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# Sharing Arrangements in the Nonprofit Hospital Industry

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*The major task of this paper is to develop hypotheses about voluntary sharing arrangements (SAs) from a plausible economic analysis of the hospital industry. The second task of the paper is to review some emerging evidence about SAs. Our research suggests that some SAs could or actually do reduce hospital costs to the community. However, there are reasons which indicate that cost reduction is neither a necessary nor a sufficient result for the success of many SAs.*

**T**HE hospital industry in the U.S. is composed predominantly of non-governmental, nonprofit enterprises. A typical nonprofit hospital has a trustee board and a staff of attending physicians with some autonomous managerial control reserved for each. Both groups delegate significant operating authority to the professional administrators, and ordinarily no party can simply sell its interest for an outright cash payment. Therefore, it is hardly surprising that these enterprises are not acquired or merged or otherwise consolidated in the customary manner observed in other industries.

While there has been only a modest amount of merger activity in the industry since 1960, a significant growth of horizontal integration has nevertheless occurred in the form of sharing arrangements (SAs). In a sharing arrangement, each hospital agrees to yield some independence in one or more of the following areas: types of patients

served, facilities and personnel employed, privacy of personnel compensation or other information, plans for future development. The SA may be as simple as an agreement to purchase standardized supplies from a central warehouse or to use the same legal staff to plan collective bargaining with employees. The SA may be as complex as creating a centralized blood bank or laundry, or making an agreement to close an obstetrical service at one hospital in exchange for expanding another of that institution's specialty services. The growth of SAs has been monitored by surveys performed by the American Hospital Association in 1971 and 1975 [1,2]. By 1971 at least two thirds of nonprofit hospitals had entered one or more SAs. As of 1975 it was found that the growth of participation over the preceding decade had been well above 100 percent for most types of SAs.

Government officials have applauded

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the development of SAs whose stated premise is to reduce economic inefficiency of the industry. Mergers and sharing are stressed in Public Law 93-641 as priority areas for voluntary innovation in health care. Four of ten national priorities listed in the law directly concern multihospital arrangements.

Behind the presumption of industry inefficiency is a body of literature on supposed excess bed capacity, duplicative equipment, and other areas for reducing unit costs of service to the patient. There is not enough space here to assess the extent and magnitude of these phenomena. However, our basic hypotheses about the industry will permit these inefficiencies to occur or, more precisely, to resist correction.

The current evidence on the nature and consequences of SAs has been obtained through a variety of research projects of modest scale. Such observations are useful to the extent that general hypotheses about nonprofit hospitals can be supported or discredited. The next section briefly surveys existing theoretical models of the industry and indicates important limitations that should be overcome in order to analyze SAs.

### Conceptual Framework

A theory of the economic behavior of a nonprofit hospital, in the U.S. environment of extensive third party reimbursement of costs by insurers and government, should meet several criteria of plausibility. The following brief list has been adopted. A theory should be consistent with the fundamental trend of dramatically rising average cost during periods when insurance coverage expanded and technical change was rapidly adopted. The theory should offer some insight into the survival of the nonprofit form of organi-

zation. It should be consistent with trustees retaining some critical authority in return for their service and capital fund raising, while physicians direct the medical services. Finally, it should be consistent with the relative rarity of merger.

In view of this difficult assignment, it is understandable that no tractable, rigorous model enjoys a consensus of informed opinion. Nevertheless, notable progress has been made on some issues. Naive models which show that supply of hospital service depends only on inelastic needs, or that output is maximized subject to a budget restraint, are by now inadmissible (see, e.g., Davis [3,4]). Since only physicians have the option to open a proprietary institution on their own, a nonprofit institution must be satisfactory to physician interests. For some interesting evidence on this point, see Rosett [5].

Feldstein, e.g. [6,7], along with others, has described the management of hospitals as a bureaucratic process with compromises and bargains. Feldstein assumes that a stable mathematical objective function can display the effective consensus of such a bureaucracy. Lindsay [8] and Clarkson [9] have offered alternative rules of thumb as objectives in a hospital bureaucracy. This general approach of analyzing bureaucracy to find bargains and rules is realistic, but the specific results are not applicable to issues addressed in this paper. For example, Feldstein's model of a stable trade-off between quantity and quality of hospital care does not illustrate how the separate interests of trustees and physicians may come into conflict over prospective mergers and sharing.

