Hospital Market Structure, Hospital Competition, and Consumer Welfare: What Can the Evidence Tell Us?

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I. INTRODUCTION

A fundamental premise of federal health care antitrust enforcement efforts is that vigorous market competition will result in a socially desirable allocation of resources to (and within) the health care sector. This premise has become increasingly controversial. The application of the competitive market paradigm to the analysis and design of health care policies has been criticized by both health care economists and health care professionals. Economists and health planners argue that market failures arising from imperfect information and third-party reimbursement will defeat the ability of unregulated markets to allocate health care resources efficiently.[1] Health care professionals, on the other hand, argue that sellers of health care services are not (or, at any rate, should not be) governed by the types of profit-seeking behavior that motivate producers of other goods and services; policies that encourage competition among physicians and hospitals, it is further argued, only exacerbate[2] a trend toward excessive commercialization of health care.[3]

In one important sense, both criticisms share a common origin: namely, the presumed ignorance of the ultimate consumers of medical

1. *See generally* James C. Robinson, *Hospital Quality Competition and the Economics of Imperfect Competition*, 66 MILBANK Q. 465 (1988).

2. For an enlightening exchange of views on ethical issues associated with for-profit health care, see Arnold S. Relman, M.D., & Uwe Reinhardt, *An Exchange on For-Profit Health Care, in* FOR-PROFIT ENTERPRISE IN HEALTH CARE 209 (Bradford H. Gray, Ph.D., ed., 1986).

3. *See* Arnold S. Relman, M.D., *What Market Values Are Doing to Medicine*, ATLANTIC, March 1992, at 98.

care, and the resultant existence of what economists call a "principal-agent" relationship between the buyer (i.e., the patient) and a seller (e.g., a physician) who also makes purchasing decisions on the patient's behalf.[4] Absent consumer ignorance, much of the basis for the efficiency critique,[5] and virtually all of the basis for the ethical critique, would evaporate, as there would no longer be any information imperfections for profit-seeking agents to exploit.

While no serious student of health care economics denies that real-world medical markets differ from the perfectly competitive markets of the introductory economics texts, this observation by itself is empty; virtually no real-world market satisfies the conditions necessary for "perfect" competition. In our view, the debate over health care reform has focused excessively on cataloguing the ways in which health care markets fail to satisfy the conditions of perfect competition, to the neglect of other, more important issues. The meaningful questions are: (1) how important are these departures from the abstract world of perfect competition?; (2) what types of market institutions can develop (or have developed) to address problems created by these departures?; and (3) how does the performance of a necessarily imperfect market compare with the performance of necessarily imperfect alternative methods for allocating health care resources?

Providing definitive answers to all of these questions is beyond the scope of this paper. We have a more modest goal: to review two strands of the immense empirical literature on the positive and normative aspects of hospital and health care competition. The first examines the relationship between hospital competition and hospital costs, prices, and service quality. We review two decades of research on structure-performance relationships in hospital markets and attempt to determine what is known about the costs and benefits of hospital competition. We conclude that, due to flaws in research design and methodology, existing empirical work has not yielded much useful information on the welfare implications of differences in hospital market structure. Most studies (especially those completed before the late 1980s) focused principally on the relationship of market structure to "costs," rather than to prices or price-cost margins; moreover, the literature largely ignored the impact of market structure on quality variation.

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    4. *See generally* Kenneth J. Arrow, *Agency in the Market, in* 3 HANDBOOK OF MATHEMATICAL ECONOMICS 1183 (Kenneth J. Arrow & Michael D. Intriligator eds., 1986).
    5. Questions relating to the efficiency consequences of third-party reimbursement would remain.

Not surprisingly, the failure of the empirical literature to explore properly issues of pricing and quality severely impairs its ability to illuminate any of the normative issues that now dominate the public debate on health care. One particularly surprising and pervasive element in this literature is the assumed (often implicitly) invidious nature of nonprice competition among health care providers. This presumption seldom is defended, other than through oblique references to the above-mentioned principal-agent problems. Neither theory nor existing evidence can justify the antipathy toward competition that characterizes much of the scholarly research on hospital competition. Researchers who condemn nonprice competition have tended to assume, rather than demonstrate, that increases in the intensity of this competition harms society.

We also examine the still-developing literature on the effects of health maintenance organizations (HMOs), preferred provider organizations (PPOs), and other competition "experiments" on hospital and health care costs. This literature has, of necessity, focused on those areas where these market institutions have developed most fully (e.g., Minnesota and California). Although the evidence from the California experience is still unfolding, it supports the proposition that markets can work, provided market participants are given the flexibility to engage in arrangements that address the principal-agent problems that arise in these settings.

While the literature on hospital competition, market institutions, and health care market outcomes is incomplete in several important respects, we observe that this is beginning to improve. Recently, researchers have begun to adopt research strategies that will better address the questions that we consider the most relevant for the design of public policy. Accordingly, answers to these questions have at last started to take shape. As more reliable measures of hospital quality are developed, and as more instances of true competition develop, analysts will be much better positioned to draw clearer pictures of structure-performance relationships in hospital markets. This will enable policy makers to make much more informed judgments about the benefits and costs of hospital competition.[6]

II. INCENTIVE STRUCTURES AND HOSPITAL COMPETITIVE BEHAVIOR

Most empirical analyses of hospital competition have been premised on the notion that explicit price competition rarely occurs in this industry.

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6. Nevertheless, further competition experiments may not in fact be tried, as certificate-of-need regulation is coming back into vogue. *See* Robert Pear, *States Are Moving to Re-Regulation on Health Costs*, N.Y. TIMES, May 11, 1992, at A1, A10.

Indeed, hospital markets often possess features that may diminish the incentives of hospitals to engage in the type of price competition that is commonly observed in most other markets. These features include extensive insurance coverage and high consumer search costs. Consequently, a large number of studies have examined the impact of market structure on hospital expenses or costs (which are often thought to serve as proxies for "quality"), although some of the more recent empirical work has attempted to analyze hospital pricing behavior. Before turning to a discussion of these studies, however, we discuss the reasons why these features of health care markets may attenuate the incentives for price competition.

As noted in the introduction to this paper, the criticism of the performance of health care market behavior has, at its heart, the existence of what economists term "principal-agent" problems. Kenneth Arrow succinctly characterizes principal-agent problems as follows:

> The common element is the presence of two individuals. One (the agent) is to choose an action among a number of alternative possibilities. The action affects the welfare of the other, the principal, as well as that of the agent's self. . . . The problem acquires interest only when there is uncertainty at some point, and in particular, when the information available to the two participants in unequal. The main but not only case in the literature is that where the agent's action is not directly observable by the principal and where in addition the outcome is affected but not completely determined by the agent's action. (If the latter were not true, the principal could in effect infer the agent's action by observing the outcome.)[7]

There are two main principal-agent relationships that might conceivably contribute to imperfections in health care markets. The first is the physician-patient relationship; the second, the patient-insurer relationship. In the former, the physician, acting as agent for his patient, provides both diagnosis and treatment. The patient is presumed to have less information than the doctor, and thus cannot ascertain whether the medical benefits of the recommended treatment outweigh the costs. This ignorance provides the physician with a financial incentive to recommend treatments that would not be purchased by a fully informed consumer. This incentive to overprescribe services is commonly referred to as "demand inducement."[8]

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7. *See* Arrow, *supra* note 4, at 1183.
8. *See* David Dranove, *Demand Inducement and the Physician/Patient Relationship*,

A second principal-agent problem is created by the presence of health insurance. Here, patients can be thought of as "agents" for their insurers, making consumption decisions that will affect the insurers' profits.[9] The potential inefficiency arises because health insurance typically reduces substantially the out-of-pocket (marginal) cost to consumers of health services. Accordingly, the price paid by consumers may not vary with the amount of services purchased or the source of those services. Under such conditions, consumers have little incentive to search for lower-priced providers, because most of the gains from search accrue to others (i.e., the insurer), and not to the insured.[10] The absence of an incentive to search, in turn, diminishes providers' incentives to cut prices, because output (and profits) will be unresponsive to these cuts.[11]

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26 ECON. INQUIRY 281 (1988); *see generally* Michael R. Darby & Edi Karni, *Free Competition and the Optimal Amount of Fraud*, 16 J.L. & ECON. 67 (1973); Roger Feldman & Frank Sloan, *Competition Among Physicians, Revisited*, 13 J. HEALTH POL., POL'Y & L. 239 (1988) (concluding that there is some evidence of physician inducement in the market for surgical services, but little evidence of inducement in the market for primary physician services).

9. A significant percentage of all U.S. citizens is covered by some kind of health insurance. For instance, of the $531 billion spent on personal health care in 1989, only $125 billion (24%) was paid directly by patients. The other 76% was covered by government (40%), private insurance (33%), or industrial in-plant provision or philanthropy (3%). Third-party payments constitute an even larger portion of hospital expenditures. In 1989, 94% of the nation's $233 billion hospital bill was paid by third parties. As of 1991, estimates indicate that 36 million Americans (15% of the population) were not covered by health insurance. *See* BUREAU OF THE CENSUS, U.S. DEP'T OF COMMERCE, STATISTICAL ABSTRACT OF THE UNITED STATES 94 (1991); EMPLOYEE BENEFIT RESEARCH INSTITUTE, SOURCES OF HEALTH INSURANCE AND CHARACTERISTICS OF THE UNINSURED: ANALYSIS OF THE MARCH 1991 CURRENT POPULATION SURVEY (1992).

10. A consumer would gain from the use of low cost providers if the cost of such search and any reduction in service quality was offset by subsequent reductions in his insurance premiums. Savings to the insurer, however, are not typically passed on directly to the consumer who chooses the low cost provider. The gains from consumer search might also be captured by the consumer's employer if the consumer is enrolled in an employer-based insurance plan, as is common. In either case, the individual normally has little incentive to search for low cost providers. If subject to actual or potential competition, insurers have incentives to encourage their policy holders to patronize low cost suppliers. *See infra* part VI (discussing innovations in third-party reimbursement (e.g., "health maintenance organizations" and "preferred provider organizations") that provide a different incentive structure and that are intended to pass back savings to the insured). Such systems, if properly structured within the employer-based insurance system, tend to encourage price competition.

11. Indeed, the presence of insurance likely exacerbates providers' incentives to over-prescribe services, because part of the cost of the services will be borne by a third party. There is a sizable literature indicating that the level of insurance coverage matters and affects both the consumer's and the health care provider's incentives. *E.g.*, Willard G. Manning et al., *Health Insurance and the Demand for Medical Care: Evidence from a Ran-*

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Other features of health care markets contribute to high consumer search costs, and thus to the existence of possible market imperfections. Price information, for example, has not been readily available for many of the services offered by hospitals. Without access to this information, consumers will find it difficult to identify and patronize low price suppliers.[12] This problem is aggravated further by the large number of individual services (e.g., room and board, lab services, nursing services, operating room, etc.) that are consumed during the stay and that are priced individually. The consumer must compare baskets of aggregated prices across hospitals if he wishes to find the lowest cost provider.

Although it is clear that health care markets are characterized by informational asymmetries and imperfections, the practical (and policy) significance of this observation is unclear. Many economists apparently believe that information asymmetries can be found in a wide variety of market settings. Indeed, one prominent writer has claimed that "informational imperfections have fundamental implications for how product markets function, at least for many (most) of the commodities which consumers purchase."[13] If this belief is correct, health care markets would have no claim to uniqueness on these grounds. Although one might reasonably argue that the degree of asymmetry is more severe in hospital markets than elsewhere, the theoretical literature shows that even minor departures from a world of perfect information can, in principle, cause

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domized Experiment, 77 AM. ECON. REV. 251, 258 (1987) (finding in the RAND experiments that a free health care plan realized expenses that were 46% higher than those realized by a plan with 95% co-payment requirement for the first $450). Other studies have shown that uninsured individuals are admitted less often to the hospital and/or receive less health care during hospital stays than do insured individuals. *See, e.g.*, John Z. Ayanian et al., *The Relation Between Health Insurance Coverage and Clinical Outcomes Among Women with Breast Cancer*, 239 NEW ENG. J. MED. 326, 328-30 (1993); Paula A. Braveman et al., *Differences in Hospital Resource Allocation Among Sick Newborns According to Insurance Coverage*, 266 JAMA 3300, 3303, 3306-07 (1991); Jack Hadley et al., *Comparison of Uninsured and Privately Insured Hospital Patients*, 265 JAMA 374, 378-79 (1991); Randall S. Stafford, *The Impact of Nonclinical Factors on Repeat Cesarean Section*, 265 JAMA 59, 61-62 (1991); Joel Weissman & Arnold M. Epstein, *Case Mix and Resource Utilization by Uninsured Hospital Patients in the Boston Metropolitan Area*, 261 JAMA 3572, 3575 (1989). Hadley's and Ayanian's evidence also implies that uninsured individuals achieve worse outcomes for a given severity of illness.

12. *See* George J. Stigler, *The Economics of Information*, 69 J. POL. ECON. 213 (1961), *reprinted in* THE ORGANIZATION OF INDUSTRY 171-90 (1968); George J. Stigler, *Price and Non-Price Competition*, 76 J. POL. ECON. 149 (1968), *reprinted in* THE ORGANIZATION OF INDUSTRY 23-28 (1968) (discussing the importance of information in generating price competition).

13. Joseph E. Stiglitz, *Imperfect Information in the Product Market, in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 769, 843 (R. Schmalensee & R.D. Willig eds., 1989).

large departures from the full-information competitive equilibrium values for price, quantity, and quality. Nonetheless, society has allowed economic activity in these nonhealth-related markets to be governed by the competitive, self-interested behavior of buyers and sellers. The apparently ubiquitous nature of information imperfections would seem to suggest, however, either that this policy is gravely misconceived or that performance in these markets, though inferior to that obtainable in the nonexistent world of perfect information, is nevertheless superior to that which could be achieved through alternative institutional arrangements.

Ultimately, one cannot resolve these issues on the basis of theoretical analysis. Empirical evidence is required. It is to this that we now turn. In this review, we look specifically at studies of hospital market behavior to assess what information they might offer to resolve the positive and normative issues of hospital competition.

III. EMPIRICAL LINKS BETWEEN MARKET STRUCTURE, EXPENSES, AND LENGTH-OF-STAY

A. Early Studies

Many studies of hospital competition have examined the links between market structure[14] and hospital expenses or costs. Joskow presented perhaps the first attempt to estimate a model in which the relationships between market structure and nonprice competition were explicitly measured.[15] He assumed that hospital administrators seek to maximize some "utility function" defined over the quantity, quality, and scope of services provided. Due to extensive third party reimbursement, Joskow argued that hospitals face few incentives to price compete. Further, he argued that patients make hospital choices indirectly, through their

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14. It should be emphasized that the key market structure variable used in most of these studies, the Herfindahl index, is only a proxy for competition. For a discussion of the problems associated with using concentration as a proxy for competition, *see* Harold Demsetz, *Two Systems of Belief About Monopoly*, INDUSTRIAL ORGANIZATION: THE NEW LEARNING (H. Goldschmidt et al. eds., 1974).

