

THE ECONOMICS OF MORAL HAZARD: FURTHER COMMENT

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INTRODUCTION

Pauly has pointed out that insuring a commodity, the demand for which is stochastic and price elastic, leads to a welfare loss which may or may not be offset by the reduction in risk which insurance provides.¹ The example he uses to illustrate his point is medical care insurance. Briefly Pauly's argument is that insurance reduces the price to the individual below marginal cost and thus acts as any subsidy. Arrow, in a reply to Pauly's note, agreed with Pauly that "...the optimality of complete insurance is no longer valid when the method of insurance influences the demand for the services provided by the insurance policy. This point is worth making strongly."²

Pauly's example of medical care has led us to a somewhat more general formulation of his case. Specifically we wish to consider the effect of hospital insurance upon the consumption of those items in the consumer's utility function which relate to the "quality" as well as the quantity of care consumed. Further, we wish to suggest a means

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¹ Mark V. Pauly, "The Economics of Moral Hazard: Comment," American Economic Review, 58:3, June 1968, pp. 531-537.

² Kenneth J. Arrow, "The Economics of Moral Hazard: Further Comment," American Economic Review, June 1968, pp. 537-539.

of minimizing the distorting influence of such insurance. We believe this suggestion is relevant to the current policy debate over the costs of medical care--especially the costs of Medicare and Medicaid. It may also be of more general relevance to the economics of insurance.

THE SUBSIDY PROBLEM IN HOSPITAL INSURANCE

Insurance plans that lower the price of care to the consumer provide; in effect, a per unit subsidy, which as is well known results in an allocative distortion, assuming that the initial position was one of full competitive equilibrium.¹ The allocative distortion induced by a subsidy will be less, the lower the price elasticity of demand is for the commodity. Since demand for hospital care is generally assumed to be price inelastic, relatively little concern has been evinced among economists about hospital insurance arrangements. For example, Pauly says, "Insurance is more likely to be provided against those events (a) for which the quantity demanded at a zero price does not greatly exceed that demanded at a positive price . . . [This] statement might be made with respect to ordinary hospitalization insurance."² This notion of relatively low price elasticity of demand for hospital services is also reflected by different coinsurance provisions in Part A and Part B of Medicare. Part A, which insures hospital services has no coinsurance provisions, while Part B, which insures physician services, has a 20 per cent coinsurance feature.

While the quantity of hospital care demanded may be relatively price inelastic (in that the individual who needs an appendectomy performed will be relatively insensitive to price in the range of one

¹See Milton Friedman, "The 'Welfare' Effects of an Income Tax and an Excise Tax," in Essays in Positive Economics, Chicago: University of Chicago Press, 1953, pp. 100-113. We would be the first to admit that the hospital sector, even without insurance, would fall far short of competitive equilibrium, but modification of this assumption in the direction of greater realism would only strengthen our results. See below.

²Pauly, op.cit., pp. 534-535. Pauly notes that this statement might not be applied to dental care, eyeglasses, or drugs.

appendectomy), we suspect that the demand for quality of care may not be so inelastic. That is, many individuals, if they had to bear directly the differences in cost between treatment in a major medical center and treatment in a lower-cost institution, would opt for the latter more often than they do under present insurance plans.¹ If the conjecture is correct, present types of hospital insurance schemes cause a significant misallocation of resources. The greater the price elasticity of demand for quality, the greater the misallocation.

