [hereinafter Feldman]; Johnson & Aquilina, *The Impact of Health Maintenance Organizations and Competition on Hospitals in Minneapolis/St. Paul*, 10 J. HEALTH POL., POL'Y & LAW 659 (1986); Luft, Maerki & Trauner, *The Competitive Effects of Health Maintenance Organizations: Another Look at the Evidence from Hawaii, Rochester, and Minneapolis/St. Paul*, 10 J. HEALTH POL., POL'Y & LAW 625 (1986).

80. Johnson & Aquilina, *supra* note 79, at 672.

81. Feldman, *supra* note 79.

F.   *Physician/Hospital Interaction*

One study classified physician care and hospital care as gross complements based on the effects of physician prices on hospital use and hospital use on physician prices.[82] A second study agreed with this conclusion, finding that higher coinsurance rates for ambulatory care, which is primarily a physician-provided service, resulted in a negative effect on hospital use.[83] A third study disagreed, stressing the correlation between higher physician population and lower hospital use.[84]

Another study examined the relationship between physicians and hospital care.[85] This study found that hospitals compete for physicians by increasing hospital attributes and decreasing costs of physician affiliation.[86] Meanwhile, both physicians and hospitals compete for patients by price competition and nonprice considerations such as office attributes and the amount of health care provided. Using data from 1977, the study found that hospital attributes have a significant effect on physician prices. Physicians charge more when affiliated with hospitals that offer more services. The study also found that hospital price competition results in lower physician prices. Additionally, physician density was found to negatively correlate with physician prices.

VI.   DIRECTIONS FOR FUTURE RESEARCH

Hospital competition studies examine effects of concentration on hospital costs, hospital prices, rate of technological diffusion, occupancy rates, and a host of nonprice competition variables. These studies conclude that increases in concentration lower costs. This is most likely a result of decreases in nonprice competition. Increases in concentration have been found to negatively affect prices. These results, in conjunction with financial market analysis, demonstrate that hospital profits rise in more concentrated markets.

However, most studies that analyze average costs, revenues, or prices ignore effects produced by variations in types of services hospitals supply. For example, hospitals may elect to reduce laboratory

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82. Newhouse & Phelps, *New Estimates of Price and Income Elasticities of Medical Care Services*, in THE ROLE OF HEALTH INSURANCE IN THE HEALTH SERVICES SECTOR 261 (R. Rosett ed. 1976).

83. Manning, *supra* note 17, at 251-80.

84. McCombs, *Physician Treatment Decisions in a Multiple Treatment Model*, 3 J. HEALTH ECON. 155 (1984).

85. Custer, *Hospital Attributes and Physician Prices* 52 S. ECON. J. 1010 (1986).

86. These costs include physician time donated to the hospital and costs the physician incurs in monitoring hospital quality. Physician time is donated either directly, such as in emergency room duty, or indirectly, such as in administrative duties.

prices and simultaneously raise daily room charges as a result of competition. Also, to accurately reach any conclusions, a study must determine the appropriate market area for the variable studied. Hospitals may compete in smaller markets for more routine procedures and services, while competition among open heart surgical facilities may cross state lines.

As a result of new regulation, innovation, and insurance structures, the hospital industry is evolving. Insurance is making hospitals more competitive by increasing consumer copayment rates and by increasingly using PPOs and HMOs. As a result, price-conscious consumers will alter the present positive correlation between concentration and hospital prices. The importance of nonprice competition will be reduced, causing hospitals to compete through price competition. Consequently, there is a need for updated and more extensive studies of the hospital industry.