15. Paul L. Joskow, *The Effects of Competition and Regulation on Hospital Bed Supply and the Reservation Quality of the Hospital*, 11 BELL J. ECON. 421 (1980). Although studies of hospital costs predated Joskow's, none found statistically significant relationships between market structure and costs. *See, e.g.*, Karen Davis, *The Role of Technology, Demand and Labor Markets in the Determination of Hospital Costs*, in THE ECONOMICS OF HEALTH AND MEDICAL CARE 283 (M. Perlman ed., 1974); Karen Davis, An Empirical Analysis of Alternative Models of the Hospital Industry, Address at the American Economic Association (Dec. 20, 1972); C. Watts, A Managerial Discretion Model for Hospitals (1976) (unpublished Ph.D. dissertation, Johns Hopkins University).

choice of physician. Hospitals therefore compete for patients by attracting additional staff physicians through the provision of higher quality services. "Higher quality" in Joskow's model is measured by the hospital's "average reserve margin," defined as the excess of available beds over the average daily census (in percent). Physicians value increases in the average reserve margin because it reduces expected admission delays, and because physicians believe that hospitals provide better care when they are operating well below their capacity constraints.[16]

Joskow's empirical model sought to explain variations in "reserve margins" through indices of market concentration (measured at the standard metropolitan statistical area/SMSA level), entry conditions (a variable indicating the presence of certificate-of-need/CON laws), and the ratio of physicians to hospitals (to reflect hospital competition for physician affiliations).[17] Overall, the empirical results conformed closely to Joskow's prior expectations. Reductions in the number of hospitals, as measured by high values for the Herfindahl index, significantly reduced the size of hospitals' average reserve margins.[18] Increases in the number of physicians in the market, and the presence of CON regulations, also significantly reduced reserve margins. Joskow interpreted these results as evidence that increased competition can have undesirable efficiency effects, in that it may lead to "uneconomic expansions in the quantity and quality of care provided."[19]

Wilson and Jadlow used 1973 data and a two-stage econometric approach to estimate the effect of "competition" on the productive efficiency of nuclear medicine services.[20] In the first stage of the analysis they estimated a "best-practice frontier" production function for nuclear medical services. This technique identifies the maximum quantity of output that can be produced with a given quantity of labor and capital inputs. Using the estimated best practice frontier, the authors computed an "efficiency index" for each hospital. This index equaled the percentage

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16. Joskow, *supra* note 15, at 432.

17. Joskow also included variables to control for the presence of both hospital rate regulations and HMOs in the market, which have an unclear *a priori* impact on reserve margins. *Id.* at 437-42.

18. This effect could occur because of an anticompetitive reduction in service quality or because of scale economies. If fewer, larger hospitals exist, they may be able to economize on excess beds while offering the same probability that a bed will be available when demanded. This is a typical outcome of inventory models.

19. *Id.* at 446.

20. George W. Wilson & Joseph M. Jadlow, *Competition, Profit Incentives, and Technical Efficiency in the Provision of Nuclear Medicine Services*, 13 BELL J. ECON. 472 (1982).

difference between the hospital's actual and potential output. In the second stage of the analysis, the authors asked whether interhospital variations in this efficiency index could be explained by the degree of concentration in each hospital's service area, and by the hospital's profit/nonprofit status. They found that low hospital concentration was associated with inefficient production.[21] Wilson and Jadlow interpreted these results as confirming the "wasteful nonprice competition" hypothesis proposed by Joskow and others.

Using pooled cross section-time series data for the 1970-77 period, Farley explored the impact of market structure on three separate aspects of hospital performance: finances (e.g., "profitability"), case-mix, and resource usage.[22] His results indicated that "competition" (as measured by structural indices of concentration) is not associated with differences in profitability, although it appears to increase expenses per admission. He interpreted this result as evidence that competition among hospitals raises costs. However, Farley did not explicitly control for exogenous sources of cost differences (such as wage rates) that might be positively correlated with his "competition" variable,[23] and the measured competition-cost relationship may not be robust to such an adjustment.

Farley found no relationship between market structure and a length-of-stay-based case-mix index. He did find, however, evidence suggesting (assuming that the case-mix index adequately controlled for severity of illness) that patients having similar conditions are treated differently, depending upon market structure. In particular, mean lengths-of-stay tended to be longer in unconcentrated (and presumably more competitive) markets. In addition, Farley found that hospitals in unconcentrated markets tended to hold more unused bed capacity, offer a broader array of diagnostic and therapeutic services, and employ more capital and more

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21. In addition to the concentration index, Wilson and Jadlow's equation included dummy variables for government and proprietary hospitals. Wilson and Jadlow's results produced the anomalous finding that investor-owned hospitals were closer to the efficiency frontier than were not-for-profit hospitals, yet competition between hospitals produced waste.

22. DEAN E. FARLEY, PH.D., U.S. DEP'T HEALTH AND HUMAN SERVICES, PUB. NO. 85-3353, COMPETITION AMONG HOSPITALS: MARKET STRUCTURE AND ITS RELATION TO UTILIZATION, COSTS AND FINANCIAL POSITION, Research Note 7 (1985).

23. The more "competitive" markets are undoubtedly metropolitan areas, which are sufficiently populous to support a large number of hospitals. Cost factors, such as wage rates, tend to be higher (relative to rural areas) in these areas. Variation of this sort will be controlled through the use of an "urban-rural" classification scheme. However, there is also likely to be substantial variation between different urban areas. Farley did not control for this type of variation.

labor per adjusted admission than did institutions in more concentrated areas. All of these results are consistent with the nonprice competition hypotheses.

Consistent with the results obtained by Farley, Robinson *et al.* found that increased competition (as measured by the number of "neighboring hospitals") was positively related to length-of-stay.[24] Using 1982 data on 747 short-term hospitals, the authors regressed length-of-stay for each of ten medical/surgical procedures on variables measuring case-mix and patient characteristics, physician experience, population, population density, region, and teaching and ownership status. Their results indicated that increasing the number of neighboring hospitals from none to eleven or more in a fifteen-mile radius was associated with a seven to twenty-three percent increase in length-of-stay.[25]

More evidence on the wasteful competition hypothesis was provided by studies that focused on hospital costs. For example, while acknowledging that price competition was of increasing importance, Robinson and Luft hypothesized that hospital competition was still conducted primarily along nonprice dimensions.[26] Because higher quality is costly to produce, the assumed importance of nonprice competition leads to the prediction that increased competition will contribute to higher pecuniary costs. Using 1972 data, Robinson and Luft indeed found that when other factors[27] are held constant, average costs per admission and per patient day increase significantly with increases in the number of rival hospitals. Unlike Joskow, however, they found that increases in the physician-population ratio (which should reduce competition for staff physicians and could therefore reduce costs) are associated with higher unit costs. The authors conjectured that this variable may reflect an expansion in the number of noncompeting *subspecialties*, rather than an increase in the number of competing *specialists*. Based on these empirical findings,

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24. James C. Robinson et al., *Hospital Competition and Surgical Length of Stay*, 259 JAMA 696 (1988).

25. *Cf.* James C. Robinson, *HMO Market Penetration and Hospital Cost Inflation in California*, 266 JAMA 2719, 2722 (1991). In this 1991 study, Robinson found that the cost-ameliorating effects of HMOs were greater in those markets where a larger number of rivals existed. He implied that his earlier work using 1982 data could have been misleading because during that period legal restraints on contracting may have kept hospitals and HMOs from responding to competitive incentives.

26. James C. Robinson & Harold S. 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).

27. These other explanatory factors include number of admissions, average length-of-stay, bed size, ownership status, size, and per capita income of the patient population.

Robinson and Luft contended that "competitive" (or "market") strate-
gies may be of limited applicability as a means for containing health care
costs, and speculated that some degree of "cooperation" among rival hos-
pitals may be desirable as a means for reducing excess capacity.

Using data from the same period, 1972, Luft *et al.* conducted a more
direct test of the nonprice competition hypothesis.[28] They argued that if
hospitals in a particular geographic area are inclined to engage in
rivalrous behavior, an increase in the availability of a particular service by
neighboring hospitals will (other things constant) increase the likelihood
that any individual hospital in the area will offer the service. To test this
hypothesis, they performed a statistical analysis for twenty-nine clinical
services in which they attempted to explain the presence of a particular
service at an individual hospital by both the total number of competing
hospitals in the area and by the percentage of these competing hospitals
that offered the service.[29] Their results indicated that the availability of a
service at an individual hospital is strongly (and positively) related to the
number of competitors also offering the service, but not to the absolute
number of competitors in the same basic location. From this, Luft *et al.*
inferred that the introduction of competition into hospital markets can
have an undesirable inflationary impact on hospital costs, since hospitals
will respond to entry through the addition of services and facilities.[30]

Continuing the focus on average costs, Garnick *et al.* employed 1982
data on 504 California hospitals to assess the relationship between mar-
ket concentration and cost per admission. Three different techniques
were used to delineate geographic market boundaries.[31] The first was
based on "geopolitical" distinctions (i.e., counties or SMSAs); the second
was derived from information on distances between hospitals (i.e., the
number of hospitals located within a fifteen-mile radius of a particular
location); the last utilized "patient origin" data.[32] This yielded three sets
of concentration statistics.[33] Each concentration index was then entered
as an explanatory variable in an equation that explained "average cost

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28. Harold S. Luft et al., *The Role of Specialized Clinical Services in Competition
Among Hospitals*, 23 INQUIRY 83 (1986).

29. Examples of the services analyzed are mammography unit, cobalt therapy, heart
surgery, and emergency services.

30. This reaction to entry may benefit consumers as more and better services are of-
fered. *See infra* notes 57-59 and accompanying text.

31. Deborah W. Garnick et al., *Appropriate Measures of Hospital Market Areas*, 22
HEALTH SERVICES RES. 69 (1987).

32. *Id.* at 75-76.

33. *Id.* at 78-79.

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per admission."[34] Garnick *et al.* found that when the first two market definition techniques were used, there emerged a statistically significant positive relationship between the proxies for competition (lower concentration ratios) and costs. However, when the market boundaries were established by the patient flow data, the observed relationship was negative (albeit statistically insignificant).

Expanding the work of Garnick *et al.* to a national sample, Robinson and Luft examined the relationship between market structure and costs using 1982 data on a sample of 5,732 hospitals.[35] Market boundaries were derived via the application of an algorithm that computed, for each hospital, the number of competing hospitals located within a fifteen-mile radius.[36] The corresponding concentration figures were entered into regression equations whose dependent variables were cost per patient-day and cost per admission.[37] Like Garnick *et al.*, Robinson and Luft found that for both cost measures, lower concentration was associated with higher hospital costs. On the basis of these results, the authors concluded that "a degree of caution [should] be exercised in predicting the cost-reducing effects of recent 'market-oriented' policy initiatives."[38]

It should be noted that Robinson and Luft used only one of the three market definition techniques proposed by Garnick *et al.* Specifically, Robinson and Luft did not construct concentration statistics corresponding to markets defined by patient origin data.[39] It will be recalled that Garnick *et al.* did not obtain a positive relationship between competition (lower concentration) and costs when the concentration variables were derived in this fashion. It is unknown whether Robinson and Luft's principal results would be invariant to this modification.

Each of the studies reviewed in this section, using pre-1983 data, found that decreased hospital concentration was associated with increased unit costs, increased length of stay, and increased production of health care

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34. Other explanatory variables included hospital characteristics (i.e., bed size, ownership, staff per bed), inpatient days in various units (i.e., case-mix), and socio-demographic characteristics (i.e., physician/population ratio). *Id.* at 86.

35. James C. Robinson & Harold S. Luft, *Competition and the Cost of Hospital Care, 1972 to 1982*, 257 JAMA 3241 (1987).

36. This is the same procedure used by Garnick *et al., supra* note 31, at 72.

37. Robinson and Luft also included variables to control for variation in case-mix, population characteristics, and input prices. They did not, however, include variables to control for ownership-type or chain/nonchain status. Robinson & Luft, *supra* note 35, at 3242-43.

38. *Id.* at 3244 (emphasis in original).

39. *See* Garnick *et al., supra* note 31, at 76.

services. These increases were characterized as socially wasteful, because they raised the cost of providing a fixed quantity or quality of hospital care.

B.   More Recent Studies

Although the previous studies suggest that structural indices of competition were associated with increased health care costs and resource use, more recent studies, using data from 1983 or later, provide a somewhat different picture. These studies tend to focus on the experience of California hospitals after the introduction of selective contracting in that state. Selective contracting allowed third-party payers to exclude some providers from participation in their programs if they chose to do so.

Continuing their examination of the effects of market structure on costs, Robinson and Luft studied the effects of various state level hospital regulatory policies from 1982 through 1986.[40] Applying regression analysis to a national sample of 5,490 hospitals, they compared the performance of California's "procompetition" policies with the rate regulation strategies of Maryland, Massachusetts, New Jersey and New York.[41] The authors concluded that the two policies were equally effective in controlling changes in costs per admission in the short run.[42] From a competition standpoint, their most interesting finding was that competition appeared to reduce rates of cost inflation in these five states as well as nationally. In addition, the rate regulation and procompetition policies seemed to control costs better in local hospital markets where hospitals faced a large number of rivals. California hospitals facing more than ten rivals experienced increases in their costs per admission that were 22%

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40.   James C. Robinson & Harold S. Luft, *Competition, Regulation, and Hospital Costs, 1982 to 1986*, 260 JAMA 2676 (1988).

41.   The authors used each hospital as an observation and regressed the logarithm of changes in costs per admission from 1982 to 1986 on the logarithm of the 1982 levels and the 1982 to 1986 changes in the levels of several independent variables. The explanatory variables included the percentage of discharges by payer type (Medicare/Medicaid), average employee earnings, output measures (bed size, inpatient and outpatient visits, bed size per admission, etc.), teaching status, ownership type, patient mix in six service categories, number of neighboring hospitals, physician density, median income, population density, and dummy variables indicating the form of state regulatory regime. Because the model examines cost changes over a four year period, rather than levels of costs at a point in time, a failure to explicitly adjust for quality variation across hospitals may not be as important as in prior studies of hospital costs, if the quality of a given hospital does not change markedly over time. *Id.*

42.   *Id.* at 2680. The authors also found that hospitals with a high percentage of Medicare patients tend to exhibit significantly lower rates of cost increase than those hospitals for whom Medicare is a less important payer. *Id.*

below those experienced by hospitals that faced ten or fewer rivals.[43] Similar results were obtained for the rate regulation states. In these states, adjusted cost inflation rates ranged from 5.4 to 13.7 percentage points lower (depending on the state) where hospitals faced more than ten rivals.[44] In the remaining forty-three states, increases in costs per admission were 9.1 percentage points lower where hospitals faced more than ten competitors.[45] This evidence implies that competition may have had a significant impact in reducing cost increases from 1982 to 1986. Because hospitals in high competition areas tended to have significantly higher cost *levels* in 1982, however, those hospitals still exhibited significantly higher 1986 cost levels than did hospitals that faced ten or fewer rivals.

These results were corroborated to some extent by Melnick and Zwanziger,[46] who examined data for California hospitals from 1980 to 1985 and found that after the introduction of selective contracting[47] by third-party payers in California in 1983, those hospitals in markets with many competitors reduced their costs to more closely approximate the costs of hospitals in less competitive markets.[48] That is, average inpatient costs were higher in more competitive markets both before and after the introduction of selective contracting, but the increases in costs per discharge were 3.5% lower in highly competitive markets (relative to hospitals in less competitive markets) after the switch to selective contracting.[49] Melnick

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43. *Id.* at 2679.

44. *Id.*

45. *Id.*

46. Glenn A. Melnick & Jack Zwanziger, *Hospital Behavior Under Competition and Cost-Containment Policies: The California Experience 1980 to 1985*, 269 JAMA 2669 (1988).