The effect of insurance is illustrated in Figure 1, which shows the situations confronting an ill consumer with insurance and without insurance. The horizontal axis measures the "quality" of the care he would receive in the various hospitals available to him for treatment of his conditions. Quality represents a vector of product characteristics, not all of which are directly related to effectiveness of treatment (for example, room size and furnishings, food quality) but which all affect the cost of treatment. The scale used in Figure 1 makes equal movements along the quality axis represent equal changes in dollar cost of care; thus the budget line AC represents the choices available to the representative sick consumer without insurance. He maximizes his welfare by choosing care of quality OB'.²

With insurance his funds available to buy other goods will be lower by the price of the insurance policy, but the budget line will have a smaller (absolute) slope because of the subsidy provided by insurance. Line DEF represents the budget line under a plan with 20

¹This exaggerates the role of consumer choice in the selection of hospitals, since individual physicians are restricted to hospitals in which they have staff privileges. The incentives facing physicians in choosing hospitals with which to affiliate and in which to hospitalize patients would seemingly favor high quality hospitals. Under the insurance schemes outlined above, the demands of consumers reinforce these incentives.

²Not all quality choices will actually be available (each hospital represents one point), but for simplicity of exposition the discrete nature of choice will be ignored. Including in price the cost of the consumer's time and other non-monetary costs which he bears when hospitalized would not change the conclusion.

Composite
Bundle
of Other
Goods

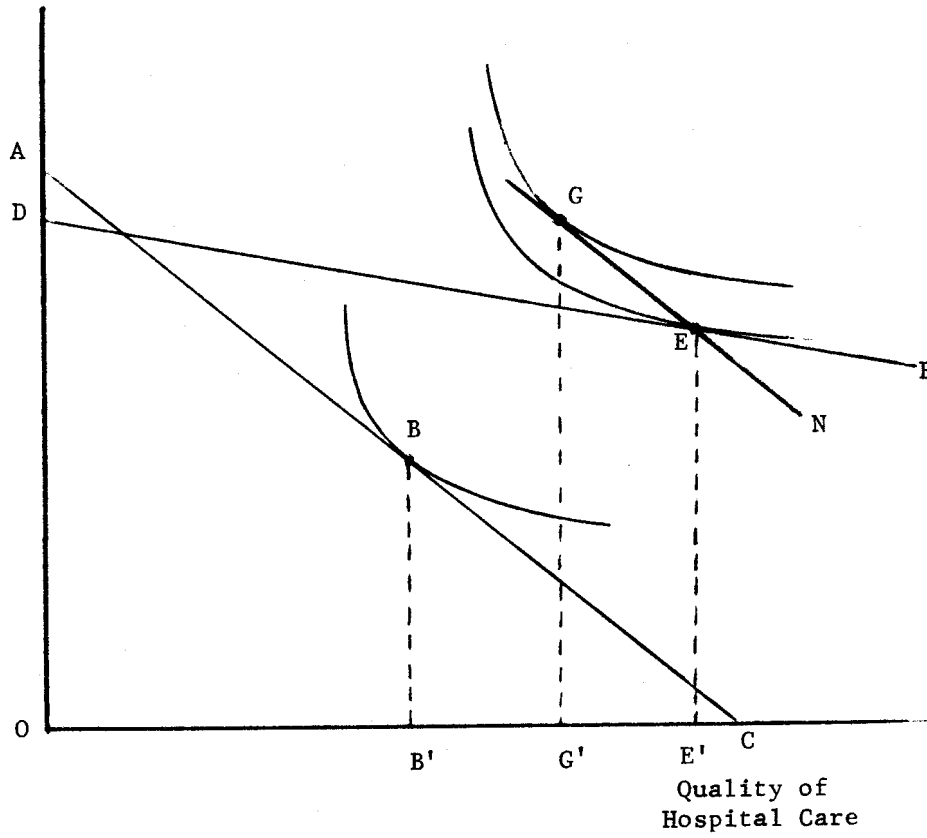


Figure 1

per cent coinsurance (it would be horizontal if there were no coinsurance). Faced with this budget line, the consumer chooses care of quality OE'. He has been made better off than at B because of the income transfer provided by insurance in the event of illness. But the income effect of insurance is coupled with a subsidy effect that detracts from the welfare gains. GEN represents the budget line based on market prices that passes through E. If the consumer were given this income and permitted to purchase care at market prices, he would choose to be at point G. The difference in welfare between E and G measures the welfare loss to the individual caused by the insurance subsidy effect.¹

