



Cost-benefit analysis and health care planning : an application to rural hospital closures
by Steven Glenn Bender

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE
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Abstract:

The purpose of this thesis is to apply cost-benefit techniques to evaluate rural hospital closures. Data on hypothetical closures are examined to illustrate the relative importance of various types of benefits and costs. The distribution of benefits and costs that explain community support for hospitals is identified as an aid for public decision makers. The first chapter provides background and rationale for the research. The second and third chapters develop frameworks for evaluation closures. The fourth chapter presents the application of the framework to four hypothetical closures. The policy significance of the empirical results is discussed in the concluding chapter.

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A. B. Borden

Date

July 31, 1980

DEDICATION

This thesis is dedicated to my wife,
Cindy Bender.

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by

STEVEN GLENN BENDER

A thesis submitted in partial fulfillment
of the requirements for the degree

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Approved:

Jon B. Christianson by Larry Anderson
Chairperson, Graduate Committee

Bruce R. Beall
Head, Major Department

Michael Halse
Graduate Dean

MONTANA STATE UNIVERSITY
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ABSTRACT

The purpose of this thesis is to apply cost-benefit techniques to evaluate rural hospital closures. Data on hypothetical closures are examined to illustrate the relative importance of various types of benefits and costs. The distribution of benefits and costs that explain community support for hospitals is identified as an aid for public decision makers. The first chapter provides background and rationale for the research. The second and third chapters develop frameworks for evaluation closures. The fourth chapter presents the application of the framework to four hypothetical closures. The policy significance of the empirical results is discussed in the concluding chapter.

Chapter I

PURPOSE OF STUDY

The purpose of this study is to apply benefit-cost techniques to evaluate rural hospital closures. Data on hypothetical closures will be examined to illustrate the relative importance of various types of benefits and costs. The distribution of benefits and costs that explain community support for hospitals will be identified as an aid for public decisionmakers.

The purpose of this chapter is to define the problems faced by rural hospitals that contribute to closures. The second chapter develops a formal framework for assessing hospital closures. The next chapter discusses the simplifying assumptions necessary to make an assessment of benefits and costs practical. This model, with its simplifying assumptions, is applied to four hypothetical cases in Chapter 4. The policy implications and a summary of the theoretical and empirical results are in the concluding chapter.

BACKGROUND

Hospital cost inflation is a problem receiving much attention in the United States. The hospital price index increased 352 percent from 1960 to 1974, compared with a 167 percent increase in the consumer price index for the same period. Hospital expenditures increased by 500 percent per capita during this same period. Not only

is the absolute size of expenditures for hospital care growing, but the total of all health care expenditures as a proportion of gross national product (GNP) also is increasing. Between 1960 and 1974, the health care industry's proportion of GNP rose from 5.3 percent to 8.0 percent making health care industry the third largest in the United States.

Possible reasons for the rapid increase in hospital costs are abundant. Low occupancy rates indicating excess capacity is a major contributing factor. Excess capacity has been defined by McClure as "any hospital capacity which contributes unnecessarily to per capita health care expenditures, if alternative, less expensive medical (or non-medical) means exist to achieve equal levels of health" (McClure, p. 15). Under-utilized hospital capacity results from "capacity built, equipped and/or staffed to handle a volume of services in excess of its actual utilization" (McClure, p. 12). A rural hospital over-built for community needs would fall into this category. McClure (McClure, p. 12) argues that excess capacity may be in evidence even though the occupancy rate is high. That would be the case when less intensive alternative services than now being provided would have sufficed for adequate inpatient care.

Excess hospital capacity contributes to higher than necessary health care costs. Hospital costs are high since fixed costs of providing care are spread over relatively few patients. A more

subtle effect of excess capacity on hospital cost is the "Roemer effect," which states that empty beds induce utilization (Roemer, May). In this case, individuals are hospitalized when less intensive treatment would have sufficed.