47. Melnick and Zwanziger argue that selective contracting was enhanced by a June 1982 California law that allowed third-party payers to exclude certain health care providers from their lists of participating providers without significant fear of antitrust prosecution. *Id.* at 2669-70.

48. The authors used a multiple regression technique in which various inflation-adjusted measures of the annual percentage change in total cost, average cost, total revenue, and utilization were regressed on dummy variables that indicate: (1) the competitiveness of a market both before and after 1982; (2) the 1980 to 1982 period prior to selective contracting; and (3) rural hospitals. Also included as an explanatory variable was a "financial pressure" index based on the Medicare Prospective Payment System's importance and stringency for a particular hospital. *Id.* at 2670-71. Other studies by the authors yielded similar results using a regression model that also included measures of labor input prices, hospital size, and other hospital-specific factors in the estimating equation. *See* Jack Zwanziger & Glenn A. Melnick, *The Effects of Hospital Competition and the Medicare PPS Program on Hospital Cost Behavior in California*, 7 J. HEALTH ECON. 301 (1988).

49. Melnick & Zwanziger, *supra* note 46, at 2673.

and Zwanziger argued that as selective contracting spreads to other states, we should observe similar effects of competition among hospitals.

Robinson and Phibbs also examined the changes in average costs experienced by hospitals in California following the change to selective contracting.[50] They measured the competitiveness of markets by counting the number of rivals faced by each hospital when the market boundaries were determined by flows of patients from different ZIP Code areas. Markets with ten or fewer rivals were compared with those with eleven or more rivals. The results implied that a larger number of rivals was associated with a significantly lower rate of increase in both cost per admission and cost per day.[51]

In a study that did not focus on California alone, Hadley and Swartz examined the impact of competition proxies on hospital costs using a generalized multi-payer cost function applied to data from forty-three SMSAs (1,293 hospitals) for 1980 through 1984.[52] They found that competition mattered, but that it did not matter very much. They argued that the large cost reduction effects they observed were due to prospective payment schemes rather than to competition.[53] Unfortunately, Had-

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50. James C. Robinson & Ciaran Phibbs, *An Evaluation of Medicaid Selective Contracting in California*, 8 J. HEALTH ECON. 437 (1989). The authors examined 262 private hospitals in California between 1982 and 1986. They regressed changes in average costs or length of stay on measures of changes in Medicare and MediCal shares, groupings of numbers of competitors (11 to 20, or 21 or more), changes in area demographics, hospital wages, beds per admission, and eight types of services, as well as the hospital's contract status. The number of competitors were measured in areas defined by patient flows from various zip code areas. *Id.*

51. It appears that hospitals facing either 11 to 20 or 21 to 43 rivals exhibited lower rates of cost increase than did those hospitals facing ten or fewer rivals. It did not appear that the effect was significantly greater in the 21 to 43 competitor markets than in the 11 to 20 competitor markets, however. It is possible that the effects measured here are due more to urban/rural differences than to competition differences, because the urban/rural distinction was only indirectly incorporated in the regression model. *Id.* at 437-55.

52. Jack Hadley & Katherine Swartz, *The Impacts on Hospital Costs Between 1980 and 1984 of Hospital Rate Regulation, Competition, and Changes in Health Insurance Coverage*, 26 INQUIRY 35 (1989). The method used is essentially to estimate a multi-product cost function where the products are defined by payer-type rather than by the type of service provided. The cross-section/time-series model regressed total hospital expenses on Medicare and Medicaid admissions and patient days (entered linearly and squared), outpatient surgical and other visits, full time equivalent residents, type of regulation or reimbursement scheme, HMO prevalence, insurance prevalence, physician density, year dummies, public/private hospital type, case-mix, nurse and other wage indices, and capital costs and energy costs per bed. An output function is also estimated. No tests for the appropriateness of pooling are reported. The authors also do not report tests for autoregressive disturbances. *Id.*

53. This conclusion differs markedly from that of Zwanziger and Melnick, who found

ley and Swartz were unable to measure competition reliably,[54] and had to rely on measures of HMO prevalence, physician density, and type of ownership as proxies. Thus, as the authors conceded, the study is likely to estimate incorrectly the effects of competition.[55]

Although studies of general hospital costs had dominated this literature in the late 1980s, Dranove *et al.* returned to a more direct examination of the effects of competition on the quantity of hospital services provided.[56] In response to much previous literature, they sought to answer the question: "Do hospitals in more competitive environments really provide more services than hospitals in less competitive markets?"[57] Using data on eleven groupings of 171 hospital services provided by 445 California hospitals in 1983, the authors found that hospitals in more competitive environments provide more services, but that the size of this effect is quite small.[58] They argued that the key factor in determining the number of available services is simply the population of the area — a factor that has been neglected in other examinations of hospital competition. In addition, the authors presented evidence that the provision of any particular hospital service is likely to be significantly affected by the presence or absence of scope economies among the various service groups.[59]

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that prospective payment systems had little independent effect on cost changes in California. *See* Zwanziger & Melnick, *supra* note 46, at 2674.

54. The Herfindahl index calculated at the SMSA level was always very low and was statistically insignificant in the regressions. Hadley & Swartz, *supra* note 52, at 39-44.

55. *Id.* at 45.

56. David Dranove et al., *Is Hospital Competition Wasteful?*, 23 RAND J. ECON. 247 (1992).

57. This was the same kind of question examined earlier by a number of researchers. *See* FARLEY, *supra* note 22; Harold S. Luft et al., *The Role of Specialized Clinical Services in Competition Among Hospitals*, 23 INQUIRY 83 (1986); Robinson et al., *supra* note 24 (using data from earlier years). Dranove et al. only allude to the more basic question: "Even if hospitals in competitive markets produced more services, would that be bad?" Dranove et al., *supra* note 56.

58. The probit statistical model regresses the number of hospitals in area i providing service j on the area population, the population of the adjacent fringe areas, distance to the next more populated area, media income, wage costs for support personnel, and market concentration. The authors chose to leave out hospital specific factors, arguing that they are endogenous. The authors used "urbanized areas" as the geographic markets in which to examine the effects of market concentration. As a result, hospitals in the larger urban areas (i.e., Los Angeles and San Francisco) face hundreds of competitors. The authors noted that exclusion of such markets from the data does not alter the results appreciably. Dranove et al., *supra* note 56, at 261.

59. *Id.* at 254-60.

C. Summary

Much of the existing empirical evidence suggests that low concentration is associated with increased nonprice (quality) competition. Studies published during the period of 1970 to 1987 indicate that low concentration was associated with higher costs and technically inefficient production. The more recent evidence, however, suggests that areas with a relatively large number of competing hospitals have lower rates of cost inflation than do areas where there are fewer competitors. In addition, the evidence of "overproduction" of health services in unconcentrated markets is less apparent in the more recent studies.

IV. EMPIRICAL LINKS BETWEEN MARKET STRUCTURE AND PRICES

Although there has been a considerable amount of research on the relationship between hospital costs and market structure, less emphasis has been placed on exploring the relationship between market structure and hospital prices. Two studies using data from the 1970s indicate that price competition among hospitals existed even in that early period.

One study was performed by Noether in 1987.[60] Noether estimated two basic regression equations. In the first, the price of a particular hospital service[61] was estimated as a function of a set of exogenous demand, factor price, and market structure variables. In the second, expenses per admission were regressed on the same explanatory factors.[62] Market structure should affect expenses only through its effect on quality competition, but will influence price both indirectly (i.e., through its effects on quality competition) as well as directly (i.e., explicit price competition). Therefore, Noether argued that differences in the magnitudes of the market structure parameters in the price and cost equations should indicate the nature of competition (i.e., price versus nonprice) that is most prevalent in hospital markets.[63]

Noether's results suggested that both quality and price competition occur in the hospital industry. The market concentration variable generally

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60. Monica Noether, *Competition Among Hospitals*, 7 J. HEALTH ECON. 259 (1988).

61. Noether used 1977 price data for eleven disease categories. *Id.* at 261-70.

62. The expense data, unlike the price data, were not disaggregated by disease category, and may thus suffer from unmeasured differences in disease severity. Noether attempted to control for this by including as explanatory variables hospital characteristics (such as whether the facility was a teaching hospital) that are thought to affect case-mix. *Id.*

63. *Id.* at 278-79.

exhibited a significant negative effect on expenses per admission[64] (indi-
cating that hospitals in concentrated markets engage in less quality com-
petition),[65] but exercised no significant direct influence on price. If
hospitals did not engage in price competition, we would expect to find
both prices and expenses increasing with concentration. The results ob-
tained in this study suggest that the cost-increasing impact of competition
is offset by its price-reducing impact.

Frech and Woolley examined the effects of SMSA hospital concentra-
tion on average prices, costs, and markups for various hospital services
(room and board and certain laboratory services).[66] They found that in-
creased concentration is associated with higher hospital laboratory
charges.[67] They also found that increased concentration lowered average
costs more than it lowered average prices. They argued (as did Noether)
that this could imply that higher concentration is associated with a higher
quality-adjusted price of hospital care. Frech and Woolley also concluded
that the effect of concentration on prices implies that price competition
existed between hospitals as early as 1970.

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64. *Id.* at 270-78. Noether also examined the relationship between market structure
and intensity of input use. The results showed that higher levels of concentration reduce
the number of employees hired per bed, as well as the quantity of assets employed per bed.
Id. at 278.

65. An alternative explanation for this result is that efficient (low cost) hospitals gain
large market shares, which increases measured concentration. This rationale may not be
valid in this case, since Noether included a separate firm-size variable that should have
captured any size-related efficiency effects. *Id.* at 273.

66. H. Frech, III & J. Michael Woolley, Consumer Information, Price and Nonprice
Competition Among Hospitals (Dec. 1988) (unpublished mimeograph, on file with the
Journal of Contemporary Health Law and Policy).

67. The authors aggregated the 1970 hospital data to 170 SMSA level observations and
regressed the average price (and cost) variables on concentration, mean income, insurance
coverage, population and other demographics, for-profit and government hospital preva-
lence, nursing wages, housing costs, average patient length-of-stay, hospital unionization,
certificate-of-need law age, Blue Cross market share, proportion of beds in medical school-
affiliated hospitals, and local government health care expenditures per capita. All mone-
tary variables were adjusted by a 1978 SMSA cost of living index. The authors also in-
cluded three proxies for the level of information that consumers might have regarding
hospital prices and quality. These variables included: percent of households with a female
head, the percent of housing units moved into during the past five years, and proportion of
households with a phone available. The coefficients on the information variables as a
group were often statistically significant. Individually, however, they were either statisti-
cally insignificant or they obtained the wrong sign. The coefficients on the for-profit and
government variables were generally insignificant. *Id.*

A.   The California Experiment and Prices

We previously mentioned four studies that examined the effects of competition on hospital costs and resource utilization using post-1982 California data.[68] These studies tend to indicate that cost increases were lower in those areas where more competitors existed. Two studies have also recently examined the effects of hospital market concentration on the prices charged by California hospitals.

In the first such study, Dranove, Shanley, and White examined the effects of hospital market concentration on prices charged by hospitals to private pay patients. They studied 300 nongovernment hospitals in California between 1983 and 1988, a period when selective contracting between health care plans and health care providers was allowed and when HMOs grew from 24% to 80% of the private insurance market in California.[69] They found a statistically significant and economically nontrivial positive effect of concentration on both net markups and transaction prices. They argued that standard merger analysis should probably be applied to hospitals given that the direction of the concentration effect is consistent with that found in markets for other goods and services.[70]

Continuing with the California experiment, Melnick, Zwanziger, Bamezai, and Pattison examined the effects of hospital concentration on prices charged by hospitals to the Blue Cross (BC) PPO in California in 1987.[71] They found that BC paid lower prices for medical/surgical bed

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68. *See supra* notes 40-59 and accompanying text.

69. David Dranove et al., *Price and Concentration in Hospital Markets: The Switch from Patient-Driven to Payor-Driven Competition*, 36 J.L. & ECON. (1993). The authors examined several dependent variables including net hospital markups, list price markups, estimated average transaction prices, aggregate markups, and intensity of in-patient clinical lab use. Each dependent variable was based on data weighted by eight profit centers for each hospital. The dependent variables were regressed on Herfindahl concentration indices and several hospital characteristics including: hospital market share, a hospital size dummy variable based on 300 beds, "high tech" status, fixed asset intensity, Medicaid and Medicare funding intensity, and bad debt and charity revenues. The markets were defined by Census Bureau urban areas rather than by patient flows. Given the level of aggregation, the prices do not correspond to prices for any particular service or illness treatment, but rather are aggregated prices across a basket of eight common cost and profit centers (i.e., med/surg acute care, clinical lab, diagnostic radiology, etc.) with relatively little specific adjustment for case-mix.

70. An interesting finding by Dranove *et al.* is that certain hospital profit centers operate at large negative markups. This implies that these services (intensive care and medical/surgical beds) must be complements to the hospital's other services and cannot be analyzed in isolation. *Id.*

71. Glenn A. Melnick et al., *The Effects of Market Structure and Bargaining Position on Hospital Prices*, 11 J. HEALTH ECON. 217 (1992).

days in those markets where there were more competing hospitals.[72] The regression analysis indicated that a merger leading to a 50% increase in the concentration measure would be associated with a 9% increase in price.[73] The authors also found that, where a hospital handled a larger share of BC customers, BC paid higher prices; and where BC provided a larger share of a hospital's patient days, BC paid relatively low prices.[74] Thus, the relative bargaining strengths of the hospital and the PPO apparently are significant. The authors argue that excess hospital capacity must exist in the market for the PPO to maintain a credible threat to move patients to alternative hospitals.[75] Without such a threat, the PPO cannot elicit lower prices from the hospitals.

B. Studies of Mergers and Hospital Pricing

Eisenstadt and Klass examined evidence from mergers of not-for-profit hospitals in small towns for 1985 and 1986.[76] They compared the price changes (for standard diagnosis groups) in seven markets that had experienced mergers with the price changes that occurred in similar markets that had not experienced mergers. They estimated several equations that, as a group, indicated that there was no statistically significant relationship between hospital price increases and the occurrence of a merger.[77] In addition, Eisenstadt and Klass used MEDPAR price data from thirty Pennsylvania hospitals (for thirteen common diagnosis groups) to ex-

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72. *Id.* at 227. The model regresses the Blue Cross PPO's negotiated price per inpatient medical/surgical day on market structure (Herfindahl concentration indexes for markets based on either patient-flow data or county boundaries), hospital characteristics (prior year's cost index relative to that for all hospitals (to control for product differences), teaching status, ownership-type dummies), and market position variables (Blue Cross share of inpatient days, hospital occupancy rate, average hospital occupancy in the market, the hospital's share of all Blue Cross days within the market). The authors also test and correct for the endogeneity of the market share variables. *Id.* at 225-29.

73. *Id.* at 229.

74. *Id.* at 230.

75. *Id.*

76. D. Eisenstadt & M. Klass, The Relationship Between Non-Profit Hospital Market Structure and Economic Performance: Evidence from Pennsylvania and from Non-Profit Hospital Consolidations 10-20 (1988) (unpublished mimeograph, on file with ICF Consulting Associates).