Fuchs [10] argues that physicians are the major influence on hospital output and cost, while the behavioral role of trustees has some importance for a low merger rate and inefficient size distribution. While these specific arguments

may or may not prove valid, it is noteworthy that Fuchs does not attempt to synthesize the compromises of a hospital bureaucracy into a single objective function. We will also follow this approach.

Perhaps the major current alternative to a bargaining model is the simpler approach that the hospital acts to maximize average physician income. Pauly and Redisch [11] develop such a model, assuming that physicians, through separate billing, earn the difference between the total value of care to the consumer and the cost of hospital inputs.

A primary criticism of the Pauly-Redisch model is that it ignores the role of trustees in supplying capital funds, soliciting philanthropic contributions, and exercising authority for fundamental decisions on existence and facilities of the nonprofit hospital. In return for the provision of capital and solicitation of grants, it is assumed that trustees earn some nonpecuniary benefits contingent upon survival of the institution. Surveys show that a plurality of nonprofit hospitals which are not operated by government or religious organizations have self-perpetuating governing boards [12].

Nonpecuniary benefits enjoyed by trustees are not readily susceptible to objective measurement. We propose that the major areas of potential conflict between trustee and physician interests are the independent survival of the hospital, the size of the deficit, and the size of capital expenditure.

It is plausible that the rarity of merger may be due to the difficulty of compensating trustees of an acquired hospital. The available research on merger activity is scant and incomplete at this time, but still raises problems for extreme views of physician dominance as in Pauly-Redisch.

In a general review and bibliography [13], it is reported that a typical merger

includes an acquired hospital with severe financial budgeting difficulties and that merger was a last resort. But according to the Pauly-Redisch model, opportunities to consummate merger would occur if and only if the average income of staff physicians could be raised. If a hospital has an operating deficit, this is neither necessary nor sufficient to imply that its medical staff and the medical staff of some other hospital could raise overall average incomes by merging. This point deserves further brief exploration.

Merger studies by Treat [14] and Ginsburg and Allen [15] compared merged systems with similar autonomous institutions. Their findings show that mergers tend to result in relatively slower growth of bed capacity and faster growth of unit costs of service, particularly within sophisticated facilities. Why would the medical staff of an acquiring institution share its facility with more physicians unless either costs per unit of service are reduced or patient care demand and potential revenues per doctor are increased? Average incomes of the acquiring staff would otherwise fall. Since costs were not reduced, perhaps patient demands were raised by the growth of specialized facilities. But in that case, the expansion of quality or intensity of care could have been generated by the original institution without having to dilute the privileges of the original physicians.

The questions raised by the merger research pose no obstacle to a bargaining model of the acquiring or acquired hospital. If acquiring trustees exercise independent authority in capital budgeting decisions, they may compensate their original physicians with sophisticated facilities in order to expand the sphere of influence. If trustees of the acquired institution cannot be compensated for their ownership participation, merger will tend to be a last resort.

We will now specify in more detail a bargaining model for the industry and derive implications for SAs.

### The Individual Hospital

Given a hospital with a fixed bed capacity, the utilization demanded by the community will depend on many demographic and environmental variables. We focus only on three economic influences: the net price of inpatient care (consumer cost), the price of services by attending physicians (physician fees), and the hospital stock of real assets (quality of care) which is assumed to be proportional to the quality of care perceived by patients. The demand for care is a function of these three economic variables. This scheme crudely oversimplifies the concept of the quality of care at a particular institution, especially if quality is assessed by technical experts. Therefore the analysis is limited to quality differences that are closely linked to the investment of capital funds. (Appendix A, which is available from the authors, contains the formulae derived for this analysis.)

The net price or consumer cost is only a fraction of average revenue to the hospital, owing to the presence of insurance benefits. Because of risk aversion, people are willing to buy insurance even though it leads to some inefficient hospital use.

