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7 Conclusions and Policy Implications

The major goals of this study were (1) to show how physicians as providers of inputs affect the productivity of other providers in the health sector; (2) to examine the role of the physician as proxy demander for the patient of other inputs into the treatment process, especially those inputs for which the physician himself bears no outlay cost; (3) to indicate whether or how the physician as provider of advice on states of health and on the productivity of care affects the demand for his own and other inputs. In this chapter I will summarize the answers to each of these questions and relate them to issues of public policy.

Physicians as Providers of Inputs

The results in chapter 3 indicate that the level of physician input may have important effects on measured hospital productivity. Put another way, if one does not take differences in physician input into account, hospitals may exhibit relatively large and inexplicable differences in productivity. Since costliness is just the obverse of productivity, it follows that if the level of physician input does vary across hospitals, some of observed variation in hospital costs across such hospitals may in fact reflect the level of physician input.

Hospitals do vary fairly extensively in such measures of cost as cost per case and cost per patient-day. Often the mere magnitude of this variation is used as evidence for the proposition that hospitals are typically inefficient enterprises: if some have low costs, but others high costs, then the high cost hospitals must be behaving in an inefficient way. This is not, of course, all there is to the matter of inefficiency: hospitals could have virtually identical costs, and still be equally inefficient. Nevertheless, many of the mechanisms proposed for incentive reimbursement of hospitals involve comparison of hospital costs, either across hospitals

or over time. This implies that "objective" determinants of the level of cost—things which are in some sense not the fault of the hospital, or not properly labelled as inefficiencies—should be adjusted for before the comparisons are made. Traditional candidates for such adjustments are such things as casemix, teaching status, and so on. Some other potential adjustments such as length of stay or service intensity are more questionable. But the implication of the results of chapter 3 is that there is another candidate for inclusion in the first list: the level of physician input, or proxies for it.

If the level of physician input is not controlled for in reimbursement formulas, some potentially severe biases and inefficiencies can be introduced. Hospitals with high levels of physician input will be rewarded, and ones with low levels of physician input punished. If the level of physician input is wholly exogenous and random, in the short run this will simply mean a capricious distribution of largesse. In the longer run, some hospitals, those with large amounts of physician input, may have surplus funds, while those with small amounts will suffer deficits. The latter will presumably go out of business or contract, while the former will expand.

Since I showed that hospitals, on average, use relatively too little physician input, the immediate impact of this development may be beneficial, since output will be concentrated in those hospitals with close to the ideal ratio of physicians to hospital inputs. If, however, the hospitals with too few physicians remain in business, even this beneficial outcome is uncertain. Some physicians will be likely to leave such hospitals, making the ratios even worse than before. Eventually some output may be produced at lower cost than before, but other output may be produced at higher cost. What is relevant, of course, is not average cost, but marginal cost.

The primary difficulty, however, is that there is no reason to expect this process to stop once the ideal ratio is approximated. Instead, it will continue up to the maximum technological limit of substitution of physician input for other hospital input. In effect, by transferring costs to physicians' inputs (even if physicians are fully reimbursed), a hospital can appear to be efficient, and it will therefore be rewarded and survive. A hospital that cannot or will not transfer costs will shrink or disappear. Since the process only looks at the hospital's cost, not the total cost, there is no reason to expect that it will achieve a solution which minimizes total cost. Indeed, it will be likely to transfer to physicians activities which cost more when performed by physicians in their offices, but which nevertheless lower hospital costs.

In summary, given the caveat about the relationship of marginal and average costs, reimbursement mechanisms based on efficient cost levels rather than actual costs can improve the efficiency of the hospital sector. Because these methods are so powerful, it is important that they be

based on the proper measure of costs. One such component which is not included in hospital budgets, but which deserves emphasis, is the level of physician inputs. What is relevant is the *total* cost of hospitalization, including the physician input; this is the cost on which reimbursement should be based if an efficient outcome is to be achieved.

Physicians as Proxy Demanders

The physician serves as a surrogate demander for the patient in choosing the level of inputs to produce health. It is sometimes argued in the literature that under fee-for-service the physician has no incentive to choose the cost minimizing combination of those outputs for which he does not pay directly. Since some of those inputs, such as hospital care or prescription drugs, are a large proportion of total cost, often larger than the doctor's bill, it is argued that such inefficiency can be severe. To avoid it, some method which makes the physician directly liable for the costs of all inputs, such as prepaid group practice, is often suggested.

