# DISCUSSION

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Although the Feldstein and Carr paper and Rosenthal's paper share a common tradition, that of applying advanced statistical techniques to the study of economic problems, they are sufficiently different to warrant separate discussion.

### FELDSTEIN-CARR PAPER

This paper is instructive, ingenious in design, and lucid in presentation. It is lucid, in that complicated ideas are presented simply. It is ingenious, in that diverse techniques are brought to bear on the question at hand. It is instructive, in that existing data which have lain dormant in many reports and repositories receive a fresh interpretation.

### Technical Comments

The authors aver two purposes: (1) to ascertain the net effect of a change in income on (private) medical care spending; and (2) to appraise the stability of the relationship over time. Their major conclusion is that the income elasticity for medical care spending was more than one in 1950 and probably near one in 1960. The calculated figure is often smaller because the reported income of consumers includes transitory income and because employer contributions to health insurance premiums are excluded. The downward effects are aggravated when simple correlation is replaced by multiple correlation, and income becomes only one of several independent variables.

By following the authors' formula it is possible to raise the 1960 estimate of income elasticity from .883 to .930, if the proportion of employer contributions to total health insurance premiums is reduced. This is warranted because the figure of one-half employed in the paper is too high. For the year 1960 two-fifths appears to be more nearly correct.

In order to gain additional insight the authors go beyond correlation analysis of crosssection data for households. In this discussant's opinion the analysis of time series does not enhance our understanding. As Louis Paradiso has pointed out, in the post-war period annual changes in consumer spending have reflected growth relationships almost exclusively, rather than sensitivity to changes in income. Nor should one regard D. S. Lees' incidental observations on this score as considered comments. To deal with the problem of transitory income the authors resort to an analysis of data for 91 cities. The question arises whether equally good, or better, results would not be obtained in the preceding analyses by substituting family expenditures for reported family income. The sacrifice of information concerning the characteristics of individual families would thereby be avoided.

It is appropriate to note that Feldstein and Carr are not measuring income elasticity in a strict sense. Given a one percent change in income, they aim to measure the associated percentage change in medical care expenditures, rather than in the quantity of services taken. As we shall shortly see, this distinction is not unimportant when changes take place in the volume of free care rendered or in the application of the sliding (variable) scale of fees.

# Support for Hypothesis that Income Elasticity Has Declined

The authors may wish to consider the possibility that the income elasticity of medical care spending has declined. Their data in Table 3 show lower figures for 1960 than for the earlier years. Certain institutional changes appear to lend support to the hypothesis that such a shift has taken place.

1. The volume of free care has declined. This would serve to raise the proportion of medical care spending to income for families with low income, thereby reducing the income elasticity for all families. (It makes no difference whether free care is rendered without charge or is paid by government, as long as it is not reflected in private expenditures.)

2. The sliding scale of fees is less pervasive than formerly and its range is probably narrower. The effect is to reduce the income elasticity of medical care spending.

3. The proportion of total health insurance premiums paid by employers has increased. A constant sum is, in effect, added to the income and expenditure distributions for employed persons, and the effect is the same as above.

## Implications for Policy

If the income elasticity of private medical care spending has in fact declined so that it now falls below one, what are the implications for the volume of medical care spending in the future? At first impression the answer is that the proportion of aggregate income devoted to medical care will decline.

There are certain offsets, however, which should be recognized. Health insurance is likely to continue to increase medical care spending in two ways. The two-price system (a lower one for beneficiaries of insurance) leads to increased utilization by lowering the price of insured items relative to other objects of expenditure. In addition, persons with health insurance seem to spend more than uninsured persons on all types of health and medical service, including uninsured items.

Also to be taken into account is the prospect that the unit cost of hospital service will continue to rise at a high rate, owing to the hospital lag in productivity gains behind other industries. This factor is independent of any increase in the general price level, increased costs of educational programs, or extraordinary improvements in the technology and efficacy of medical care.

The discussant concludes, therefore, that there is little reason to expect that an income elasticity of less than one at a given time will necessarily signify a decline over time in the proportion of aggregate medical care spending to aggregate income. The simultaneous occurrence of other changes may offset any such tendency.

### ROSENTHAL PAPER

This paper offers a principal components analysis of the demand for general hospital facilities. It is a progress report on a continuation of the author's original work on the same problem. The findings are preliminary and their interpretation is boldly imaginative.

# Conceptual and Technical Comments

The objective of the new work is to simplify and improve the original 12 variable model, by reducing the number of independent variables. Five principal components explain 92-93 percent of the variation in patient days. Since the components are statistical creations, the author seeks to represent each by one of the original variables. Initially this is done on the basis of factor loadings; however, the procedure for selecting representative variables is not mechanical. For the first component the proportion of the population with low income is preferred to the proportion under age 15 because the former is more meaningful on <u>a priori</u> grounds. Marital status is chosen to represent the second component on <u>a priori</u> grounds plus statistical stability. The urban-rural variable is chosen for the fourth component on the ground of statistical stability. Only for the third and fifth components are age and level of education, respectively, chosen in accordance with the factor loadings.