Changes in quality of care have an effect on consumers, attending physicians and trustees. An increase in quality of care, with consumer cost constant, affects total physician income, shifting the demand curve and allowing either higher physician fees, higher demand for services, or both. Since there are other economic influences on physician fees in the wider market for physician services, physician fees are taken to be independent of quality of care. The eventual result, that total

physician income does not always rise with an increase in quality of care, will not depend crucially on physician fees being exogenous. We concentrate on the positive direct effect of quality of care on demand which can be offset by a negative indirect effect when quality of care raises consumer cost of inpatient care.

Hospital trustees may derive benefit from higher quality of care, but they also bear the cost of fund-raising activity when the new investment cannot be wholly financed with borrowed funds and accumulated net revenue. Therefore, it is necessary to explore how the quality of care level affects net revenue. Given quality of care and fixed bed capacity, it is assumed that there would be no conflict between trustees and physicians over purchasing variable inputs to minimize operating cost of any particular level of output. The minimum average operating cost of a hospital is a function of the actual utilization, given the stocks of assets and fixed bed capacity.

Hospital net revenue is equal to the difference between average hospital revenue and average operating cost, which increases or decreases as a function of demand. So long as average hospital revenue is greater than average operating cost, an increase in demand is welcome by trustees, as well as by physicians. However, if increased demand can only be attained by increasing the quality of care, there is some point at which trustees would prefer to forego further expansion due to a high marginal cost of capital fund-raising. It is reasonable to assume, especially for a nonprofit institution, that the cost of capital is a rising function. Trustees, in summary, have a direct interest in the annual net revenue less the cost of capital fund-raising.

The level of revenue is not solely determined by hospital management

and ultimate consumer demand, since government and insurance reimbursement policies intervene. Third party payers may have fee schedules or other payment limits based on areawide prevailing rates. They use formulae for depreciation allowances which commonly are a simple percentage of current expenditures. Finally, it is common for third parties such as Blue Cross and federal government agencies to reduce their average allowable payment if occupancy of a hospital is below some standard rate. Except in the case of commercial insurance companies, most of these payment policies cannot be evaded by simply raising the direct cost to patients. Therefore, it is assumed that average revenue is proportional to average cost, with an allowable proportion for depreciation, adjusted directly with the occupancy rate.

A major implication of the above assumptions is that the expansion of assets would produce a typical pattern of benefits to trustees and attending physicians. Initially, the expansion is beneficial to both groups. As the cost of fund-raising increases, however, there is a point at which capital expansion is undesired by the trustees while still marginally beneficial to the physicians. This pattern of effects is derived and discussed more rigorously in Appendix A.

For the individual hospital, any policy change which potentially raises net revenue can be viewed as creating a fund which could benefit both trustees and attending physicians. If an increase in net revenue is actually realized, trustees will be able to reduce efforts to secure philanthropic contributions for capital spending programs. Trustees may forego some of this increase in favor of nonpecuniary rewards. At the same time, potential increases in net revenue can be spent in ways that benefit attending physicians.

The conclusion, from these observations, is that a hospital participating in a successful sharing arrangement need not achieve lower costs or higher net revenue. In addition, offsetting benefits for changes unfavorable to physicians will mean higher costs and lower net revenue than technically feasible.

### **The Local Hospital Industry**

It is assumed that hospitals participating in a sharing arrangement cannot arrange for cash payments to compensate an individual hospital for unfavorable changes in its own net revenue. Either the arrangement must offer increased special facilities and other assets so that a hospital will be content with lower net revenue, or the arrangement must offer a potentially higher net revenue.

The latter possibility could occur in several ways. One alternative is that patient demand is reallocated and attracted away from nonparticipants. Suppose that one participating hospital, A, discontinues an underutilized service and converts the facilities to expand other services. The physician specialists affected by the discontinued service at A can be offered staff privileges at hospital B which would benefit from increased capacity utilization. Patient demand for the expanded services at A could be sought from B, or from nonparticipants through investing in higher quality facilities. This sort of arrangement could be described as a swap of specialty departments and privileges.

Because of rather large investment and transactions costs involved in such a swap, it is expected that some sort of long-term exclusive contract would be arranged. Nevertheless, there is a strong prospect of response by nonparticipants. Since agreements on patient referrals would be difficult to enforce, exclusive agreements would

not be expected to have strong survival prospects.

Reallocation of patient demands among hospitals with underutilized departments is a feature widely discussed by government agencies and insurance intermediaries. The next section shows that this has not been a widespread feature of existing agreements. Other means for each hospital to increase net revenue are perhaps less costly to arrange, particularly if exclusion is not essential.