Most of this analysis is conceptual; what empirical evidence there is is often anecdotal or confounds the measurement of cost minimization for a given level of health or well-being with that of the level of health or well-being achieved. I do not wish add to the store of anecdotes on this subject, but rather show that, at least at the conceptual level, the argument is invalid if the physician is an income maximizer and is free to adjust the price he charges for his own services. In such a case, the physician will not order a high-cost input where a low-cost input would do just as well. For if he were to do so, the amount he could collect for his own services would be less. The physician may *not* act as his patients' agent in choosing the level of health or well-being, but he will act as such an agent in choosing the level of other inputs for a given level of health.

What then of the anecdotes? I offer two possible explanations for the possibility that physicians do not cost minimize. One is that they are not really income maximizers, a proposition for which there is ample empirical evidence. But this is a problem of objective functions, not incentive systems. Indeed, attempts to produce cost-minimizing solutions by fiat will actually be less efficient than permitting physicians to do what they want. If this is the case, there is relatively little that can be done at a policy level.

The second possible reason is that consumers have differential information. They know what going rates are for physicians' services, but they are unaware of differences among physicians with regard to the prices or quantities of other health care inputs they prescribe. Then a physician who substitutes, say, a cheaper but therapeutically equivalent drug for a more expensive one will not find that he can gain from doing

so by charging slightly more for his own services. For if he raises his price, even though the total cost to the consumer of his method of treatment is less, he will lose customers.

If this assumption about differential information is correct, the analysis offers a new perspective on the difference between prepaid group practice or health maintenance organizations (HMOs) and fee-for-service. It suggests that one advantage of HMOs, and of competition among HMOs, is that they can make information on the total cost of treatment available to consumers.

Another implication is that current legal proceedings to remove medical ethical bans on advertising would have the largest potential benefit not from the information that could be provided on the prices different physicians charge for their own services, but rather from the information that competing physicians might find it worthwhile to provide on the quantities and prices of other services they typically use. Existing empirical work on the effect of permitting advertising has been confined to a profession (optometry) where the quantity of prescribed services provided by others is small relative to the professional's charge.[1] In medicine, where hospital and prescription drug bills combined far exceed physician charges, both the benefits from permitting advertising and the content of that advertising might be expected to be much different. This is especially likely to be true for hospital-oriented specialties.

A final important implication of the analysis is that if physician fees are fixed, as might occur under various forms of third party reimbursement or under price controls, then much of the incentive to minimize the cost of other inputs is lost. The physician can still attract customers by offering them lower costs for other inputs, but he cannot gain from this increased demand for his own services by raising his price. Only if he were initially in a situation of excess supply, i.e., if he actually gained from producing additional output at the current price, would he have such an incentive. And even here the incentive would be less than would be provided if he could both produce more output *and* get a higher price for it.

Physicians have, in this analysis, an incentive to cost minimize given the net prices of other inputs that they face. This solution will coincide with minimization of social costs only if those net prices are equal to or proportional to social opportunity cost. Even apart from the usual noncompetitive market distortions, I argued in chapter 2 that for one important class of inputs—hospital inputs—additional distortions may be present. The individual physician may perceive the cost of hospital inputs for his patients to be much less than real cost either because of typical hospital insurance coverage or because of the inability of hospitals to price all of their inputs at marginal cost. If physicians do behave in part as the income maximizers described earlier, one would predict that hospitals would provide too much hospital input relative to physician input.

The empirical results in chapter 3 strongly support this proposition. This is in marked contrast to the results found by Reinhardt and others for physician ambulatory practice, in which physicians used relatively too few other inputs.

While these results are consistent with (apparent) cost minimization or income maximization by physicians, they only point in the hypothesized qualitative direction; they do not prove that all of the substitution that would enhance physician incomes has gone on. But they do show that input combinations of other inputs *are* sensitive to relative net prices, as postulated by the theory. There are, of course, other ad hoc explanations possible: physicians may be thought to be overly aware of costs they must pay directly, such as costs of other inputs in their own practices, and less aware of costs they cause their patients to incur elsewhere. Physicians may not be well informed about gross hospital prices. But if hospital insurance coverage is extensive, net hospital prices may not vary enough to make it worthwhile for the physician to become informed. On balance, these ad hoc explanations seem to be more descriptive of the results of a maximization process such as that outlined rather than genuinely competitive alternative models.

The Physician as Provider of Information

The second empirical study attempts to look at the effect of the information physicians provide on demand for physician and other services. With regard to an individual consumer's demand for physicians' own services, the independent variables of interest are the number of physicians per capita, the total or average demand in his market area, and the gross price received by the physician. I argue that information for a given patient is more likely to be distorted in the direction of increasing the quantity demanded at a given price the smaller the average quantity used per capita, the larger the number of physicians per capita, and the higher the gross price. All of these changes are likely to increase the gain by shifting demand. The first two also reduce physician income, which is more likely to lead to a reduced level of accuracy.