77. Because all data came from small town markets, each market tended to be highly concentrated both before and after the merger. The time series regression analysis did not adjust for any factors other than the existence of the merger. Control was accomplished by pairing the merger cities with comparison markets chosen to match in market structure and location. Since the post-merger periods tended to be rather short, the results could not be expected to be too informative. *Id.*

amine the relationship between price and market concentration.[78]   They reported that in 1986, increased concentration was associated with lower prices for all thirteen diagnosis related groups (DRGs), and that this effect was statistically significant in four instances.[79] They also found no relationship between concentration and their measures of cost per admission or quality.[80]

An indirect test of the impact of market structure on pricing behavior was conducted by Woolley, who performed an "event study" of the impact of hospital mergers.[81] Event studies utilize the assumption of efficient financial markets (i.e., the notion that the price of a firm's stock reflects all available information bearing on the expected future profitability of the firm) to assess the perceived consequences of mergers and acquisitions.   Using data for hospital mergers during the 1969-85 period, Woolley reported that "promerger" events (e.g., a merger announcement) tended to increase "rivals" market value, while "antimerger" events (e.g., the announcement of an antitrust complaint) reduced market value.[82] Woolley characterized this pattern of results as consistent with traditional views of market competition (i.e., mergers lead to supracompetitive prices, hence monopoly rents for rivals, while antitrust actions eliminate these rents).[83]

We do not share Woolley's interpretation of these findings. Vita and Schumann carefully examined fifteen of the post-1980 events in Woolley's sample.[84] They found that all of these events fall into at least one of the

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78. The sample was small because the study was designed to examine only small city hospitals in Pennsylvania where relatively high market concentration existed. The authors used multiple regression techniques to examine factors affecting prices, average costs and hospital quality. The models adjusted for concentration, for-profit status, management contracts, system affiliation, service to HMO or PPO members, hospital wage rates, case-mix, teaching hospital affiliation, bed size, length-of-stay for a DRG and overall, and the prevalence of "birthing services." *Id.*

79. *Id.*

80. Measures of quality included the percentage of patients who died while in the care of the hospital, and the percentage of cases with blood transfusion complications or surgical complications. *Id.*

81. J. Michael Woolley, *The Competitive Effects of Horizontal Mergers in the Hospital Industry: An Even Closer Look*, 10 J. HEALTH ECON. 373 (1991) [hereinafter Woolley 2]; J. Michael Woolley, *The Competitive Effects of Horizontal Mergers in the Hospital Industry*, 8 J. HEALTH ECON. 271 (1989) [hereinafter Woolley 1].

82. Woolley 1, *supra* note 81, at 282-84. "Rivals" were defined to consist of other investor-owned chains, even though not-for-profit independent hospitals have a significantly greater market share. *Id.*

83. *Id.* at 285.

84. M. Vita & L. Schumann, *The Competitive Effects of Horizontal Mergers in the Hospital Industry: A Closer Look*, 10 J. HEALTH ECON. 359 (1991).

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following three categories: (1) the transaction was not truly horizontal; (2) the transaction was horizontal, but generated a concentration increase too small to plausibly produce market power; or (3) the transaction might have created market power, but could not have conferred monopoly returns on firms improperly characterized as rivals.[85] Vita and Schumann suggested an alternative rationale for Woolley's findings; i.e., the sample transactions conveyed information to other firms about the existence of merger-related efficiencies.[86]

C. Other Market Structure and Pricing Evidence

Feldman and Dowd employed a different approach to measuring the market power of hospitals.[87] Using 1981 data on thirty-one Twin Cities hospitals, the authors estimated the price elasticity of hospital demand for three different payer groups: Medicare, Medicaid, and private pay. Not surprisingly, they found that each group's demand is less than perfectly elastic. They concluded from this result that the Twin Cities hospital market was not competitive.[88] We believe, however, that this conclusion does not follow from their empirical findings. The measure of an individual firm's market power is the elasticity of the *residual* demand curve facing the firm. This elasticity is determined by the firm's market share, *market* demand elasticity, and fringe supply elasticity.[89] To estimate whether individual firms have unilateral market power, one must estimate a demand curve for each firm.[90] Feldman and Dowd did not do this; rather, they estimated the demand curves for separate groups of consumers (which, when aggregated, yield the market demand curve). They found that all groups exhibited inelastic demands. This implies that overall market demand may respond very little to price changes (a highly inelastic demand). However, an individual firm may lose virtually all its sales if it

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85. *Id.*

86. *Id.* at 371.

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

88. *Id.* at 291.

89. *See* William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 944 (1991).

90. For empirical examples, see Jonathan B. Baker & Timothy F. Bresnahan, *The Gains from Merger or Collusion in Product-Differentiated Industries*, 33 J. INDUS. ECON. 427 (1985); David T. Scheffman & Pablo T. Spiller, *Geographic Market Definition under the U.S. Department of Justice Merger Guidelines*, 30 J.L. & ECON. 123 (1987); Jonathan B. Baker & Timothy F. Bresnahan, Estimating the Elasticity of Demand Facing a Single Firm: Evidence on Three Brewing Firms (1984) (unpublished research paper, Dept. of Economics, Stanford University).

raises price even a small amount (the firm faces a perfectly elastic residual demand curve).[91] One could infer from Feldman and Dowd's results that Twin Cities hospitals would find it profitable to collude (assuming that they could coordinate their behavior). One could also infer (assuming coordination) that they would find it profitable to charge different prices to different consumer groups (i.e., price discriminate). Inferences about *unilateral* market power, however, cannot be made from Feldman and Dowd's empirical findings.[92]

The evidence for Florida hospitals has recently been analyzed by the Florida Health Care Cost Containment Board (HCCCB).[93] The HCCCB focused on 201 Florida hospitals from 1984 through 1990 and argued that higher market concentration was associated with lower average revenues and lower average costs.[94] The coefficients from the empirical analysis imply, however, that competition may indeed work. While the HCCCB found that the level of concentration (apparently measured in 1984) had no significant relationship to rates of change in average revenues or costs, the change in concentration over the period was positively associated with rates of increase in costs and revenues. This latter evidence implies that rising levels of concentration lead to higher costs and prices, while falling levels of concentration lead to lower costs and prices.

Overall, the empirical studies relating hospital concentration to pricing behavior present a mixture of results that do not lend themselves to de-

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91. As an illustration, consider the demand for wheat. It is probably true that a general rise in the price of wheat will not cause a large reduction in total wheat consumption (i.e., the market demand for wheat is inelastic). However, if any individual wheat producer increased his price alone, he would lose virtually all his sales as rival wheat producers increase their sales at the previous price (i.e., the residual demand facing any single producer is highly elastic).

92. *See also* Roger Feldman et al., *Effects of HMOs on the Creation of Competitive Markets for Hospital Services*, 9 J. HEALTH ECON. 207 (1990) (similarly interpreting regression results in an examination of HMO behavior in choosing hospitals).

93. HEALTH CARE COST CONTAINMENT BOARD, STATE OF FLORIDA, DIMENSIONS OF LOCAL COMPETITION IN FLORIDA 1984-1990 (1992) [hereinafter FLORIDA STUDY].

94. *Id.* at 27. The HCCCB study examined gross and net revenues per admission and costs per admission. These variables were regressed on market concentration (using markets defined by patient flow data), surgi-center competition, hospital characteristics (average daily census, HMO/PPO funding, Medicare funding, ownership type, input prices, service index, case-mix index, teaching status), and some area demographics (physicians per thousand population). The study used a stepwise statistical procedure to choose the various models. This procedure may lead to statistical bias in the estimates of the coefficients if it results in the deletion of relevant explanatory variables that are correlated with the included variables. The authors present little information on the sensitivity of the coefficients to the exclusion of potentially relevant variables and one must, therefore, place less emphasis on the results than might otherwise be the case.

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finitive conclusions. Those studies that use the most defensible methods, however (with one exception), show that price competition does exist among hospitals and that a positive relationship exists between market concentration and prices.[95]

V. INTERPRETATION OF THE EMPIRICAL RESULTS

The empirical studies surveyed in the previous section provide fairly strong evidence that nonprice competition has traditionally been an important element of hospital competition. In and of itself, this does not suggest market failure. Markets for virtually all goods and services exhibit a mixture of price and quality competition. Pure price competition is the exception rather than the rule. Given a choice between low quality, low price goods, and high quality, high price goods, consumers will often voluntarily choose the latter. Total (and average) expenditures on the good may rise as a result, yet few would construe this as evidence of a market failure or suggest that collusion to reduce quality is desirable.[96] Indeed, the standard analyses of quality competition find that competitive markets tend to produce efficient (i.e., welfare maximizing) levels of both quality and quantity.[97] Nevertheless, many discussions of hospital competition conclude that quality competition reduces social welfare.[98]

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95. Several studies indicate that competition "works" in the sense that lower concentration is associated with lower prices. *See* Dranove, *supra* note 69; Frech, *supra* note 66; Melnick, *supra* note 71; MONICA NOETHER, FED. TRADE COMM'N, COMPETITION AMONG HOSPITALS (1987). Others find that hospital competition does not "work" in that decreased concentration is associated with higher prices. *See* FLORIDA STUDY, *supra* note 93; Feldman & Dowd, *supra* note 87; Eisenstadt & Klass, *supra* note 76. Of the latter group of studies, however, only the Eisenstadt & Klass paper used a method that was likely to shed light reliably on the questions the papers attempted to address.

96. Such collusive behavior might violate the antitrust laws. Most known episodes of collusion in hospital markets focused on easily observable output such as services or beds and not on the arguably more complex pricing dimension. Frech & Woolley, *supra* note 66.

97. *See, e.g.*, K. Leffler, *Ambiguous Changes in Product Quality*, 72 AM. ECON. REV. 956 (1982).

98. *See, e.g.*, Catherine G. McLaughlin, *Market Responses to HMOs: Price Competition or Rivalry?*, 25 INQUIRY 207 (1988); Robinson, *supra* note 1. There is one sense in which a positive relationship between total expenditures and competition could be construed as providing evidence of waste, even in a world with good information. Suppose firms compete (and therefore seek to collude) on both price and nonprice ("quality") bases. If collusion over quality tends to break down more rapidly than price collusion as concentration falls, then unit costs will rise as firms compete for the monopoly rents through quality improvements. *See* George J. Stigler, *Barriers to Entry, Economies of Scale, and Firm Size, in* THE ORGANIZATION OF INDUSTRY 67-70 (1983). These additional expenditures could be characterized as "wasteful," in that they exceed the levels that would be obtained in a completely noncollusive environment. In such an instance, con-

The basis for this conclusion is not always articulated, although it presumably derives from the consumer and provider incentive incompatibilities created by health care insurance and the information asymmetries discussed earlier. These problems would tend to reduce the efficiency of the market irrespective of whether competition occurs mainly on price or nonprice dimensions. The discussions of health care markets generally conclude that competition cannot be relied upon to assure allocatively efficient outcomes in the health care sector. An obvious corollary to such a conclusion is that the traditional antitrust analysis of horizontal mergers is not applicable to hospitals.

Can this policy conclusion be supported by empirical evidence on the relationship between concentration and hospital costs? We do not believe that studies of this type can support such an inference. Ideally, one should measure allocative efficiency in a market by comparing the marginal social value of an additional unit of output (or quality) to the marginal social cost of producing that unit. Both quantity (and quality) levels are efficient when these marginal values equal their marginal costs. There is insufficient quantity (or quality) when marginal value exceeds marginal cost; there is excessive quantity (or quality) when the marginal cost exceeds marginal value. If one wishes to assess whether particular market conditions are conducive to optimal economic performance, a sensible research strategy would therefore be to develop empirical proxies for marginal value and marginal cost, and estimate their relationship to the market structure variables of interest (such as concentration). There is a vast amount of industrial organization literature in which this approach has been employed.[99] This literature does not attempt to address resource allocation questions by examining only the behavior of unit (or even marginal) costs, because, by themselves, cost data provide only part of the information necessary for welfare calculations.[100]

Regardless of its flaws, the research strategy used in the industrial or-

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sumer welfare would be maximized, however, not by enforcing quality collusion, but by eliminating all forms of collusion from the market.

99. For a review of this literature, see Paul A. Pautler, *A Review of the Economic Basis for Broad-Based Horizontal-Merger Policy*, 28 ANTITRUST BULL. 571 (1983). While the literature in industrial organization is imperfect in several respects, it does attempt to answer the correct questions. The hospital competition literature, most especially in its early stages, does not answer these questions.

100. Indeed, one suspects that in markets where both price and quality competition occur, cross-sectional regressions would often show a positive relationship between unit costs and competition, as we often observe in hospitals. However, such a result would seldom, if ever, be construed as evidence of systematic market failure.

ganization literature would represent a substantial improvement upon the techniques used in most early studies of hospital competition. The only obvious distinction between studies of the hospital industry and those of other industries is that, while students of other industries are usually searching for evidence of insufficient output (i.e., monopoly power), hospital researchers typically are testing hypotheses about excessive output (or quality). But, as we have seen, the early health care researchers did not (with few exceptions) adopt this approach. Rather, they attempted to analyze structure-performance relationships in hospital markets mainly through an analysis of unit costs, despite the fact that this research design is singularly unsuited to generating insights into resource allocation and consumer welfare issues. Those authors who, more recently, have examined the joint behavior of costs and prices using better empirical methods, have tended to find that price competition exists and that the "standard" result holds — lower market concentration is associated with lower hospital price increases. While their results cannot be construed as evidence that hospital output and quality levels are "optimal," the more recent studies suggest nonetheless that hospital markets respond to normal competitive forces. To that extent, these newer studies of hospital competition support the application of competition policies to health care markets.

We do not argue that incentive incompatibilities have been eliminated from health care markets. Nevertheless, while the existence of incentive incompatibilities might induce departures from the "first best" competitive equilibrium, their presence does not establish the proposition that quantity and quality levels arrived at through collusion are socially preferable to those obtained through an admittedly imperfect market.[101] This is true whether the collusion occurs tacitly or explicitly (e.g., under the auspices of a planning agency). Advocates of collusive (or regulatory) allocation mechanisms presumably should bear the burden of proving that society would benefit if health care resources were allocated by these mechanisms rather than by markets. That burden has not yet been satisfied by existing empirical research; indeed, the most recent research often contradicts this position.[102]

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101. *See* Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1 (1969).

102. We have intentionally not addressed two issues that often gets intertwined in the debate over "competition" versus "regulation." Namely, whether relatively healthy persons should be forced to subsidize relatively sickly persons, and whether the insurance system can (or should) be used as a wealth transfer mechanism to make medical care avail-

One additional point should be noted. Many of the empirical studies discussed in the preceding section were based upon pre-1982 data. Dramatic changes in reimbursement, production, and delivery have taken place during the past decade. Many of these developments represent an endogenous market response to principal-agent problems. The (intended) effect of many of these transformations has been to confront health care consumers (or their agents) with prices that reflect production costs and thereby diminish incentives to overconsume health care services. This, in turn, will furnish providers with an incentive to compete on price and, accordingly, to reduce costs. Indeed, most of the hospital competition studies that employed post-1982 data are more sanguine about the effects of competition on unit costs (or intertemporal changes in unit cost) and prices than were earlier studies.[103]

Because the information upon which formal analyses of hospital competition are based becomes available with a time lag, researchers only now are beginning to study the data generated during this recent innovative period.[104] Consequently, conjectures on the ultimate competitive impact of these advances can be based on two information sources. The first source is the anecdotal information contained in the hospital trade press. The other is the set of empirical studies that is based on data generated in those areas where the aforementioned innovations seem to have taken hold and rapidly diffused. In the ensuing section, we discuss first the various transformations that occurred during the 1980s and 1990s and review the impact that these developments were predicted to have had on hospital competition. We then survey the currently available econometric evidence to assess whether these innovations have, in fact, had their intended procompetitive effects.