Each of the participating hospitals has a potential gain in net revenue from a reduction of unit cost of inputs, or from an increase in the price of final service. Either of these may be attempted through technical means or through collective negotiating strength. Collective negotiating strength is an arrangement in which participants agree not to bid competitively against each other so that they present a united position on reimbursement or wages or other input prices.

Input prices may be reduced by technical innovation aimed at economies of scale in intermediate activities such as laundry. In addition, a reduction in internal competition for employees could lead to lower personnel costs, since many of the professional employees are rather narrowly specialized in the hospital sector.

Hurd [16] offers evidence that, in 1960, hospital industry concentration was associated with lower earnings of nurses. Since that time, earnings of hospital employees in most categories have reached and even surpassed comparable occupations in other industries (see, e.g., Feldstein [6, p. 63]). Therefore, the appearance of collective monopsony strength (i.e., collusion in wage offers) at this time could be expected to meet with some success without being totally outweighed by countervailing employee organization.

A reduction of price competition among participating hospitals may allow higher net revenue without much decline in the volume of service, since the total industry demand is likely to be relatively inelastic. Whether net revenue could be raised in this fashion depends on the reimbursement strategies of government and insurance intermediaries which have undertaken stronger roles in price determination in the last several years. As a result of this regulatory effort, collective monopoly gains are not expected to be a major stimulus to sharing arrangements.

For services such as emergency medical care or education and training, a sharing arrangement tends to either redistribute the cost and responsibility or to start new programs. These are services which, if undertaken by one hospital, generate external benefits to other hospitals. For example, a large emergency service program at one hospital can lead to the waiving of legal responsibility for emergency care by other hospitals. It is not surprising, therefore, that such sharing arrangements have typically required new grant funds in order to gain participants.

The foregoing theoretical discussion is concerned with the general bargaining context of a sharing arrangement based on assumptions about consumer, trustee and physician interests. The following is a list of the major hypotheses which were derived for testing against the experience of existing arrangements.

- H1 Increased investment or association with special facilities and plant assets,  $K$ , is a principal method for trustees to share benefits of innovation with the physician staff.
- H2 With increases in  $K$ , provided output does not fall, a hospital may be satisfied with a sharing

- arrangement even though average costs increase.
- H3 Trustees may be satisfied with a sharing arrangement, regardless of cost changes, if there is a reduction in capital fund-raising efforts.
- H4 A sharing arrangement may seek to lower average costs for each hospital in any of the following ways: (i) economies of large scale in intermediate activities, (ii) reduced unit costs from collective negotiating strength, (iii) increased average revenue from collective negotiating strength.
- H5 Reallocation of patient categories among hospitals (e.g., obstetrical departments, pediatrics) is expected to exist only in exclusive arrangements with unclear survival prospects.

Note that most of these propositions do not conflict with a simpler model in which the hospital industry acts in the interest of the physician staffs. For example, lowering deficits or input costs or capital requirements can be favorable to physician incomes when all the indirect results on quantity and quality of service are considered. We have no evidence whether SAs ever reduce physician earnings. Earlier it was argued that the relative rarity and special circumstances of hospital mergers reflect the authority of trustees who have investor rights that are not easily sold. Our predictions about SAs from a bargaining model have the general feature that these innovations must be acceptable both to trustees and physicians.

Suppose, alternatively, that SAs exist to maximize physician incomes, or at least to increase them. This implies that any potential improvement in a hospital's net revenue must be shared with physicians through capital expansion or lower charges to patients. Obviously, this puts the matter too strongly since a

single counterexample should not be weighted too heavily. Standard references show that average hospital net income in relation to plant assets has been rising since 1950 and this is a more critical general problem for the physician ownership model. It is doubtful that a study of sharing arrangements is the best context for further testing of whether physician interests are dominant in hospital decisions. It does appear, however, from the SA experience below that physician involvement and initiative is typically very small except when medical departments are consolidated.

### Review of Empirical Evidence

Several data sources are examined in order to determine whether the above hypotheses are reasonably valid. General descriptive surveys are supplemented with the tentative conclusions from case studies. (Appendix B, available from the authors, provides more details about the case studies.)