The empirical results strongly support two propositions: (1) the availability effects observed for physicians' services come from alterations in accuracy, not from any of the other hypothesized causes, but (2) except for ambulatory care for low education persons in big cities, such effects are of minor importance. For hospital care, the availability effects, while not measured very precisely, and while not of major importance, seem to come from a reduction in ease or speed of obtaining a hospital bed. In particular, the amount of physician demand creation for expensive types of medical care—hospital episodes and surgery—is small or nonexistent. Past empirical work which has suggested important demand creation effects for these services failed to account adequately for the

health status of the patient or for differences in effects across types of geographic areas.

There *is*, then, an availability effect; physicians can affect consumer demand by what they tell consumers. And the effect is strongest precisely among those groups of consumers, those with little education or information, for which one would expect it to be strongest. Overall, however, the practical consequence of the availability effect is quite small. In particular, where patients are more easily able to exchange information about diagnostic accuracy, as perhaps in rural areas, little availability effect can be detected. Either physicians do not generally manipulate information in an effective way or, if they do, they do so to approximately the same extent regardless of how many of them there are in an area, and regardless of how busy they are.

The most obvious policy implication of the alternative theories of the availability effect is implicit in what has already been said: if different theories imply differential effects on different population groups, then concern for the appropriateness of use can be directed to those groups most likely to be affected. In the simplest case, where a policy decision about what is regarded as appropriate use has already been made, the theories have different implications about the kinds of people whose use is likely to be affected by availability. Under one theory, availability will affect most strongly those people with what physicians regard as undeserving conditions (whether because they are trivial or because they are uninteresting); under another, it would be those with higher opportunity cost of time; under still another, those with least information or experience. The confirmation of the information-manipulation theory provides suggestions for the design of corrective measures. For instance, the results in chapter 5 suggest that direct programs to determine the appropriateness of use, such as PSROs, would be most useful for those persons whose use might most be expected to be affected by availability—persons in high producer price areas, persons who are less well educated, and persons with chronic conditions. Of perhaps equal importance is the suggestion in the information manipulation theory that estimates of the partial effect of price on use may be biased downward unless the accuracy of information is controlled for. This qualification is most relevant when insurance coverage is sufficiently low that prices received by producers are approximately equal to prices paid by consumers, as in the case of ambulatory care. The policy implications of changing user prices, e.g., by reducing insurance coverage, while leaving producer prices constant, are also important. The intent of an increase in user price to reduce use and cost may be frustrated if physicians manipulate information to counteract the effect of reduced use on their own incomes.

Where appropriateness of use has not been determined a priori, and where the changes in resource availability are to be evaluated in terms

of their effect on use, analysis becomes more complex. The value of use of medical care to the receiver is measured, at the margin, by the price he would be willing to pay if he were appropriately informed.[2] In the case in which time prices are altered by changes in physician availability, a measure of the time price would provide an estimate of the value of additional use, if any exists. But in the excess demand or information manipulation cases, results are not as clear-cut. In the excess demand case, we know that the value of use is at least as great as the price, but that is all. But in the case of information manipulation, even this benchmark is gone. Where manipulation is present, all of the presumptions about the desirability of market results is lost. This makes it especially important to circumscribe those areas: the results in chapters 5 and 6 suggest that they are much more limited than is often suggested.

Finally, if it continues to be confirmed for certain parts of the population, the information manipulation theory can suggest a tool for public policy which has not been much used up to the present: the provision, at public expense, of accurate information to these population groups. This information would have two possible forms, not only more accurate information about the usefulness or, equally, the uselessness of kinds of care physicians suggest, from hypertension therapy to tonsillectomies and hysterectomies, but also information on the accuracy of advice of particular physicians. PSROs should generate this kind of information in any case; it might, however, be most effectively utilized if communicated to consumers. Here again, the kind of information to be collected, the kinds of consumers to whom it should be provided, and the geographic areas of most concern could be determined by empirical analysis.

Economic Models of Physician Behavior

The most general message of this set of studies is that we should not be too quick to depart from standard maximizing economic models in attempting to explain behavior in the medical care industry. Supposedly anomalous features of that industry sometimes vanish when more appropriate sets of data are used, while other apparent institutional differences require only redefinitions of price, ownership-entrepreneurship, and markets to make models analogous to the traditional ones applicable.

This is not to deny that there are not some peculiar features of this industry, nor that expansion of producer and consumer utility functions may be necessary in order to explain behavior. But it does suggest that adaptations of standard economic models may be the most fruitful way of approaching these problems.