Insurance which reimburses expenses may cause X-inefficiency as well as allocative inefficiency in the production of hospital services.² To consumers insured by such plans cost is of negligible importance. Lack of consumer concern with cost means there is no reward to a hospital which produces the identical services as another at lower cost. As a result, hospital management need not be concerned with its own efficiency.³

¹If the ratio of market prices equals the marginal rate of transformation between Other Goods and Hospital Quality, the welfare loss to the individual in moving from G to E is not offset by gains to other members of society. If, because of some market imperfection, too few resources are devoted to Hospital Quality relative to Other Goods, the subsidy is a desirable effect. See Friedman, op.cit. However, the peculiar institutional arrangements in the hospital market make it seem that, if anything, too many resources are now being devoted to Hospital Quality relative to Other Goods. Both because nonprofit institutions are relatively free from market pressure and because prestige (and hence quality) are important to most hospitals, the quality of care produced in the absence of insurance is likely to be higher than in full competitive equilibrium. See Joseph P. Newhouse, "Toward a Theory of Nonprofit Institutions: An Economic Model of a Hospital," American Economic Review, forthcoming. Hence the subsidy effect of insurance further exacerbates the situation.

²"X-inefficiency" is a term coined by Harvey Leibenstein, "Allocative Efficiency vs. 'X-Efficiency'," American Economic Review, June 1966, 56, pp. 392-415. X-inefficiency refers to the situation in which the hospital is inside its production possibility frontier.

³Data cited by the National Advisory Commission on Health Manpower indicated that cost per patient day in a set of "distinguished" hospitals chosen for their comparability of quality ranged from \$46 to \$96 after adjusting for wage differences. Report of the National Advisory Commission on Health Manpower, Vol. I, Washington: Government Printing Office, 1967, p. 55.

The effect of hospital insurance which consumers find desirable is that it effectively increases their income when sick. Unfortunately, the subsidy effects of many present insurance plans lead individuals to inefficient choices. If a way could be found to transfer resources to sick individuals without disturbing the marginal equalities, all could be made better off. Further, since the effect of the subsidy is, ceteris paribus, to increase the quality of care consumed and hence raise insurance premiums, eliminating the subsidy in government financed plans such as Medicare and Medicaid would have the additional benefit of decreasing the distortions induced by the taxes levied to finance them.

WHY THE PROBLEM EXISTS

In general, the purpose of insurance is to compensate an individual for expenses that will be incurred (or financial losses sustained) if a particular undesirable event occurs.¹ Insurance, thus, usually takes the form that if the event occurs, an appropriate lump-sum transfer is made to the individual. For example, if an individual's home burns down, he receives a certain sum of money. The amount he receives depends only on the damage sustained, not on how much he spends to replace the damaged housing. As a consequence, he must pay from his pocket the full market costs of any upgrading in housing quality that he may choose. Because of their lump-sum nature, fire insurance payments do not distort consumer choice with respect to housing quality. There is no subsidy effect.

The subsidy effect would also disappear from hospital insurance if such insurance paid specified lump-sum amounts to individuals requiring hospitalization. But, in order for lump-sum transfers to be effective

¹Pauly and Arrow assume the event is outside the control of the consumer. If it is not, there is a further distortion induced by insurance, but since we are not concerned with that distortion in this note, we too assume the event is outside the control of the consumer. In the real world, however, this distortion may be very important. For example, routine, uninsured visits to a physician in time *t* may reduce the probability of hospitalization in future time periods. If individuals do not bear the financial costs of hospitalization, some may be deterred from seeing the physician when that would have been beneficial.

at reducing the financial costs imposed on an individual by an illness, the size of the transfer must depend on the seriousness of his illness. Lump-sum insurance payments that did not reflect the extent of illness would not provide good "insurance" against the financial risks of hospitalization. They would shift the mean level of resources available to an individual upwards, but the wide variance in possible hospital bills would still leave him with the possibility of a large loss should he be hospitalized. Thus, to provide effective insurance against loss, the size of lump-sum payments must vary with the degree of illness. The problem that has led to price subsidy rather than lump-sum transfers in hospital insurance is the practical difficulty of providing lump-sum payments that appropriately reflect the degree of illness. Insurance companies have evidently not felt it possible to establish a procedure for determining the size of lump-sum transfers that would make insurance incorporating such payments more desirable to purchasers of insurance than the present price-subsidy plans.

