VOLUNTARY GIVING FOR RURAL HEALTH CARE:

THE SWEET GRASS COUNTY

HEALTH CARE FOUNDATION

by

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This thesis is dedicated to my late husband, William J. Cremer, Jr. Although nearby hospital care did not make the difference between life and death for him, accident victims are among those for whom a short distance to medical help can be vital.

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ABSTRACT

The purpose of this thesis is to identify factors influencing community support for rural hospitals. Hospitals in rural areas are liable to experience unfavorable financial situations in the near future. Data from a specific fund drive were utilized to develop a model of voluntary giving that may be helpful in predicting the success or failure of other similar drives for the purpose of providing support to these hospitals. Results indicate that voluntary giving is consistent with economic utility maximization theory.

CHAPTER 1

INTRODUCTION

Many charities and foundations owe their existence, either partially or totally, to the donations of individuals who often seem to receive no direct benefits from their acts of giving. In Sweet Grass County, Montana, a group of residents initiated a fund drive in response to the local hospital's plea for financial help. The result of this drive is a new foundation with monies in excess of eight-hundred thousand dollars ($800,000.00). The income from the foundation's portfolio provides support for the hospital.

Economic models of human behavior often rely on the assumptions that man is rational and that rational man makes choices intended to maximize his utility. The fact that the donations to the foundation are voluntary implies that there are motives for giving that result in utility for the donor if these assumptions are correct. This study is intended to test hypotheses about motives for giving that are suggested by models of voluntary giving in economic literature. The data used in the analysis are specific to the donations to the Sweet Grass Health Care Foundation, but many of the hypotheses examined generalize to other fund drives. Other communities

with characteristics similar to those of Sweet Grass County may find the results herein useful in predicting the success of similar efforts.

The organization of this thesis is as follows. Chapter 2 contains a discussion of recent health economics that explains the current situation for Sweet Grass Community Hospital and others like it. Chapter 3 provides a review of the economic literature concerning option prices and models of voluntary giving. In Chapter 4, a formal utility maximization model is presented, and hypotheses about household characteristics are developed through the use of comparative static analysis. Descriptions of the data and sampling procedures used in the study appear in Chapter 5, as well as development of the variables for the model. Chapter 6 describes the estimation procedures and the presents results. Chapter 7 contains a summary and conclusions about the study.

CHAPTER 2

RECENT HEALTH ECONOMICS AND RURAL HOSPITALS

The current problems in hospital finance and management stem to a large degree from the substantial changes in the economics of the health care industry that occurred in the late 1970's and early 1980's. A brief review of recent history of health economics provides an understanding of the events that precipitated these changes.

Although prepayment systems had been introduced before World War II, health insurance coverage in the United States was still not widespread in the mid 1940's. Millions of soldiers, however, had been recipients of relatively comprehensive treatment in the medical system of the U.S. armed services. They had experienced the expertise of the medical community and had come to expect much more from private health care providers than they had before the war. These changes in expectations spread to friends and families, resulting in a rapid increase in the demand for health insurance to assure financial access to such care.

Tax incentives that allowed employers to provide health insurance to employees as a deductible expense with no tax liability to the employee encouraged the provision of such

insurance as a fringe benefit. More and more of the nation's workers found themselves covered by private insurance or prepayment systems. Concerns that the unemployed and the retired were being inequitably treated because they could not afford similar coverage finally prompted the passage of Medicare/Medicaid legislation in the mid 1960's as part of Lyndon B. Johnson's Great Society initiatives. The implications of this policy innovation for health care expenditures in an aging society is especially important when one realizes that one third of all health care in this country is devoted to persons over the age of 65. (Fuchs, 1986)

Third party payment systems effectively removed the income constraint from the individual's ability to acquire health care. No longer did the payment for treatment come directly from the consumer's pocket. In 1980 only 9.1 percent of total outlay for hospital care came directly from the consumer (Ginzberg, 1985), contrasted with 56.3 percent in 1950 (Bronzino et al, 1990). The result was an increase in the demand for all types of health care.