Studies indicate that 5 to 10 percent of the licensed acute care beds are under-utilized (McClure, p. 19). Bennett and Sattler estimated a total of 68,887 under-utilized beds existed in 1975. This translates to 7.5 percent of the bed stock at that time, even allowing for different ideal occupancy rates for small hospitals (Bennett and Sattler cited in McClure, p. 70). The Bureau of Health Planning (HEW) estimated a gross surplus (corrected for under-supplied areas) of 83,217 beds for the same period (HEW cited in McClure, p. 19).

The Federal government has set guidelines for bed supply and utilization for the nation in an attempt to identify areas of excess capacity. The guidelines call for a maximum of four beds per 1000 population with an occupancy rate of 80 percent for short-term hospitals. This guideline compares with a supply of 4.5 beds per 1000 population and an average occupancy rate of approximately 76 percent in the nation in 1978.

A new planning and regulatory structure to implement these guidelines created 213 Health System Agencies (HSA's). HSA's are designed to work with existing state planning agencies to provide for public accountability and control of the local medical systems. They are

private, non-profit organizations consisting of professional staff, providers and consumers (Altman, p. 562). Each HSA is required to "review on a periodic basis, but at least every five years, all institutional health services offered in its health service area and make recommendations to the state agency . . . respecting the appropriateness in the area of such services" (Federal Register, p. 71769).

The HSA review process is concerned with existing institutional health services, with a goal of identifying areas or institutions with excess duplication of services (and areas with unmet needs). Health services that fall under the appropriateness review process include those provided through private and public hospitals, rehabilitation facilities, and nursing homes. Low occupancy hospitals will receive considerable attention because their occupancy rates are assumed to indicate excessive duplication and inefficiency in the delivery of hospital services. Furthermore, institution-specific findings are viewed as the most effective means of eliminating excess capacity (Federal Register, p. 71768). At the present, the health planning structure lacks an enforcement mechanism for institutions that are viewed to be inappropriate.

The Committee (Committee on Interstate and Foreign Commerce) has not required any sanction related to these reviews which would require that unneeded existing institutional health services be eliminated or closed. However, were a state to decide on its own initiative to create such a sanction, the Committee would of course have no objection to this. (Federal Register, p. 71754.)

While HSA's currently have no formal regulatory authority, a facility specific finding of inappropriateness would require a recommendation for remedial action. It also would attach a stigma to the facility, making it difficult for the hospital to attract staff and financing. Thus, HSAs have considerable de facto power to affect the closure of health care institutions through the appropriateness review mechanism.

Many rural hospitals would be subject to close scrutiny under a strict interpretation and enforcement of the guidelines. Rural hospitals are typically small and have relatively low occupancy rates (Michela, p. 1; Raatke and Nordblom, p. 1). These low occupancy rates suggest that some hospitals may come under pressure to close in order to bring the remaining facilities within the suggested guidelines.

The closure of rural hospitals is likely to be controversial and opposed by residents of rural areas. Hospitals in rural areas are a major source of employment, physicians and administrators are usually key community figures, and hospitals are monuments to civic pride (Altman, p. 575). Hospitals are also seen as a means to attract physicians to rural communities. The importance of rural hospitals to their communities is illustrated by the sheer volume of letters received by HEW in response to the Federal guidelines. Over 55,000 comments were received and about 80 percent of these were from persons who apparently lived in small towns and rural areas (Zwick, p. 412).

Health care planners will have to make decisions that alter the allocation of health care resources in the appropriateness review process. Cost-benefit analysis provides one framework for judging the appropriateness of a hospital. The application of this framework provides information that can guide what is essentially a political decision. Gainers and losers of a proposed closure can be identified in a benefit-cost framework and the magnitude of these effects calculated. Thus, the distribution of the resultant benefits and costs can be used to generate an understanding of the politics of rural hospitals.