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able to all citizens regardless of ability to pay. Those issues are beyond the scope of this paper and are distributional issues that are logically (if not emotionally) separable from the question of whether competition or regulation more efficiently produces a particular level of health care output.

103. *See, e.g.*, Robinson, *supra* note 25; Zwanziger & Melnick, *supra* note 48; Melnick & Zwanziger, *supra* note 46; Dranove et al., *supra* note 56.

104. In an oft-cited legal decision in this area, Judge Posner noted that the literature relating hospital concentration to prices and competition "is at an early and inconclusive stage . . . ." United States v. Rockford Mem. Corp., 898 F.2d 1278, 1286 (7th Cir. 1990). For several differing views on the state of this literature, see Paul J. Feldstein et al., *Concentration and Price in the Hospital Industry: Prices Are Lower in Competitive Markets*, 22 ANTITRUST L. & ECON. REV. 55 (1991).

V. COMPETITIVE DEVELOPMENTS IN HEALTH CARE FINANCING AND DELIVERY

The principal focus of most of the innovations in health care finance has been to confront decisionmakers, whether patients or physicians (acting as patients' agents), with prices that reflect the costs of increased consumption. Presumably, the establishment of such a pricing structure will induce the decisionmakers to weigh carefully incremental costs against expected benefits when making consumption choices. If this occurs, one would expect to observe a commensurate increase in providers' propensity to compete on price. There are two primary changes that have been introduced to achieve this end. The first is the reformulation of traditional indemnity plans to increase subscribers' out-of-pocket payments, and the second is the development of plans that reward providers for constraining the quantity of services provided.

As Noether notes, much of the impetus for the reformulation of traditional indemnity plans has come from employers, who have seen their insurance premiums steadily grow over the past two decades.[105] To reduce this growth, many firms have adopted plans that incorporate larger deductibles, mandatory second opinions, and higher coinsurance rates.[106] In 1982, for example, only 17% of private companies required the payment of deductibles; by 1984 the number had grown to 52%. In 1984 only 50% of firms fully reimbursed policy-holders for hospital room and board expenses, whereas in 1979 the corresponding figure was 89%. The number of firms providing full coverage for surgery expenses has also fallen since 1979, declining from 45% to 27%.[107]

This reduction in the share of health care expenses covered by traditional indemnity plans is significant, given the large percentage of the population covered by these plans. Perhaps equally important is the advent and growth of nontraditional "managed care" plans, such as HMOs and PPOs, which alter the incentives of health care providers and consumers. As we will see, however, the impact of these plans on the price, quantity, and quality of health care is controversial.

105. NOETHER, *supra* note 95, at 84.

106. A plan's deductible is the amount that the subscriber must bear before the plan will reimburse any expenditures. The coinsurance rate is the percentage of expenses (in excess of the deductible) that must be absorbed by the patient. For evidence regarding the growth of cost control devices such as preadmission certification, second opinions before surgery, and increased deductibles, see Steven DiCarlo & Jon Gabel, *Conventional Health Plans: A Decade Later*, 10 HEALTH CARE FINANCING REV. 77 (1989).

107. *See* Robert Pear, *Companies Tackle Health Costs*, N.Y. TIMES, Mar. 3, 1985, at F11.

A. *Effects of Coinsurance and Deductibles*

There is evidence that altering the completeness of insurance coverage, or the form of insurance reimbursement, can substantially alter consumption behavior. As part of a RAND Corporation study, Manning *et al.* found that consumers who had to pay higher out-of-pocket costs for services were sensitive to price changes.[108] In particular, they estimated nontrivial (albeit low) market demand elasticities for medical care of about - 0.2.[109] The largest percentage reductions in consumption occurred when the coinsurance rate was increased from 0 to 25%. Raising the coinsurance rate from 0 to 95% (but capping total personal contributions at $1,000) led to a 46% reduction in total predicted health care expenditures.[110]

In another study based on the same RAND data set, Siu *et al.* found that the imposition of cost sharing for in- and out-patient services induced declines in both the number of admissions and the number of inpatient days.[111] The percentage decline in the number of "appropriate" admissions (and days) was similar to the rate of decline of the number of "inappropriate" admissions (and days), where "appropriateness" was determined by reference to a well-established medical protocol. Siu *et al.* concluded that strategies directed specifically at reducing "inappropriate" admissions could yield substantial resource savings.[112]

In a more recent study that is generally consistent with the RAND results, Cherkin *et al.* examined the effects of an inexpensive ($5) office visit copayment imposed in 1985 on a group of Washington state employees enrolled in an HMO.[113] Federal employees enrolled in the same HMO were not subject to the copayment and served as a control group. The authors found that the small copayments had no effect on the use of various child immunizations, hypertension drug use, and cancer screening therapies. These copayments did, however, reduce the use of general

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108. Manning et al., *supra* note 11.

109. *Id.* at 268.

110. *Id.* at 260. The RAND study found that most cost savings were attributable to reductions in the likelihood of admission with higher coinsurance rates; however, the RAND researchers found few insurance-induced differences in resource use once admission occurs.

111. Albert L. Siu et al., *Inappropriate Use of Hospitals in a Randomized Trial of Health Insurance Plans*, 315 NEW ENG. J. MED. 1259 (1986).

112. *Id.*

113. D. Cherkin et al., *The Effect of Office Visit Copayments on Preventative Care Services in an HMO*, 27 INQUIRY 24 (1990).

medical exams by about 14%.[114]

One recent study provides mixed results regarding the effects of copayments and deductibles on the demand for ambulatory surgery. Pauly and Erder used a large data set from one private insurer who offered multiple insurance plans to seven large companies.[115] The authors found that insurance plans offering copayment and deductible terms making ambulatory surgery cheaper than in-patient surgery do not appear to induce more ambulatory surgery. They did find, however, that surgery rates generally are lower when out-of-pocket costs are higher for the insureds.[116] So insurance incentives seem to affect surgery generally, but they do not matter in determining whether the surgery occurs in an ambulatory setting or in a hospital in-patient setting. The authors offered no particularly compelling rationale for the lack of a price effect for ambulatory surgery.

The potential effects of insurance were indirectly revealed in another study that examined the sensitivity of consumers to prices charged by individual hospitals.[117] Luft *et al.* found evidence from a logistic hospital choice model that the price elasticity of demand faced by an individual hospital may range from -0.5 to -1.4.[118] These values indicate a relatively low responsiveness of consumers to price when distance to a hospital and hospital quality are held constant. These estimates must be interpreted cautiously, however. First, the price data used in this study (and others like it)[119] likely do not correspond to the prices facing the entities actually making the choices. Typically, the price data consist of information on "charges," which may be only vaguely related to the actual prices faced by the person making the choice of hospital. Additionally, it is often difficult to identify the entity making the choice. It could be the doctor, the patient, the employer, or a third party carrier.

Second, this study in all likelihood suffers from a problem frequently encountered in empirical studies of consumer demand.[120] The problem arises because the consumers' choice is in part determined by some factor (e.g., "quality") that is not observed or measured by the researcher. If

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114. *Id.*

115. M. Pauly & M. Erder, *Insurance Incentives for Ambulatory Surgery*, 27 HEALTH SERVICES RES. 813 (1993).

116. *Id.*

117. Harold S. Luft et al., *Does Quality Influence Choice of Hospital?*, 263 JAMA 2899 (1990).

118. Id.

119. *See, e.g.*, Feldman et al., *supra* note 92.

120. *See* Hal R. Varian, *Econometrics and Economic Theory*, in MICROECONOMIC ANALYSIS 118-35 (1978).

"quality" is correlated with price (i.e., higher quality hospitals charge higher prices), this omission will cause the researcher systematically to underestimate consumers' sensitivity to changes in price.

B. Health Maintenance Organizations (HMOs)

The incorporation of deductibles and coinsurance into traditional indemnity plans constitutes an attempt to induce the ultimate consumers of health care services to reduce their consumption of these services. However, because many consumption decisions are made by physicians acting as agents for their patients, another strategy for altering incentives has been the vertical integration of the health insurance and health care delivery functions. Although this integration can take a variety of forms, perhaps the best known organizational configuration is the closed-panel HMO. Such HMOs typically have their own in-house medical staff and facilities. An HMO subscriber pays a fixed premium to the organization, which in turn provides the subscriber with comprehensive health care services.[121] The incentive to control utilization is clear. Because the organization is operating on a fixed budget, any costs in excess of this amount will constitute financial losses (and, conversely, low costs will generate profits). If the compensation of HMO physicians is linked to these profits and losses, the physicians will no longer have incentives to treat health care services as "free" goods, as traditional "fee-for-service" providers allegedly do, and will accordingly have an incentive to exercise considerably more discretion when making consumption decisions on behalf of their patients. If HMOs are successful in altering physician behavior, then utilization of health care resources should decline, leading to cost reductions for HMOs.[122] HMOs should then be able to charge less for insurance. This process implies that HMOs may provide health care services with fewer resources (and of potentially lower quality) than do traditional plans. Consumers of health care services then have a choice of the resource-intensive traditional system or the HMO system. If HMOs grow relative to traditional insurance systems, then consumers must perceive them to be a superior alternative to the traditional system.[123]

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121. In most cases where the HMO cannot provide the service itself (e.g., most HMOs do not own their own hospitals), the patient generally must obtain care from an institution that has been approved by the HMO.

122. See David Dranove, supra note 8 (discussing a model of physician demand inducement that illustrates the potential benefits of HMO incentive structures in reducing "unnecessary" treatment).

123. If consumers can evaluate the quality of the care they receive, then the growth of HMOs would imply that they are clearly a superior alternative to traditional plans for

Health maintenance organizations have grown quite rapidly during the past decade, although the pace of growth shows some evidence of abating. From 1976 to 1993, HMO enrollment grew more than 580% (from 6 million to more than 40.8 million); from July 1991 to July 1992, enrollment rose 6.4%.[124]

If HMOs are successful in achieving cost reductions, their impact will be felt market-wide. HMOs' lower costs will be reflected in lower premiums, thus making HMOs attractive to consumers and businesses alike. If the market for insurance is competitive, competing insurers (i.e., traditional fee-for-service) will be constrained somehow to replicate these savings in order to offer comparable premium reductions. Interesting empirical questions, therefore, are: (1) whether HMOs have fulfilled their promise of reduced resource use (for a given care level); and (2) if so, whether their success has forced traditional insurers to modify their behavior. These issues have been addressed in a relatively large body of research that has so far yielded evidence that HMO growth has: (1) reduced hospital admissions; (2) reduced resource use once the patient is admitted to the hospital; (3) altered physician incentives and behavior; and (4) not led to a significant reduction in quality of care.[125]

1. Evidence that HMOs Work.

An early study by Goldberg and Greenberg found that hospital utilization among Blue Cross enrollees was lower in markets where HMO penetration was high, suggesting that traditional insurers respond to the competitive constraint imposed by HMO plans.[126] Noether found that HMO market share was positively related to hospital expenses, but that

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many consumers. However, if consumers cannot evaluate the quality of care, the growth of HMOs could be due to a lower than desired quality of care rather than to a better match to consumer preferences.

124. Data from InterStudy, Aug. 1993.

125. These results seem to be more commonly found for staff or network model HMOs compared to the more loosely affiliated IPA-type HMOs. In addition, none of the results (except perhaps for the hospital admissions reduction) are confirmed beyond doubt. As HMOs and other health care provision systems have evolved over time, the distinctions between categories have blurred. Many health care systems have installed incentive systems that try to mimic those used by HMOs. For a description of these changes and a review of some of HMO-related research, see Ellen M. Morrison & Harold S. Luft, *Health Maintenance Organization Environments in the 1980s and Beyond*, 12 HEALTH CARE FINANCING REV. 81 (1990).

126. Lawrence G. Goldberg & Warren Greenberg, *The Competitive Response of Blue Cross to the Health Maintenance Organization*, 18 ECON. INQUIRY 55 (1980). This study suffered from problems in determining the cause of the effect. The results were quite sensitive to the inclusion or exclusion of certain Western region dummy variables.

an *increase* in HMO market share resulted in reduced costs.[127] She inter-preted this as evidence that HMO entry is provoked by high hospital costs that are eventually reduced as HMOs increase their share.[128]

Johnson and Aquilina found that, in 1982, patients insured by Twin Cit-ies-area HMOs experienced significantly shorter lengths-of-stay than did patients insured by other payers.[129] The authors concluded that this was not due to self-selection (i.e., HMOs attracting relatively healthy enroll-ees), but rather to the incentive effects of HMOs.[130] Examining disaggre-gated data for seven diagnosis-related groups (DRGs), the authors found that when factors such as hospital bed size, patient age, sex, and illness severity were held constant, members of HMOs and other prepaid groups exhibited significantly lower average lengths-of-stay.[131] The authors did not conclude, however, that HMO introduction and development lead to community-wide reductions in utilization.

In a randomized experiment, Manning *et al.* also found that a Seattle HMO reduced hospital admissions and expenditures relative to a control

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127. NOETHER, *supra* note 95, at 72.

128. Noether also found that the hospital prices were higher in those areas with greater HMO market penetration (possibly indicating that HMOs initially enter markets with high prices). The change in HMO market share, however, is negatively related to hospital prices and costs, implying that as HMO growth occurs, hospital prices fall significantly. *Id.* at 71-72, 84-85.

129. Allan N. Johnson & David Aquilina, *The Impact of Health Maintenance Organiza-tions and Competition on Hospitals in Minneapolis/St. Paul*, 10 J. HEALTH POL., POL'Y & L. 659 (1986).

130. For a survey of the empirical evidence on the HMO self-selection issue, see Gail R. Wilensky & Louis F. Rossiter, *Patient Self-Selection in HMOs*, 5 HEALTH AFFAIRS 66, 70 (1986) (summarizing 21 articles published between 1974 and 1986 and relating that ten studies found that HMOs select low-risk patients, three found that HMOs select high-risk subscribers, and eight reported no evidence of biased selection). *See also* Kathryn M. Langwell & James P. Hadley, *Evaluation of the Medicare Competition Demonstrations*, 11 HEALTH CARE FINANCING REV. 65, 68 (1989) (finding more recently that enrollees in the 26 HMOs that participated in the Medicare Competition Demonstration 1984-1986 were significantly healthier than average nonenrollees). For a general discussion of the theoreti-cal issues involved, see John Newhouse, *Is Competition the Answer?*, 1 J. HEALTH ECON. 110 (1982); Joseph P. Newhouse, *Cream-Skimming, Asymmetric Information, and a Com-petitive Insurance Market*, 3 J. HEALTH ECON. 97 (1984); Mark V. Pauly, *Is Cream-Skim-ming a Problem for the Competitive Medical Market?*, 3 J. HEALTH ECON. 87 (1984); Gregory C. Pope, *Hospital Nonprice Competition and Medicare Reimbursement Policy*, 8 J. HEALTH ECON. 147 (1989).