The Hill-Burton Act of 1946 provided access to federal funds for the construction of hospitals where previously none had existed, especially in rural areas. Subsidies through this Act to large teaching hospitals in the field of biomedical research led to expansion in the numbers of medical

students and technological advancements. Allowances for depreciation as a legitimate cost of operation both for tax purposes and for cost-calculated reimbursement made capital purchases more attractive to hospital management. Not surprisingly, hospitals grew in size and scope of treatment. The nonprofit status of many hospitals created an environment in which competition was manifested in the quantity and quality of treatments available. The possession of the latest in technological advancements attracted the physicians who have the authority to admit patients.

The growth rate for health care expenditures exceeded that of the general economy for more than three decades. In 1950 health care expenditures were slightly over 4 percent of GNP; in 1983, they accounted for nearly 11 percent (Bronzino et al, 1990). This change in the share of GNP is attributed to increases in inputs and in price increases of those inputs (Ginzberg, 1986). The relatively rapid rate of increase in health care expenditures has prompted policy makers to consider ways to slow the growth rate. The late 1970's and the 1980's saw changes in the Medicare\Medicaid regulations designed to lower total government outlay for health care and, with the implementation in 1984 of the Diagnosis Related Group (DRG) system of reimbursement, to provide incentive for health care providers to lower costs.

The private insurance sector has also felt the effects of the rising costs of care. Its response has been to increase premiums and copayment schedules. This has resulted in an increasing burden on both employers and employees who participate in third party insurance contracts. Provision of health insurance has become an inherent part of the employment contract, yet the ability to afford the rising premiums is shrinking. Private insurance providers are under pressure to either lower or cap premiums, or risk losing huge customer groups. To do this, they have to reduce outlays in some way; one way is to encourage providers to reduce costs and charges.

In the search for solutions to the problems in health care economics one goal involves a reduced inflow of real resources without an accompanying reduction in useful output that would lower the satisfaction and general health level of consumers. Ginzberg (1986) suggests some areas in which cost containment might be successful. These include eliminating resources for procedures of dubious value, reducing underutilized and duplicative services, and a more discriminating policy in relation to outlays for new technologies. Some experts target greater ambulatory care in place of hospital care and greater emphasis on preventative rather than curative care. Louise Russell (1986) cautions policy makers about the potential cost-savings of preventative

care; she points out that in a macro sense preventative care can lead to greater expenditures at little or no relative gain in the general health status of the population. However, it is likely that interest in these two areas of potential cost containment will adversely affect hospital income for the forseeable future.

The health care industry now finds itself under fire for the very things that, historically, it has been encouraged to do -- expand services and technologies. New policy initiatives by both private insurance companies and government reimbursement agencies tend to discourage consumers from utilizing health care services as heavily as in the past. In addition, hospitals that were built with the help of Hill-Burton funds are now being targeted as likely candidates for closure because of new beds-per-population guidelines. However, individuals and communities have developed expectations about health care that do not coincide with the goals of the new policies. Many communities are not willing to give up their hospitals without a struggle. Thus, some of these communities look to local government for financial help through tax increases that must be approved by the voting public (Fort, 1980). Others, such as Sweet Grass County, seek direct help from those private citizens and organizations

which are most likely to benefit from the continued existence of the facility.

The above discussion illustrates briefly the events that resulted in the present situation facing the administrators and board of directors of Sweet Grass Community Hospital. The following chapter presents a review of the literature concerning theories about the purchase of options and models developed to explain and predict the transfer of funds to charities and other organizations such as Sweet Grass Health Care Foundation.

CHAPTER 3

REVIEW OF THE LITERATURE

Option Price

The benefits from a hospital can be assessed in a simple expected value framework. Alternatively, the concept of option price can be used to illustrate why funds may be transferred for the purpose of ensuring access to those benefits. Burton Weisbrod (1964) introduced the concept of option price in the context of cost/benefit analysis. He used national parks to illustrate the concept, but mentioned hospitals and public transit systems as being other potential examples. For example, suppose administration officials are considering closing a hospital and selling the building and capital equipment. The building could be converted to rental space and the equipment sold to a hospital in another area. The labor force employed at the hospital would look for jobs elsewhere. The costs of keeping the hospital open necessarily include labor costs and benefits foregone from excluding the sale of the capital. Hospital benefits consist of the value placed on consumption of hospital services, including any consumer surplus enjoyed by patients and outpatients. However, many individuals do not consume hospital care during

any given time period but may demand such care at some future time. Even if they never actually enter the hospital, they place some value on its continued existence because they retain the option to consume hospital care. The price an individual is willing to pay to retain such an option is defined as the hospital's option price.