More than four fifths of all short-term community hospitals in the U.S. responded to a 1971 survey on the prevalence of sharing arrangements. Two thirds of these hospitals participated in at least one sharing arrangement. One fourth of all hospitals were participating in a shared blood bank. Other frequently shared activities or resources were group purchasing of medical/surgical supplies, data processing, laboratory professional staff, and disaster planning.

The sharing arrangements most amenable to detailed analysis are embodied in formal sharing organizations. In 1974, the American Hospital Association surveyed 157 of these formal organizations. Independent blood banks with no additional activities were not included in this later survey. The services most widely offered by

these sharing organizations, in addition to the above list, were personnel management/collective bargaining, credit and collections, laundry/linen, education and training programs.

Only about 5 percent of the formal organizations included the consolidation of medical departments for final services to patients. These arrangements were the only ones with exclusive membership. These also were the only hospital systems reluctant to cooperate with our field research. Two systems refused to participate in research because of local controversies. One consortium of four large hospitals did cooperate. These hospitals consolidated several underutilized obstetrical and pediatric departments with potentially significant cost savings to the community. However, there was clearly a conversion of space to more costly and capital intensive uses, including the addition of residency programs and special equipment which now serve fewer patients than the aggregate *ex ante* in the same departments. These results are basically in accord with our hypotheses H1 and H5.

Shared blood banking was reported to be the most commonly shared service, and we found it to be a persuasive example of benefits to both physicians and trustees. In our case study, the independent blood bank was a strong commercial success, accumulating net equity while demonstrating improvements to individual hospitals in the quality, availability and price of blood products. The results were not surprising to persons familiar with the literature on blood banking. The accumulation of net equity does not directly advance physician interests.

Group purchasing of various medical and office supplies is a significant component of SAs. There is no reason to assume, however, that distribution of these commodities ordinarily yields

more than the competitive rate of return in other private industries. Therefore, a simple internalization of this net profit by the hospital sector is a transfer rather than a correction of inefficiency. Gains in efficiency from group purchasing are likely to result principally from the standardization of commodity inputs. We found that standardization was not a principal factor in the success of a group purchasing arrangement. Instead, the net advantage of the arrangement can be explained by tax exemptions and a reduced marketing budget.

The rather unexpected advantage of group purchasing which brings more sales and property under the nonprofit, nontaxable umbrella is an institutional peculiarity that goes unrecognized in congressional enactments. This feature of SAs may rival in importance the gains in efficiency from technical economies of scale, or the savings from collusive behavior in the compensation of employees.

Potential economies of scale are sometimes offered by facilities such as a shared laundry. More than 10 percent of the surveyed hospitals participate in a shared laundry. In one study, the shared laundry clearly reduced average operating costs while freeing up space for additional patient care and specialty departments and thus raising service intensity. In a second study, administrators were dubious as to whether operating costs were lower. Instead they saw a crucial advantage in the ability of the freestanding laundry to raise loan capital using future purchase contracts from the hospitals as collateral.

Evidence shows that SAs can promote lower input prices, specifically nursing wages, by collusive means. The organization studied for personnel/collective bargaining is a state hospital association with a special staff



financed partly by users and partly by the association. Membership in a state association is in itself not measured as belonging to a sharing arrangement; only those hospitals directly supporting the special legal office are considered participants.

### Tentative Implications

When both physician and trustee interests can be advanced by a consolidation, such as in blood banking, voluntary SAs are likely to arise and have strong survival prospects. Other successful SAs typically do not have potential to infringe on physician interests. Those SAs dealing with group purchasing, laundry, collective bargaining and administrative services can be attractive to trustees for a number of predicted reasons, even if average costs of final service to the patient are not reduced.

It was predictable that voluntary SAs

would not in general promote consolidation of underutilized final services to patients. That such possibilities remain unexploited is illustrated in Scannell et al. [17]. A voluntary SA may not be able to compensate staff physicians at each institution for lost opportunities. Mergers face the analogous obstacle of compensating trustees for loss of contingent property rights.

While our analysis emphasizes obstacles to reducing inefficiency in a non-profit industry, it is possible that effective pressure for such innovations, if desired by the community, can be implemented through reimbursement policies of government and insurance organizations.

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