131. Using a sophisticated econometric methodology to correct for self-selection biases, Welch *et al.* came to a similar conclusion. W.P. Welch et al., *Health Care Costs in Health Maintenance Organizations: Correcting for Self-Selection, in* ADVANCES IN HEALTH ECON. & HEALTH SERVICES RES. 95 (1984). These results indicated that it is unlikely that un-healthy persons have disproportionately selected traditional insurers.

group.[132] As part of the RAND health insurance study, the authors ex-
amined relative health care use by three groups: (1) new randomly as-
signed HMO members; (2) previous members of the HMO; and (3) a
group of consumers who were covered by a free fee-for-service plan. The
comparisons indicated that the percentage of HMO members admitted to
the hospital one or more times was one-third less than that for the fee-
for-service group (7.1% versus 11.2%). In addition, expenditures per
person for HMO members was only 72% of that for persons under the
fee-for-service plan.[133]

In a related part of the RAND study, Siu *et al.* found that the HMO
used in the RAND experiment did indeed differentially reduce "inappro-
priate" (or discretionary) surgery more than it reduced all surgery.[134]
Physicians reviewed 244 medical records and rated the appropriateness of
hospitalization and of the care provided by the hospital. The authors
found that the rate of discretionary surgery was lower for the HMO than
for the fee-for-service control group. The rates of nondiscretionary sur-
gery did not differ between the two groups. This relationship did not
appear to hold for medical admissions, however, where the HMO was
found to provide lower rates of hospitalization for both discretionary and
nondiscretionary medical admissions. The authors found no adverse con-
sequences flowing from the lower hospitalization rates.

Smaller-scale studies have also indicated that HMOs are likely to affect
physician and patient behavior. For example, Epstein *et al.* examined the
effects of HMOs on physicians' incentives to prescribe various ambula-

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132. Manning et al., *supra* note 11.

133. Health outcomes for the three groups were generally similar and those who chose
the HMO plan voluntarily were as satisfied with their care as were those consumers using
the fee-for-service system. However, those new HMO members who were selected ran-
domly for the study were somewhat less satisfied with their care than were those consum-
ers in the fee-for-service system. For a crticism of the RAND study questioning the
generality of its results, see Harold S. Luft, *HMOs and the Quality of Care*, 25 INQUIRY
147, 148 (1988). *See also* Emmett B. Keeler & John E. Rolph, *The Demand for Episodes of
Treatment in the Health Insurance Experiment*, 7 J. HEALTH ECON. 337, 364-65 (1988) (em-
phasizing that the effects of cost sharing found in the RAND experiments came mainly
from reductions in the number of episodes of illness, and not from a reduction in the cost
per episode); *cf.* Allan N. Johnson et al., *Differences in Inpatient Resource Use by Type of
Health Plan*, 26 INQUIRY 388, 395 (1989) (finding that Minneapolis network HMOs did
appear to reduce in-hospital resource use relative to IPAs and fee-for-service provision;
thus HMO cost savings in Minneapolis, which features several competing HMOs, occurred
due to lower resource use after admission as well as to a lower initial number of
admissions).

134. Albert L. Siu et al., *Use of the Hospital in a Randomized Trial of Prepaid Care*, 259
JAMA 1343 (1988).

tory tests for their patients.[135] Using 1978-79 data on 354 Boston-area patients with simple hypertension, the authors compared the rates at which ten physicians in large fee-for-service groups and seventeen physicians in two HMOs prescribed electrocardiograms (EKGs), chest films, blood counts, and urinalyses. After correcting for patient age, sex, and duration and severity of disease, and for physicians' experience, the authors found that fee-for-service physicians requested 50% more EKGs and 40% more chest X-rays than HMO-based physicians.[136] While the results are based on a small sample, they tend to indicate that payment methods may have a significant influence on the level of use of at least some types of ambulatory testing.[137] This further implies that prepaid group incentive systems may substantially reduce the utilization of health care resources.

McCusker *et al.* found that HMOs reduced hospitalization and costs. They examined hospital costs for matched pairs of 100 terminally ill cancer patients in the Rochester, N.Y., area from 1976 to 1981.[138] They found that costs were 18% lower for those in the HMO sample. The

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135. Arnold M. Epstein et al., *The Use of Ambulatory Testing in Prepaid and Fee-For-Service Group Practices,* 314 NEW ENG. J. MED. 1089 (1986).

136. The statistical results were significant at the .006 and .11 levels, respectively, for EKGs and chest X-rays. The results could not be explained by physician visit rates because patients of fee-for-service physicians had significantly fewer visits than did HMO patients. *Id.*

137. These results, showing that incentives matter, are consistent with findings by David Hemenway et al., *Physicians' Responses to Financial Incentives,* 322 NEW ENG. J. MED. 1059 (1990) (comparing practice patterns for a small sample of physicians employed by a chain of for-profit ambulatory care centers in Boston). In the Hemenway study, the physicians switched from an hourly wage compensation plan to a plan in which bonuses were paid based on the level of revenue brought into the firm. They found that physicians increased testing per patient, total charges, and their incomes under the new plan. *Id.* Superficially similar results were found in an examination of radiology. For a given set of medical conditions, nonradiologist physicians who performed radiography themselves tended to prescribe radiography procedures much more frequently than did nonradiologist physicians who referred patients to independent radiology specialists for the same procedures. Because one would expect physicians who make extensive, appropriate use of radiology to have their own equipment on-site, this study may not provide evidence of innappropriate use, but rather evidence of variation in practice patterns across physicians. Bruce J. Hillman et al., *Frequency and Costs of Diagnostic Imaging in Office Practice - A Comparison of Self-Referring and Radiologist-Referring Physicians,* 323 NEW ENG. J. MED. 1604 (1990).

138. Jane McCusker et al., *Do HMOs Reduce Hospitalization of Terminal Cancer Patients?,* 25 INQUIRY 263 (1988). Beginning from 2,052 observed terminal cancer cases, 100 HMO patients were matched with 100 Blue Cross fee-for-service patients. The pairs were matched according to the disease classification, age, months from diagnosis, and time period. *Id.* at 264-65.

results were not statistically significant when the matching methodology was used, but they were significant when a covariance analysis was applied.[139]

Muldoon and Stoddart also provide evidence that HMOs hold the potential for significant cost reductions, based largely on the experience of an HMO in Sault Ste. Marie, Canada.[140] They developed a simulation model for Canada predicting the cost savings that would arise if the experience of that HMO was typical. They predicted that a switch to capitation plans, such as HMOs, would result in cost reductions on the order of ten percent in the most likely case. This result occurs mainly due to reductions in hospital use, and not to consumer responsiveness to alternative health plan enrollment prices.[141]

HMO incentive mechanisms were also found to be of importance in larger-scale reviews of HMO resource utilization. Hillman, Pauly, and Kerstein used data from a 1987 survey of 337 HMOs to examine the relationship between several physician risk and reimbursement methods and utilization.[142] They regressed two measures of utilization (rate of hospitalization and rate of visits for outpatient services) on a set of explanatory variables that included, among other things, a set of variables that described the financial incentives facing physicians. They found that group HMOs, for-profit HMOs, capitation schemes, and physician salary schemes each resulted in lower hospitalization rates than did the use of fee-for-service payment systems by the HMOs.[143] Certain other financial incentives also decreased the frequency of physician visits per enrollee, but increases in the percentage of HMO patients in a physician's case load was associated with a greater frequency of outpatient visits. The authors suggested that the latter result may be attributable to physicians substituting outpatient visits for higher cost referrals.[144]

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139. *Id.* at 268-69.

140. Jacqueline M. Muldoon & Greg L. Stoddart, *Publicly Financed Competition in Health Care Delivery*, 8 J. HEALTH ECON. 313 (1989).

141. Muldoon and Stoddart argue that the elasticity of plan enrollment with respect to a change in plan price is a relatively small -0.25. *Id.* at 325.

142. Alan L. Hillman et al., *How Do Financial Incentives Affect Physicians' Clinical Decisions and the Financial Performance of Health Maintenance Organizations?*, 321 NEW ENG. J. MED. 86 (1989).

143. *Id.* at 89-91.

144. *Id.* at 90. *Cf.* Sally C. Stearns et al., *Physician Responses to Fee-for-Service and Capitation Payment*, 29 INQUIRY 416 (1992). Stearns *et al.* examine the results of a natural experiment in which an HMO covering a relatively young population of Wisconsin state employees altered its payment structure to primary care physicians from a fee-for-service structure to a capitation structure between 1983 and 1984. Specialist fees and hospital fees

HMO effects were also examined in connection with the effort to contain health care costs under the Medicare program. Langwell and Hadley examined the effects of HMOs between 1984 and 1986 in the context of the Medicare Competition Demonstration program.[145] The authors used HMO enrollee and nonenrollee surveys, comparative medical record examinations, and multivariate techniques to compare HMO-enrollee versus fee-for-service patient experience in overall satisfaction, quality of care, access to and use of services, selection bias and, ultimately, effects on Medicare costs.[146] The authors found that HMO quality was equivalent to or better than fee-for-service quality, that hospital admissions were lower by the second year (due, in part, to substitution to skilled nursing facilities), that satisfaction was equivalent, but that HMOs did not reduce total Medicare costs.[147] Despite the other positive findings, this final result occurred because HMOs drew a group of enrollees that were healthy on average.[148] These persons would have imposed rela-

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(which were paid based on fee schedules in both years) were reduced significantly in the second year. In the new system, primary care physicians had first claim on any surplus at the end of the year. The study follows the 2,000 persons who were enrolled in the plan in both years to examine hospital and physician services utilization under the alternative reimbursement structures. The benefits offered to subscribers were nearly the same in the two years except for out-of-plan reimbursement which was much more limited in the second year. The authors report that following the change in payment structure, HMO hospital admissions fell by 16% (compared to a country-wide decline of 2.6%). Once in the hospital, patients may have stayed slightly longer under the new plan and were charged somewhat less in total for ancillary services, but the HMO's payment structure change did not appear to alter significantly the in-hospital service patterns. The authors also found that physician visits increased by 18% after the reimbursement change. The results imply that this increase was due to increased referral to specialists rather than to increased patient-initiated visits to their primary care physician.

145. Langwell & Hadley, *supra* note 130.

146. *Id.* Langwell and Hadley gathered descriptive data on enrollees and their enrollment choices, satisfaction, and access to care via surveys. The process of care was examined by comparing medical records for routine care for 1,600 fee-for-service and HMO patients. A smaller number of comparative records (230-360 HMO and fee-for-service patients) were also examined for more resource intensive illnesses, colorectal cancer and congestive heart failure. Logit regression models were also applied to this data to examine changes in health care status during enrollment. Multivariate models were also developed to estimate the costs that HMO enrollees would have imposed on Medicare had they remained in the fee-for-service system. *Id.*

147. *Id.* at 78.

148. *Id. See also* Randall P. Ellis, *Employee Choice of Health Insurance* 1989, REV. ECON. & STAT. 215 (finding extremely strong selection bias for one large financial firm that offered various health plans with differing deductibles, copayments, and employee premium payment levels). As one might expect, employees quickly sort themselves into groups of "sickies" and "healthies" as the healthies attempt to avoid subsidizing the sickies and as sickies opt for plans that provide either more coverage or allow use of their favorite

tively low costs on the health care system under either the HMO or fee-for-service scheme. Medicare administrators apparently failed to fully incorporate this selection bias and paid the twenty-six HMOs 95% of the area average per capita cost per enrollee. Since the HMO enrollees tended to be much healthier than average, the system paid more to the HMOs on a capitation basis than they would have paid to hospitals and physicians on a fee-for-service basis. These results imply that HMOs may have resulted in lower total real resource use, but that poor program administration caused the gains to go to the HMOs rather than to the Medicare program.[149]

Feldman *et al.* also found evidence that HMOs may reduce costs by shopping for lower-priced hospital services.[150] The study examined 1986 data for six HMOs in four cities which used eighty-nine of the 322 hospitals located in those cities. They found that staff-model HMOs tended to concentrate patients at the lower-priced hospitals.[151] The authors interpreted the regression results to imply that a hospital might lose 3% of its medical-surgical admissions if it increased price by 1% to the HMO. They found no such effect for the two independent practice association (IPA) HMOs they examined.[152]

Johnson *et al.* found evidence that network-type HMOs were able to

physicians. Ellis also found that the employees tended to be risk-lovers (i.e., undervalue high dollar/low probability losses) in the range of $0 to $1,000).

149. *Id.* at 78. *See also* R. Brown & J. Hill, *The Effects of Medicare Risk HMOs on Medicare Costs and Service Utilization*, MATHEMATICA POLICY RES., Jan. 19, 1993 (reporting similar findings from their review of 1990 data for 6,400 person samples of Medicare HMO enrollees and nonenrollees). Brown and Hill found that the HMOs reduced the amount of both hospital and physician care received by HMO enrollees compared to what those persons would have received under Medicare fee-for-service provision (this reduction occurred due to reduced intensity of resource use for any given type of care). This apparent enhanced efficiency did not, however, save Medicare money because the Medicare HMO reimbursement formula did not fully adjust for the better health, and lower propensities to seek care of the HMO enrollees compared to their fee-for-service counterparts. *Id.*

150. Roger Feldman et al., *supra* note 92. The authors estimated several regressions examining (1) the probability that a particular HMO used a particular hospital for medical-surgical patients, (2) a similar regression using a dummy variable for medical-surgical use, and (3) a log-linear medical-surgical price equation. The model controlled for hospital location, medical school or residency program, public versus private ownership, the number of facilities at the hospital, occupancy rate, the hospital's market share of beds in the HMO's region, an identifier for the staff-HMO or IPA-HMO, and average hospital expense per admission. The authors used average price data and did not adjust for case-mix differences. If HMOs shop for bargains on individual medical-surgical procedures, then there may be further price sensitivity that is masked by Feldman *et al.*'s approach. *Id.*

151. *Id.* at 221-22.

152. *Id.* at 221.

reduce total resource use by reducing expenses once an admission had occurred.[153] The study examined the experience of several HMOs (and twenty-nine hospitals) from the Twin Cities area during 1982 to 1984. Using fully billed charges as a proxy for resource use, Johnson *et al.* examined resource use for patients with any of five surgical and five medical diagnoses.[154] They found that, on average, fee-for-service health plans (and IPA-type HMOs) had significantly longer lengths of stay and higher total charges than did network HMOs.[155] The network HMO effects tended to be on the order of 5-10% reductions in cost or length of stay, with the more consistent evidence appearing for the surgical diagnoses.[156]

Robinson studied the effects of HMOs on the costs of 298 non-HMO, nonpublic hospitals in California from 1983 to 1988.[157] This was a period after the state had removed its restrictions on selective contracting by third-party payers. Holding constant several hospital characteristics,[158] he found that cost per hospital admission grew at a 9% lower rate in those markets where HMO penetration was high.[159] The effects of HMOs were greater in those markets where a large number of competing hospitals existed.[160] Robinson concluded that competition among HMOs may have stopped nine percent of the 75% increase in cost per admission

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153. Allan N. Johnson et al., *supra* note 133.

154. *Id.* at 390-92. The authors regressed three different dependent variables (length of stay, total charges, ancillary charge ratio) on patient characteristics (age, sex, secondary diagnoses, number of procedures), hospital characteristics (public teaching, bed size, occupancy rate, location within city), health plan type, and season. Separate regressions were run for each of the ten diagnosis codes. *Id.*

155. *Id.* at 395. In addition, the authors note that IPA-type HMOs in the Twin Cities area tend to deal with all hospital providers and thus do not selectively contract with a limited set of providers as do most network-type HMOs. The IPA-type HMOs may not, therefore, provide sufficient incentives for participating hospital providers to economize on the use of resources. *Id.* at 394.