Chapter 2

A COST-BENEFIT FRAMEWORK FOR EVALUATING RURAL HOSPITAL CLOSURES

General Introduction to Cost-Benefit Analysis

Cost-benefit analyses are used to evaluate public policy decisions concerning alternative use of resources. It is a systematic method of comparing the benefits and costs of alternative policies. Decisionmaking is aided because dollar values are assigned to alternative outcomes and these values identify the relevant policy issues.

Allocative efficiency is the explicit concern of cost-benefit analysis, but those who lose also can be identified. Haveman and Weisbrod (Haveman and Weisbrod, p. 39) define efficiency as follows:

Allocative efficiency as an economic goal reflects the fact it is sometimes possible to reallocate resources in ways which will bring about an increase in net value of output produced by those resources.

A policy is desirable by the efficiency criterion if the aggregate dollar value of the gains of a project outweigh the dollar value of the losses. Changes in the aggregate welfare of people are estimated by assigning dollar values to the aggregate gains and losses.¹

The distribution of benefits and costs is ignored by the allocative efficiency goal. A project may yield large benefits, but the gains and losses may be distributed very unequally. Thus, the distributional impacts contain important information for many studies even though it is not the direct concern of allocative efficiency.

The efficiency goal may be sacrificed in public policy decisions because of income distribution consequences.

Direct benefits of a policy or project have been defined as "an increased value of the output associated with a project" (Sassone and Schaffer, p. 37) or "additions to the real product of an economy" (Sassone and Schaffer, p. 32). Direct benefits can arise from greater physical production, changes in quality of a good or service, changes in spatial value, or changes in temporal value (Sassone and Schaffer, p. 37). The value of benefits is measured by willingness of consumers to pay for the outputs of the project. This in turn depends on consumer demand for the product.

The willingness to pay for a good is illustrated graphically in Figure 2-1. The demand curve, D_1 , is the quantities of a good that

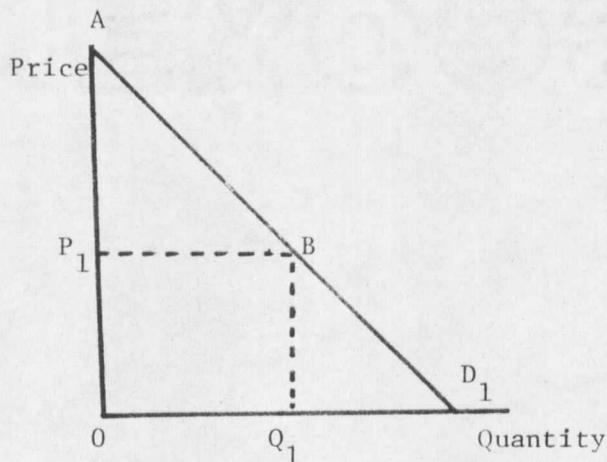


Figure 2-1. Demand for Good X

will be purchased at each price. At a price of P_1 , the quantity Q_1 will be purchased. The price P_1 is the willingness of consumers to pay for the additional unit Q_1 . The total amount payed for all units, OQ_1 is the area under the demand curve $OQ_1 B P_1$. However, consumers would have been willing to have paid a total of $OQ_1 B A$ for OQ_1 quantity.² This is the gross value of OQ_1 units of good X. Thus, consumers would have been willing to pay more for the good than they actually spent.

Indirect benefits "reflect the impact of the project on the rest of the economy" (Eckstein, p. 202). For example, an irrigation project may increase tractor sales and the income of implement dealers. Economic multipliers have been used to estimate these induced benefits. The indirect benefits included in a cost-benefit analysis depends upon the analyst's assumptions concerning the scope of the analysis and the nature of the economy. If labor is perfectly mobile and fully employed, wage income is not included in national benefits. The labor used by the project will be drawn from other areas and the gains to one area are cancelled by losses to another. On the other hand, "if the objective of the project is regional development, or spatial redistribution of economic activity, then these indirect labor benefits may be real and important and should at least be identified" (Sassone and Schaffer, p. 40).