A PROPOSAL FOR REDUCING THE SUBSIDY EFFECT OF HOSPITAL INSURANCE

Because of the difficulty of defining "illness categories" satisfactorily, pure lump-sum transfers may never be practical for hospital insurance. But as our analysis of the hospital insurance subsidy effect stressed, degree of illness is not the only determinant of the size of a hospital bill. Consumer choice with respect to quality also has a substantial influence on the size of bill. Current insurance plans subsidize quality as well as quantity--creating the subsidy effect discussed previously. If the amount of insurance payment for hospitalization could be made independent of an individual's choice of quality, an important part of the subsidy effect would be eliminated. Only the quantity of care consumed would be subsidized, and the distorting influence of insurance would depend only on the elasticity of demand for the quantity of hospital care.

We believe that there is a practical means of making hospital insurance payments substantially independent of the hospital used (quality chosen). We have termed the insurance incorporating this

feature Variable Cost Insurance (VCI).¹ The general features of Variable Cost Insurance are that: (1) hospitals in a community are given "expense ratings" reflecting their level of charges for a standard mix of cases; (2) the individual designates an expense class rating for which he would like to insure himself; higher expense class ratings are associated with higher premiums; (3) the proportion of a subscriber's hospital bill paid by insurance is inversely proportional to the expense rating of the hospital and directly proportional to the expense class rating of his insurance.²

More explicitly, Variable Cost Insurance would make:

$$E_i = \sum_j \frac{TR_{ij}}{TR_i} \cdot \frac{\bar{C}_{ij}}{\bar{C}_j}$$

$$P(i) = (1-r) \cdot C(i) \cdot \frac{E(s)}{E(i)}$$

where:³

$E(s)$ = expense rating of subscriber's insurance coverage

$E(i)$ = expense rating of i th hospital

r = coinsurance rate

\bar{C}_{ij} = average charge (in last time period) in hospital i for j th type of case or service

\bar{C}_j = average charge for j th case or service in all hospitals

$$(\bar{C}_j = \sum_{i=1}^n \bar{C}_{ij}/n)$$

¹For a full discussion of Variable Cost Insurance, see J. Newhouse and V. Taylor, "A New Approach to Hospital Insurance," P-4016, The RAND Corporation, Santa Monica, California, January 1969.

²If administratively feasible, different expense classes could be elected for different medical diagnoses.

³Other schemes are possible; the frequency of case or service i in hospital j could be used, for example, instead of TR_{ij}/TR_i . By case, we mean type of medical procedure performed (e.g., appendectomy); by service, we mean charge for a particular service (e.g., daily service charge, intensive care unit charge).

$P(i)$ = Payment for subscriber's care (if obtained in the i th hospital)

$C(i)$ = Hospital charge for subscriber's care (if obtained in the i th hospital)

TR_{ij} = Total revenue from j th case or service in the i th hospital

TR_i = Total revenue in the i th hospital

For the amount of insurance payment to be independent of the hospital, $P(i) = \bar{P}$ for all i . This will occur if $\frac{C(i)}{E(i)}$ is independent of i , that is, if the charge in question is proportional to the expense rating of the hospital. Since the expense rating of a hospital reflects its weighted-average charges, this should hold approximately. In any event, we are primarily concerned with a subscriber's expectation of the cost of care in various hospitals (since it is these expectations rather than ex post costs that will influence his choice of hospital, and it seems very reasonable that he will expect the charge for care to be proportional to expense rating. He will then act as though the amount of insurance payment will be independent of his choice of hospital, and his choice will conform to the marginal efficiency conditions illustrated in Fig. 1. The insurance will have the effect on consumer choice of moving the subscriber to a budget line similar to GEN in Fig. 1. The exact location of the budget line will be determined by the expense rating of his coverage, which will in turn be influenced by his preferences about hospital quality and risk.¹