156. *Id.*

157. James C. Robinson, *supra* note 25.

158. *Id.* at 2720. Robinson's regression model controlled for changes (from 1983 to 1988) in HMO market penetration, median family income, population density, physicians per capita, hospital funding shares from Medicare and Medicaid, uninsured patient share, the percentage change in average nonphysician salary, staffed beds, inpatient and outpatient surgeries, outpatient visits, and six categories of inpatient days. *Id.*

159. *Id.* at 2721.

160. Robinson calculated the HMO market penetration using a method that defined a market as the aggregate area from which a hospital drew any significant number of patients. He defined the number of competitors using a different method based on an area with a radius of 24 kilometers from the hospital. The latter method resulted in the average hospital having 24 competitors. *Id.*

that occurred in California during this period.[161]

The Florida Health Care Cost Containment Board also found that HMOs and PPOs tended to be associated with lower hospital revenues and costs on average.[162] Using data for 209 Florida hospitals for 1990, they found that the percentage of a hospital's patients that were insured by a PPO or HMO was associated with lower average revenue or average costs.[163] The coefficients appear to imply that a doubling of HMO/PPO presence would be associated with a decrease of 2-4% in average revenues or costs.[164]

Bradbury *et al.* used 1988 to 1989 data on 9,000 patient admissions to compare the length of stay experienced by those covered by IPA-type HMOs and traditional insurance.[165] They examined ten common diagnosis related groups at ten hospitals where patients were covered either by an IPA or by traditional Blue Cross fee-for-service coverage. The authors regressed length of stay on insurance type, a hospital indicator variable, measures of hospital characteristics (teaching, occupancy and bed-size groups), patient characteristics (age, sex), DRG category, an illness severity at admission index, and year. They found that for a given illness and severity, the patients of the IPA-type HMO had shorter lengths of stay once they were admitted to the hospital.[166] The authors noted that this finding is inconsistent with earlier literature which indicated (1) that HMOs generally only reduced hospitalization rates, but not resource use once admitted; or (2) that network HMOs might work but that IPA-type HMOs did not. They attributed the differing results to improvements in managed care and utilization review techniques during the 1980s.[167]

As part of their Medical Outcomes Study,[168] Greenfield *et al.* recently confirmed the common conclusion that HMOs lead to reduced hospitali-

161. *Id.*

162. FLORIDA STUDY, *supra* note 93.

163. For a description of the model and econometric problems in this study, see discussion *supra* part IV.C.

164. The study did not distinguish between HMO and PPO effects, so it is not possible to determine whether the effect is due only to HMOs (as some other studies might suggest), or whether the PPO effect also contributed to the reduction in average costs or revenues. FLORIDA STUDY, *supra* note 93.

165. Robert C. Bradbury et al., *Comparing Hospital Length of Stay in Independent Practice Association HMOs and Traditional Insurance Programs*, 28 INQUIRY 87 (1991).

166. *Id.* at 92-93.

167. *Id.*

168. Sheldon Greenfield et al., *Variations in Resource Utilization Among Medical Specialties and Systems of Care: Results From the Medical Outcomes Study*, 267 JAMA 1624 (1992).

zation rates. Using a sample of 349 doctors covering 20,000 patients in three cities in 1986, they examined several measures of resource use (hospitalization, doctor visits, lab tests) and medical outcomes across various provider groups (HMOs, fee-for-service solo practitioners, group practitioners, etc.). The authors used various regression techniques to try to control for factors that might account for any selection bias. They found that HMOs had 41% fewer hospitalizations than did fee-for-service solo practice physicians after adjusting for patient mix, disease severity, and other demographic factors (five versus seven hospitalizations per 100 patients).[169]

2. *Evidence That HMOs Do Not Work*

The evidence that HMOs have reduced the use of health care resources is ambiguous.[170] For example, Frank and Welch criticized earlier work on HMO effects for methodological shortcomings.[171] One of the key points Frank and Welch raised is the possibility that the prior literature did not adequately control for the simultaneity that exists between utilization and HMO market shares.[172] That is, HMO market shares may be high in markets where health care utilization is high precisely because those are the areas where HMOs can initially lead to the greatest cost saving.[173] Frank and Welch concluded that it would be "premature" to accept findings that HMO penetration and utilization are positively related.[174]

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169. *Id.* at 1628.

170. Some studies find both good and bad results depending on the particular HMOs studied. For example, McCombs *et al.* examined two HMOs in the Medicare Demonstration Project and found that one group-model HMO appeared to lower monthly hospital and physician charges by 38% while another IPA-type HMO was associated with 38% higher charges. Jeffrey S. McCombs et al., *Do HMOs Reduce Health Care Costs?: A Multivariate Analysis of Two Medicare HMO Demonstration Projects*, 25 HEALTH SERVICES RES. 593 (1990).

171. Richard G. Frank & W.P. Welch, *The Competitive Effects of HMOs: A Review of the Evidence*, 22 INQUIRY 148 (1985) (criticizing Goldberg & Greenberg, *supra* note 126, and Joel W. Hay & Michael J. Leahy, *Competition Among Health Plans: Some Preliminary Evidence*, 50 S. ECON. J. 831 (1984)).

172. *Id.* at 151.

173. This suggests that HMO presence and market share is endogenous to the system, and therefore that HMO presence/share should be jointly analyzed with the utilization variables in a simultaneous equations econometric framework.

174. Frank & Welch, *supra* note 171, at 158. Roger Feldman et al., provide some evidence that HMOs did not significantly affect hospitals' financial performance as one might have expected if they had a market-wide impact. Roger Feldman et al., *The Competitive Impact of Health Maintenance Organizations on Hospital Finances: An Exploratory Study*, 10 J. HEALTH POL., POL'Y & L. 675 (1986). These authors applied regression analysis to 1979-81 data to examine the effect of HMOs on 32 Minneapolis/St. Paul area hospitals. *See*

In an attempt to address the simultaneity problem identified by Frank and Welch, McLaughlin estimated a two-equation simultaneous-equations model in which HMO market share and hospital utilization and costs were endogenously determined.[175] The study employed pooled cross-section time-series data for twenty-five SMSAs observed during the 1972-82 period. McLaughlin found that growth in HMO share induced reductions in per-capita admissions and average length-of-stay, but also induced higher average costs per admission and per patient day.[176] This initially surprising result is quite reasonable when one realizes that it is likely to be an artifact of the use of historical accounting data to measure hospital costs.[177] As the author notes, the hospital cost variables have a fixed cost component and those costs may also be sunk (that is, they cannot be recouped).[178] If HMOs reduce admissions by hospitalizing only the more severely ill patients, the fixed (or sunk) costs of hospitals that cannot be avoided in the short run will be amortized over a smaller number of persons who require more resource-intensive care. Until these assets are removed from the hospital's books, average hospital accounting costs will rise as the number of inpatients falls. This relationship, however, provides a misleading picture of the real resource costs of providing health care. The real resources used to provide care will be lower and total *health care* costs will fall, since patients formerly treated in hospitals will receive their care from lower cost sources (e.g., ambulatory

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also Harold S. Luft et al., *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 & L. 625 (1986) (arguing that a hospital's financial performance in the Twin Cities—measured in terms of cost, revenue and profit per admission—was unrelated to the share of admissions that the hospital received from group HMOs). Feldman *et al.* venture no conclusions regarding the hypothesis that city-wide HMO activity affects average hospital costs or prices, because they have data for only one city and thus have only one relevant observation.

175. Catherine McLaughlin, *HMO Growth and Hospital Expenses and Use: A Simultaneous-Equation Approach*, 22 HEALTH SERVICES RES. 183 (1987).

176. Additional explanatory variables included a variety of SMSA-level demographic variables (e.g., income, unemployment rate, age, education) as well as data on the number of providers (e.g., physician/population ratios). *Id.*

177. This result is similar to that obtained by Jeffrey Merrill & Catherine McLaughlin, *Competition Versus Regulation: Some Empirical Evidence*, 10 J. HEALTH POL., POL'Y & L. 613 (1986), who used single-equation estimation techniques. The regression estimated in both the 1986 and 1987 studies did not adjust for case-mix differences across the 25 SMSAs, nor were controls imposed for hospital ownership, concentration, or system affiliation. SMSA dummy variables were included in both studies to account for such specification errors. It is not clear whether the results would be invariant to these errors.

178. McLaughlin, *supra* note 175, at 195.

care centers). Moreover, in the long run, average costs will fall as well.[179] Thus, the evidence contained in McLaughlin is consistent with the efficiency-enhancing aspects of HMOs.[180]

Although McLaughlin's critique of the HMO evidence falls short, other critics of HMOs have also argued that the apparently salubrious effects of HMOs may actually be due to other market factors. For example, Luft *et al.* examined cases of HMO growth in Minneapolis, Hawaii, and Rochester, and found that while a significant reduction in hospital use occurred in each case, it is not clear that HMOs were the principal cause of the utilization reduction.[181] They attributed the changes to data errors, trends predating HMO growth, other policy changes, and other forms of competition. The more recent data from California and the Medicaid HMO experiment tend to weaken this critique, but assigning causes to particular observed outcomes in these markets is difficult due to the melange of regulation and competition existing in each market.[182]

A key argument concerning the effects of HMOs is that the apparent cost saving effects of HMOs might actually be due mainly to self-selection as relatively healthier individuals choose the HMO option. Leibowitz *et al.* examined the performance of an HMO serving a heavily Hispanic, Aid to Families with Dependent Children (AFDC)/Medicaid population.[183]

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179. McLaughlin did not control for factors (such as CON regulation, which often affects bed reductions as well as increases) that would influence the rate of adjustment to the new long-run equilibrium. *Id.*

180. This is not McLaughlin's interpretation. She concludes that HMOs are not effective instruments for reducing health care costs. *Id.* at 200. Other researchers have noted that McLaughlin's empirical work suffers from a specification error that would virtually ensure that no HMO effect could be found even if such an effect existed. *See* B. Bruce Zellner & Barbara L. Wolfe, *HMO Growth and Hospital Expenses: A Correction*, 24 HEALTH SERVICES RES. 409, 412 (1989).

181. Luft et al., *supra* note 174.

182. *See* Kathryn M. Langwell, *Structure and Performance of Health Maintenance Organizations: A Review*, 12 HEALTH CARE FINANCING REV. 71 (1990); Luft, *supra* note 133. Both articles provide critiques in a similar vein. They argue that the evidence that older, well-established HMOs "worked" may be less convincing than it appears. Luft focuses most particularly on HMO quality and argues that HMOs might reduce quality below that associated with fully-insured fee-for-service care in the future, even if HMOs have not done so previously. Luft, *supra* note 133, at 154-55. Langwell argues that we cannot readily predict the future effects of HMOs on the health care system because (1) the evidence on the effects of incentives on physician and hospital behavior is still unclear, and (2) the HMOs that have been the subject of previous research are sufficiently different from other HMOs that they may not be representative of the average HMO. Langwell, *supra*, at 75, 78.

183. Arleen Leibowitz et al., *A Randomized Trial to Evaluate the Effectiveness of a Medicaid HMO*, 11 J. HEALTH ECON. 235 (1992).

Because the Medicaid recipients were randomly assigned to the HMO or to an alternative fee-for-service (FFS) system, the authors were able to compare the performance of the HMO to that of FFS while controlling for much of the self-selection. Because all participants were Medicaid eligible, they were covered for all expenses regardless of choice of plan. The authors were not able to control for all self-selection, however, because the participants were free either to never enroll in the HMO after assignment or to quit the HMO and enter the FFS system at any time during the experiment. This meant that the cost associated with a panel of randomly assigned individuals in each system cannot be observed. The direction of bias from this effect is unclear. One might expect the sickest individuals who have strong ties to particular doctors to opt for the FFS system and thus never to enroll in the HMO, or to quit an HMO once illness strikes. This would bias the results in favor of the HMO. On the other hand, when one compares the FFS group with the HMO group one must assign FFS care to the HMO assignees who chose not to participate in the HMO. This gives the HMO no opportunity to reduce costs for those individuals, because they never participated in the HMO program. This would tend to bias the results against the HMO.

Leibowitz *et al.* found the now common result that the HMO-enrolled population used less health care, but they attributed all of the reduction to self-selection.[184] That is, while those persons who were assigned to the HMO and actually enrolled in the plan used less care, this was due to the relatively good health of the HMO enrollees. One interesting result was that the HMO enrollees had lower utilization, but not lower average expenses compared to FFS participants. Once the HMO enrollees were hospitalized, their expenses were above those of FFS participants. The study also found that the HMO did not save the state money, because state administrators did not account for the good health of HMO participants when determining the reimbursement to be paid; thus, the state overpaid the HMO on a per capita basis. This is similar to results reported by Langwell and Hadley.[185]

The authors conjecture that the HMO in this particular experiment might not have had much ability to reduce costs due to the characteristics

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184. The regression model used dummy variables to indicate the group to which the individual was randomly assigned. The model further controlled for participant characteristics such as age, sex, family size, and length of time in the HMO. The models examined the probability of outpatient care or hospital care, and the average HMO or FFS care recipients' expenses each month. *Id.* at 242-43, 246.

185. *See* Langwell & Hadley, *supra* note 130.

of the population served. Most HMOs reduce expenses by reducing hospitalization.[186] This population was provided with hospitalization mainly for pregnancy, and those hospitalizations are not avoidable by preventative care or enhanced patient screening. Another possibility is that the Medicaid reimbursement for FFS is so low in any event that FFS practitioners have no incentive to overprescribe in the first instance, so HMO incentives could not matter much.

Feldman *et al.* also question the value of HMOs.[187] Their study examined the health care strategies of 922 Minnesota firms and concluded that offering an HMO option increased health care premiums by $4 to $25 per month. Using 1985 survey data from the firms, the authors estimated equations explaining: (1) the probability that a firm offers an HMO; (2) HMO enrollment share; (3) FFS premiums; and (4) HMO premiums. Several characteristics of the firms are used to explain these factors. The explanatory variables relate to the firm's employee size and location, the firm's unionization levels, the firm's predisposition to accede to employee preferences, its priorities about the cost and hassle of offering multiple health plans, the coinsurance and deductible rates offered in its HMO or FFS plans, and other characteristics of the firm or its employees. Although the regression models do not provide a good fit to the data, the results indicate that HMO use is associated with higher health care premiums.[188]

Some authors have also examined a narrower question about one possible effect of HMOs. Do HMOs contribute to lower administrative costs for hospitals? Using Medicare accounting data for 6,400 hospitals, Woolhandler *et al.* compared the average administrative costs of hospitals in 1990 in states with significant HMO penetration (20 or 25% of the population enrolled) with those in states with less HMO penetration.[189] They found that hospitals in states with greater HMO penetration have slightly higher average administrative costs (26% versus 25%).

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186. Leibowitz et al., *supra* note 183, at 254.

187. Roger Feldman et al., *The Effects of HMOs on Premiums in Employment-Based Health Plans*, 27 HEALTH SERVICES RES. 779 (1993).

188. An earlier paper by the same group of authors using the same data indicated that premiums were lower when an HMO was offered. Gregory Gifford et al., *A Simultaneous Equations Model of Employer Strategies for Controlling Health Benefit Costs*, 28 INQUIRY 56 (1991). The authors offered no explanation for the contradictory results. The 1991 paper used a different set of variables in the regression and a different (and likely inferior) estimation technique. The differing results indicate the fragility of the findings.