Weisbrod suggests that three conditions are necessary for the existence of an option price: 1) uncertainty of demand for the good in question, 2) uncertainty of supply of the good in question, and 3) the inability of the producers of the good to collect any more income from sale of the good. Given the nature of hospital care, for most individuals the first condition is fulfilled. Hospital care is consumed only when the physical condition of the individual requires it. The reduced revenues of many hospitals that have resulted from policy changes place the existence of these hospitals in jeopardy. This appears to take care of the second condition in regard to a specific hospital that is experiencing difficulty in meeting the costs of operation. The third condition holds under the regulation of hospital billing procedures by the administrators of Medicare/Medicaid policy.

The concept of option value is not without its critics. Long (1967) insisted that option value was nothing more than expected consumer surplus. That assertion led others to

attempt to separate option value from expected consumer surplus in such a way that option price less expected consumer surplus equals option value. This has become the standard definition of option value. Whether or not option value is unambiguously positive has been a subject of much controversy. Schmalansee and Bohm (1972) and Bishop (1982) agree that for uncertain demand conditions, option value may be either positive or negative. Bishop also considers the case of stochastic supply, where he finds that when demand and income are certain, consumer surplus underestimates total consumer benefits from maintaining the asset, making option value positive.

The controversy surrounding the concept of option price/option value includes a debate about which is the proper measure to use in estimating social benefits. However, the problem arises only in cases where these prices or values are being estimated. To quote Bishop, " On an empirical level, the primary contribution of literature reviewed here may not be option <u>value</u> at all, but option <u>price</u> (emphasis in original). Few would object to the assertion that if it could be measured, option price rather than projected consumer surplus is the correct measure of consumer welfare in cases involving considerable uncertainty" (1982). In the case of hospitals in general and of Sweet Grass Community Hospital in

particular, the funds contributed for the purpose of supplementing revenues to cover operating costs may be wholly or partially the price of the option to consume future care from that particular hospital.

It is also true, however, that individuals sometimes give their money to causes that are unrelated to any future possible demand by these individuals. The following section discusses models and empirical studies of voluntary giving that consider several different motives for giving. Chapter 4 provides the development of a model that incorporates these motives.

Voluntary Giving

There are two opposing schools of political thought about the rightful place of government in the provision of higher education, health care, public welfare, research, and the like. While some feel that the federal government should play a major role, others are convinced that private sources and local governments are the more appropriate providers. The subject of voluntary giving is of great interest to policy makers. What are the differences, if any, in the effects of one type of funding versus the other? Are voluntary funds

necessarily substitutes for government funds? What are the effects of tax policy on the total amounts of funds in the voluntary sector?

In his book Federal Tax Policy and Charitable Giving, Charles Clotfelter (1985) discusses a model of charitable giving. He identifies three possible motivations for this apparent contradiction of the traditional egoistic utility maximization model. Clotfelter suggests that "helping behavior" can stem from altruism, reciprocity, and/or the expectation of direct benefits. A contributor motivated by altruism has a utility function that is interdependent with the utility functions of others. An increase in utility for some other individual effects an increase in the donor's own utility. Social norms also provide an incentive to give in a way that mimics the interdependent utility function. The decision about whether or not to contribute to a cause is often based on the strength of the pressures brought about by solicitors. The greater the prestige of the solicitor and the stigma of refusal, the stronger is the pressure to give. Johnson (1973) notes that this pressure is stronger in smaller communities where each potential contributor is likely to be widely known among other residents; hence per capita contributions are higher in these communities. He also notes

that specific project may appeal to an individual; therefore its success adds to his/her utility.