What is an a priori ground? The dictionary states: "that which can be known by reason alone, not by experience." Rosenthal did, of course, look at experience, for he refers to what other investigators have found and reported. By a priori he must mean that which is plausible or makes sense. How does one deal with mutually contradictory explanations that appear to be equally tenable? (Consider the change in sign for the factor loading of the low income variable between 1950 and 1960.)

The new model is evaluated in part by comparing it with the original model for efficiency of prediction. The conclusion is that the new model is a statistically satisfactory substitute. Yet for the year 1960 a loss of 19-24 percentage points is reported in the value of  $R^2$ . How large a loss does it take to render the new model unsatisfactory?

The stated purpose of the analysis is to understand the factors that influence hospital use and to apply this knowledge to predicting use. Since variables pertaining to the organizational structure of medical care are not now contained in the model, the interpretation of findings to-date may attempt to explain too much.

The organizational structure is not clearly set forth. Apparently, it is intended to represent the forces on the supply side. Subsumed are not only the forms of physicians' practice but also the existence of substitute medical care facilities. No reference is made to the possible effect on use of the supply of general hospital beds. Rosenthal dealt with this subject in his monograph, but not conclusively in this discussant's opinion. D. J. Newell's data were not then available; and the factors that impinge on the demand for and supply of a service are by no means identical.

It is doubtful that the multiple regression approach can handle special institutional controls over hospital use. An example is the relatively low use attained by a self-insured fund in whose behalf a labor union has enlisted the protective concern of its members.

The separate analyses of the admission rate and duration of stay are welcome, and in line with steps recently taken by investigators in England, including Norman Bailey, Martin Feldstein, and G. Forsyth.

A comment may be in order on the superior performance of the equations for duration of stay. It may reflect the greater ability of this element of hospital use to adjust to various influences and pressures. To Norman Bailey such adaptability is a focal point for hospital planning.

#### Findings on the Independent Variables

Perhaps this discussant has unreasonable expectations of a new, exploratory approach. His difficulty is that sometimes he cannot see in the data what the author sees.

It is reported that the low income variable performs well in a statistical sense, being significant in almost all cases. Although Table 3 shows it to be significant for patient days, it shows lack of significance for the admission rate and duration of stay separately.

It is recognized that the contribution of the first component, ability to pay, is less important in 1960 than in 1950. The change is attributed to the enhanced importance of either the organizational structure of medical care or health insurance. Further analysis is indicated.

It is reported that the second component, represented by marital status, has a positive association with the admission rate and a negative one with duration of stay. Table 3 shows the latter, but not the former for the year 1960. Moreover, none of the coefficients is statistically significant.

Marital status has a negative relationship with patient days. The interpretation offered is that the home serves as a substitute convalescent facility. This is consistent with the findings of Brian Abel-Smith and R. M. Titmuss. It may be, however, that the true relationship is more complicated, with married persons having the higher use among the young and the lower use among the aged. It might be helpful to exclude obstetrical use from the data.

Unlike the original model, the new one shows a positive association of use with age (which represents the third component.) It is found that the association is operative more strongly through the admission rate than through duration of stay.

This discussant would have expected the exact opposite. It is not so much that "the disease mix is more heavily chronic" for the aged, but rather that they have a longer stay for almost every type of admission.

A greater impact of the proportion of aged is reported in 1960 than in 1950. This is not evident from Table 3. Notwithstanding, the conclusion may be correct. The interpretation offered is that with the dilution of the economic factor, physiological factors have come into play. It will be recalled, however, that health insurance is not dealt with. Another possibility is that the older aged (75 years and over), who use considerably more services than the younger aged (65-74), are becoming more prominent in the population.

None of the coefficients for the urban-rural variable is statistically significant. As for the interpretation of findings, it is doubtful that persons hospitalized in cities are sicker, except insofar as large cities may attract patients from more distant parts. Even so, such patients must be sufficiently hardy to survive travel. Other factors may be operative, such as the lower proportion of obstetrical (short-stay) patients in cities; the presence of major teaching hospitals, with attendant prolongation of stay; and the presence of long-term units in municipal general hospitals, designated or otherwise.

The findings concerning education and hospital use are tenuous. Their interpretation is necessarily speculative.

### Summary

In this paper Rosenthal has submitted early results of an improved statistical model of general hospital use. Since important variables are still not contained in the present model, reported findings are likely to be modified.

Some of the findings appear to be tenuous, and not able to support an elaborate structure of interpretation.

The implications drawn by the author are premature. An appraisal of the implications awaits the findings of more complete analyses.