189. Steffie Woolhandler et al., *Administrative Costs in U.S. Hospitals*, 329 NEW ENG. J. MED. 400 (1993).

3. Do HMOs Affect Other Insurers?

If HMOs were able to reduce utilization and costs, they presumably would be driven by competitive forces to reduce premiums. Indeed, there are a number of studies indicating that HMOs charge lower premiums than conventional insurers, and that the rate of growth of HMO premiums has been lower than that of their traditional counterparts.[190] If program enrollment is responsive to premium differentials, rival insurers will be compelled to achieve similar premium reductions, or else experience a decline in market share.[191] It is therefore important to measure the price elasticity of program enrollment.

Frank and Welch reported the results of two studies that found that consumers are sensitive to the relative premiums charged in a market by HMOs and other insurance providers.[192] Piontkowski and Butler found that over a ten-year period, Kaiser Health Plan enrollments in Northern California were strongly and positively related to the ratio of the Blue Cross premium to the Kaiser premium. In a later study of health plan choice, McGuire found that the probability of HMO enrollment was positively associated with the Blue Cross premium.[193] More recently, Feldman *et al.* examined the effects of out-of-pocket costs and plan characteristics on the choice of health plans made by 3,000 employees of seventeen Minneapolis firms.[194] One focus was to determine whether substitution occurred between HMOs and health plans allowing more physician choice (i.e., indemnity plans).[195] Feldman *et al.* found that the ability to choose physicians was a factor that significantly distinguished one group of plans from another group. However, they also found some significant substitution between HMOs and indemnity plans. The results also indicated that employees were quite sensitive to the out-of-pocket costs of the various plans. If these results are generally true, then low

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190. *See* Frank & Welch, *supra* note 171, at 149, 152.

191. *Id.*

192. *Id.*

193. T. McGuire, *Price and Membership in a Prepaid Group Practice*, 19 MED. CARE 172 (1981).

194. Roger Feldman et al., *The Demand for Employment-Based Health Insurance Plans*, 24 J. HUM. RESOURCES 115 (1989).

195. The nested logit model describes the probability that an employee picks a particular employee-based insurance plan as a function of (1) out-of-pocket costs, (2) plan characteristics such as coverage of preventative care, deductibles, percent copayments, stop loss levels, physician choice, and waiting times for services, and (3) enrollee characteristics such as age, sex and chronic illnesses. The model was estimated separately for individuals and family plan purchasers. *Id.* at 120-21.

pricing by one plan should induce lower pricing by other plans offered in the market. This effect, in turn, could cause a reduction in health care costs.[196] The above-mentioned studies each indicate that health care insurance choices are influenced, at least to some degree, by financial considerations.

While there is nearly a consensus that HMOs have led to reductions in certain categories of resource use, HMOs do not necessarily improve the allocation of resources.[197] It is possible that the reduction in resource use could result in a lower quality of care.[198] This is, of course, not a problem

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196. *See* Alain C. Enthoven, *Multiple Choice Health Insurance: The Lessons and Challenge to Employers*, 27 INQUIRY 368 (1990) (arguing that true competition may require the existence of multiple HMOs to ensure that solitary HMOs in a market do not retain all of their "cost advantages" by pricing just barely below the rates charged by fee-for-service plans). A recent employer survey implies, however, that HMOs cost about $3,000 per enrollee in 1991, which is 15% less than the average for traditional fee-for-service plans. Milt Freudenheim, *Picking Winners Among HMOs*, N.Y. TIMES, Apr. 27, 1992, at D6. Thus, Enthoven's fear that HMOs will not pass on the savings to consumers may not be materializing.

197. In a recent discussion of the evidence on managed care systems, Langwell notes that while HMOs may reduce utilization, it is less obvious that they reduce system-wide health care spending and that their effect may in any event be relatively small. *See* KATHRYN M. LANGWELL, THE EFFECTS OF MANAGED CARE ON USE AND COST OF HEALTH SERVICES, CONGRESSIONAL BUDGET OFFICE (1992) (CBO Staff Memorandum). While the evidence indicates that HMOs work in certain respects, it is probably true that the literature will not support a confident prediction that continued growth of HMO- or PPO-like institutions will have a large percentage effect on system-wide costs. Such an effect could likely only be obtained by generalized demand reductions.

198. Studies of Medicare and Medicaid experience indicate that HMO-type capitation payments or prospective reimbursement systems did not lead to reductions in most measures of the quality of care. *See* Deborah A. Freund et al., *Evaluation of the Medicaid Competition Demonstrations*, 11 HEALTH CARE FINANCING REV. 81 (1989); Langwell & Hadley, *supra* note 130; William H. Rogers et al., *Quality of Care Before and After Implementation of the DRG-Based Prospective Payment System: A Summary of Effects*, 264 JAMA 1989 (1990); L.F. Rossiter et al., *Patient Satisfaction Among Elderly Enrollees and Disenrollees in Medicare Health Maintenance Organizations*, 262 JAMA 57 (1989). Some researchers have found that HMO care is as good or better than that provided to comparable patients in a fee-for-service setting. *See* David M. Carlisle et al., *HMO vs. Fee-for-Service Care of Older Persons with Acute Myocardial Infarction*, 82 AM. J. PUB. HEALTH 1626 (1992); Howard P. Greenwald & Curtis J. Henke, *HMO Membership, Treatment, and Mortality Risk among Prostatic Cancer Patients*, 82 AM. J. PUB. HEALTH 1099 (1992); I. Steven Udvarhelyi et al., *Comparison of the Quality of Ambulatory Care for Fee-for-Service and Prepaid Patients*, 115 ANNALS INTERNAL MED. 394 (1991); Kenneth B. Wells et al., *The Effects of Prepaid Group Practice on Mental Health Outcomes*, 25 HEALTH SERVS. RES. 615 (1990). These authors used individual patient records to compare care provision in different disease categories (e.g., hypertension, female preventive care, acute myocardial infarction, prostatic cancer, and mental health) and used both outcome measures (mortality) as well as process of care measures of quality. In some cases, especially for preventive care, these authors found that the HMO patients received more care, which may be incon-

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if consumers knowingly choose a lower cost/lower quality form of health care provision.[199] However, if consumers are unable to evaluate the quality of care they receive, then HMOs could grow for reasons that have more to do with consumer errors than with consumer benefits. Nonetheless, consumers have been choosing HMO provisions with increasing frequency in the past decade. Unless consumers are consistently making errors, this form of health care provision is likely to be welfare-improving.

C. Preferred Provider Organizations (PPOs)

The willingness of hospitals to compete on price may be accelerated by the development and growth of PPOs. The formation of PPOs represents an explicit attempt by providers to attract additional business through overt price competition. PPOs are formed when some entity, acting as an agent for a group of patients (e.g., an employer, insurer, or an HMO), negotiates a fee and service package with some collection of providers (e.g., a set of hospitals or doctors). In exchange for a set of discounted fees, the providers are offered the prospect of an increased patient flow. The patients are usually free to patronize other providers, but are given incentives, such as fee discounts or lower copayment provisions, to use the contract providers.[200]

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sistent with the HMOs saving real resources. This result may have occurred because the HMO patients tend to be fully insured for almost all care, leading HMO patients to prod physicains for care more often than would patients covered by a fee-for-service system with larger copayments and deductibles. Opposing evidence also exists. For example, there is some evidence that HMO incentive structures may have increased the probability that a hospital patient would be discharged in a more unstable condition. *See* William H. Rogers et al., *supra.* In addition, Lindberg *et al.* examined data from 1977 to 1986 and found that age-adjusted death rates rose above projections and hospital admissions and lengths of stay fell for the elderly in Hennepin County, Minnesota after Medicare introduced HMOs and the prospective payment mechanism for hospitals in 1984. *See* Gregory L. Lindberg et al., *Health Care Cost Containment Measures and Mortality in Hennepin County's Medicaid Elderly and All Elderly*, 79 AM. J. PUB. HEALTH 1481 (1989). Another study found that Medicare inpatient mortality for 16 common surgical or medical conditions was greater for hospitals located in states with higher percentages of HMO enrollment. Stephen M. Shortell & Edward F. X. Hughes, *The Effects of Regulation, Competition, and Ownership on Mortality Rates Among Hospital Inpatients*, 318 NEW ENG. J. MED. 1100 (1988). Greater competition (the existence of two or more close rivals as perceived by hospital CEOs) did not affect mortality rates, however. *Id.*

199. *See* Harold S. Luft et al., *Does Quality Influence Choice of Hospital?*, 263 JAMA 2899 (1990) (arguing that quality is a significant determinant of hospital choice, though not as important as distance in price). The authors conjecture that such sensitivity may occur more due to physician preferences than to informed consumer choice. *Id.*

200. For a description of the various forms of PPOs, see Thomas L. Greaney & Jody L.

PPO growth has been quite rapid in the mid-1980s. Gabel *et al.* report that the number of persons eligible (i.e., enrolled in a plan with a PPO option) for a PPO increased from 1.3 million in December 1984 to 6.2 million in February 1986.[201] As of February 1988, 45 to 50 million Americans had the option of using a preferred provider.[202] More recent estimates indicate that in 1992, 58 million employees and 133.4 million enrollees were covered by plans including a PPO option.[203] The growth in both PPOs and HMOs occurred as traditional insurers expanded their offerings and as nontraditional insurance providers, such as hospital chains and others, entered the field.[204] While many of these plans went through significant growing pains,[205] PPO and HMO growth continued throughout the decade.

PPOs possess attributes that, in principle, make them promising instruments for stimulating price competition among hospitals.[206] We argued earlier that it is costly for consumers to search for information about hospital prices. There are many services involved, and most consumers participate in the market only rarely. The PPO, as Dranove *et al.* point out, transfers the function of selecting an efficient provider from the consumer to someone with greater expertise (e.g., an insurer or employer).[207] The search costs, which are in large part fixed, are spread over a much

Sindelar, *Physician-Sponsored Joint Ventures: An Antitrust Analysis of Preferred Provider Organizations*, 18 RUTGERS L.J. 513, 515-22 (1987) (focusing on the potential anticompetitive effects of physician-sponsored PPOs).

201. Jon Gabel et al., *The Emergence and Future of PPOs*, 11 J. HEALTH POL., POL'Y & L. 305 (1986).

202. There were about 640 PPOs operating in the U.S. in 1988. Interview with Ed Pickens, American Medical Care Review (Feb. 1989).

203. Data from InterStudy, *supra* note 124.

204. For discussions of the entry of hospitals into the insurance market, see *Hospital Chain Starts HMO*, AM. MED. NEWS, Apr. 27, 1984, at 3; Teri Shahoda, *Major Multis Unveil Insurance Plans*, HOSPITALS, June 16, 1985, at 21; Martin Tolchin, *Nonprofit Hospitals Join to Offer Insurance*, N.Y. TIMES, Aug. 6, 1985, at A12.

205. *See* Constance Mitchell, *Humana to Post Charge and Loss for 4th Quarter*, WALL ST. J., Oct. 3, 1986, at 7; Teri Shahoda, *Multi's Retrench, Reshape Strategies in 1986*, HOSPITALS, Dec. 20, 1986, at 36. Many HMOs that are not explicitly associated with hospital chains have reported poor financial results in recent years. *See* Malcolm Gladwell, *Growing Pains Plague Nation's HMOs*, WASH. POST, Aug. 21, 1988, at H1; Stephen K. Cooper, *Red Ink Afflicting Regional HMOs*, WASH. TIMES, Jan. 6, 1988, at C1.

206. PPOs, however, do not usually possess all of the competition-enhancing features of HMOs. Most importantly, physicians associated with PPOs do not normally bear the risk associated with overutilization of resources and cost overruns. In addition, the PPO sponsor may not bear any of the insurance risk. As a result, PPOs may have less incentive than HMOs to monitor utilization by member physicians.

207. David Dranove et al., *The Effect of Injecting Price Competition into the Hospital Market: The Case of Preferred Provider Organizations*, 23 INQUIRY 418, 420 (1986).

greater number of potential patients when the costs are incurred by a PPO. Providers may find it attractive to make price cuts to PPOs, not only because of the direct increase in output that will ensue, but also because it may be an efficient way to inform non-PPO members about their low prices.[208] The small amount of existing empirical evidence is consistent with the proposition that PPOs induce greater price competition among hospitals. For example, Zwanziger and Melnick found evidence that selective contracting has brought about a greater degree of price competition in California since 1983.[209] When PPOs contract with all area physicians and hospitals, however, they may provide little incentive for the providers to reduce resource use.[210] This conclusion seems consistent with work by Enthoven, Dranove *et al.*, Johnson *et al.*, and Melnick *et al.*, all of whom emphasize that selective contracting is a key to making competition work.[211] Selective contracting gives PPOs and HMOs the ability to contract with a limited set of health care providers in each community. This gives providers or provider groups an incentive to compete on price dimensions, allowing health care insurance plans to develop in a way that promotes price competition among rival plans and providers. If state or Federal laws require that any and all health care providers be allowed to provide care under a PPO or HMO contract, the incentives for continued cost-consciousness may be abated.

VII. CONCLUSION

Although empirical studies of hospital behavior are plentiful, there is relatively little reliable evidence about the effect of hospital market structure on competition and consumer welfare. In our opinion, this lack of persuasive evidence stems from the fact that many of the studies failed to address the questions most relevant to this issue. It is also partly attributable to the research design most often adopted in studies of hospital competition. Most of these studies have examined relationships between market structure and accounting costs. Typically, these studies have found that low concentration leads to higher average expenses. To some economists, this conclusion suggests merely that welfare-enhancing, non-price competition increases as concentration falls. More frequently, how-

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208. Frech & Woolley, *supra* note 66.
209. Jack Zwanziger & Glenn A. Melnick, *HMO Growth and Hospital Expenses: A Correction*, 24 HEALTH SERVICES RES. 409 (1989).
210. *See* Enthoven, *supra* note 196, at 372; Greaney & Sindelar, *supra* note 200.
211. *See* Dranove et al., *supra* note 56; Enthoven, *supra* note 197; Johnson et al., *supra* note 133, at 397; Melnick et al., *supra* note 71.

ever, this finding is often construed as evidence of "wasteful" nonprice competition. Consequently, it is sometimes asserted that competition is unworkable in hospital markets.

At least two objections can be raised to this "wasteful competition" interpretation. First, the studies that examined the behavior of both prices and expenses found that quality-adjusted prices fell as concentration declined, a relationship similar to that observed in many other industries. Second, and more fundamentally, there exists no theoretical presumption that these higher quality levels are socially harmful; in fact, the opposite presumption exists, provided that producers and consumers face appropriate incentives.

Thus, the important policy question is whether or not participants in health care markets confront appropriate incentives. There is evidence suggesting that institutions that elicit greater cost sensitivity from patients and their physician agents (e.g., HMOs, PPOs) are becoming more popular; for example, a growing empirical literature indicates that the presence of an HMO in an area leads to reduced rates of hospital utilization in comparison to markets where hospitalization expenses are covered by traditional indemnity insurers. Provided that legal impediments to the creation of such innovative market institutions do not exist, one could reasonably infer that these institutions offer hope for attenuating the "market failures" that have arguably plagued the health care field.

That hospital markets differ from other markets does not imply that competition cannot effectively allocate resources in those markets. It is undeniable that participants in hospital markets respond to financial incentives. The challenge facing both private and public decisionmakers is to harness those incentives in order to improve market performance. Until a few years ago, however, the scholarly literature on competition in health care markets seemed incapable of providing guidance to these decisionmakers. Researchers now appear to be posing some of the right questions. In time, we may develop a better sense of the effects of competition on hospital performance.