By not subsidizing all components of hospitalization, Variable Cost Insurance would greatly reduce distortion of consumer choice with respect to hospital quality. There would still exist, however, insurance subsidization of the quantity of services provided by the hospital. The most serious effect of this subsidization seems likely to be on length of stay, since the consumer will bear only a small fraction of the cost of staying additional time in the hospital. But by removing the distortion in the consumer's choice of hospital, VCI

¹Note, however, that the consumer may bear more risk under VCI than under present insurance plans, but allowing the consumer to choose different hospitals for different diagnoses (in advance) should minimize the additional risk.

could make a major contribution to reducing the escalation of hospital cost.

A further beneficial effect of VCI is the stimulus given to both consumers and hospital management to be concerned with X-efficiency. Consumers now have greatly strengthened incentives to choose, among hospitals producing the same (or nearly the same) services, the lower cost hospital. Hence, X-inefficient hospitals will tend to lose patients to more efficient hospitals. In this way VCI will reward well-managed hospitals and provide poorly managed hospitals a powerful motive to improve their performance.

VCI AND CURRENT PUBLIC POLICY

Variable Cost Insurance is applicable to private and government-sponsored hospital insurance. In particular it is relevant to the present debate over the costs of the Medicare and Medicaid programs. Currently Medicare and Medicaid make hospital care free to persons covered by the program. The result is to cause overconsumption of hospital services, raising the costs of these programs. Their costs could be lowered with minimum loss of welfare to the recipients by providing insurance of the type suggested. If the funds thus saved were used on other efficient programs to aid the aged and the poor, the overall welfare of the recipients could be increased from its current levels.

Specifically, we propose that government insurance plans such as Medicaid or Medicare adopt VCI with an expense rating of coverage equal to the rating of the "average" cost hospital in each community.¹ Under this plan, the consumer would bear the full cost of going to higher-than-average cost hospitals and gain the savings from going to lower-than-average cost hospitals. The insurance scheme would not distort relative prices at the margin and hence allocative inefficiencies would be reduced. At the same time, the consumer would be protected

¹The amount of co-insurance and the possibility of imposing an upper limit on payments (so that insurance payments would not exceed the hospital bill) are matters that would need to be considered by the government, but the manner of their resolution would not affect the desirable impact of VCI on consumer choice.

against a large reduction in income available to spend on other goods because of the incidence of illness. In this form the consumer could not insure to his preferred quality level, but if feasible, the government could allow the consumer to pay an additional premium to insure at a higher than average quality level.

There are, of course, practical problems in determining acceptable expense ratings for hospitals. We do not believe these problems are insuperable. They are certainly easier to solve than those presented by currently proposed schemes to induce "efficiency" by basing hospital reimbursement on target costs. Further, these latter schemes only deal with problems of poor hospital management, since they leave the consumer's choice distorted.¹

SUMMARY

Pauly has pointed out that insurance acts as a subsidy and, if there is any price elasticity of demand for the commodity being insured, can lead to a misallocation of resources. Although price elasticity for the quantity of units of hospital care consumer may be low, price elasticity for a number of product characteristics which we call quality may be much higher. Hence, even though price elasticity of demand in the usual sense is low, insurance may result in the production of an inefficient bundle of goods. By making insurance payments independent of the hospital used, VCI would avoid a distortion of consumer choice of hospital quality at the margin.

¹We also believe that hospital management can be improved, but believe VCI offers incentives in that direction. See Newhouse and Taylor, op.cit.