Reciprocity as an incentive for charitable giving provides a kind of social insurance. Acts of giving have been documented since the beginning of recorded human history. Tribal giving was and is often based on the premise that to induce indebtedness produces a type of power over the recipient tribe. A return gift lessens or cancels the indebtedness factor. The contributor also may give to provide for someone else's needs in the hope that others will be similarly motivated later to provide for him. In addition, although religious motives may be rooted in altruism, Johnson (1973) includes a quote attributed to Aldous Huxley: "Charity is a peculiar species of fire insurance."

Those whose motivation for giving stems from the expectation of direct benefits look for personal gains that follow from their contributions. These benefits can take the form of increased social prestige, business profits, or other gains perceived by the donor. A purely selfish person may give in anticipation of such gains. The continued provision of some good that provides utility to the contributor is one such direct benefit from giving.

The price of giving is defined as the after-tax foregone consumption of other goods per dollar of giving -- the

marginal rate of substitution between giving and consuming other goods. Determining the actual price of giving for each individual often involves complicated computations of federal and state tax rates. In the US, as income rises, so does the tax rate, although new tax laws have decreased the price effect on the price of giving in the higher income brackets. Nonetheless, the incentive to acquire information about tax-related matters is stronger when income is higher. For this reason many people in the lower tax brackets are less likely to take the time to learn their actual price of giving. For those who are informed, the tax structure reinforces the income effects for normal goods. As income rises, the effective price of giving falls.

These motives present underlying reasons for specifying measureable factors that influence giving. Clotfelter mentions many relevant variables, such as age, marital status, wealth, education, number of dependents, past giving, and community characteristics. He also discusses the possible crowding out effect on giving by government spending. It has repercussions for those contributors motivated by interdependent utility functions. To the degree that other individuals' utilities are subsidized by the government, the donor's contributions would be reduced.

A sizeable body of empirical work exists on the question of how tax policy relates to charitable giving (Glenday et al, 1986; Feldstein, 1975; Kingma, 1989; Weisbrod and Dominguez, 1986; Steinberg, 1987). The results are somewhat varied, but a few tendencies emerge. Religious donations make up the majority of total donations and appear to be the least price and income elastic, changing little with changes in an individual's income or tax brackets in comparison with other deductible donations. The character of the donee seems to be an important factor in predicting which income groups will contribute. Institutions such as cultural, health, and educational organizations tend to receive a higher proportion of each donated dollar as the income of the donor rises. The price elasticity of giving tends to be greatest in absolute value in the higher tax brackets, probably resulting from the larger store of tax information within these income classes.

Beneficiaries of voluntary contributions can be charities that supply goods and services to the needy, firms that supply public goods, and/or nonprofit firms. The hospital in Sweet Grass county is a nonprofit hospital, and it provides services both to patients who are insured privately and those who are insured publicly through Medicare and Medicaid. Hospital closure would remove the supply of actual patient care and any expected benefits of those who may at some future time consume

its services. Before the establishment of the foundation, the hospital was able to collect only for overt consumption of patient care. Income from caring for patients was insufficient to cover the costs of their care. The foundation drive evolved as a method of collecting in part for the benefits that could be expected if hospital services were to be consumed at a future date. A household that is uncertain about its own future demand for hospital services places some value upon their provision through its donation.

Product quality and production efficiency can be very important variables both on the "extensive margin" -- the decision about whether or not to contribute, and on the "intensive margin" -- the decision about how much to contribute (Bergstrom et al, 1986). Rose-Ackerman (1987) has suggested that differences in quality preferences between managers and contributors can lead to less than optimal levels of fund-raising for a given cause. This is especially true with respect to no-strings-attached contributions that can be spent at the manager's discretion. The foundation campaign spurred a great deal of community interest in the management of the hospital and in the membership of the hospital board, giving credence to this theory. The existence and quality of emergency room services, nursing home care, and physician availability entered into the decisions of many of those who

were solicited. These services are perceived to depend on the existence of the hospital. The fund raising activities served to be an important source of information about the quality and extent of health care services in Sweet Grass County.

This chapter has examined literature that discusses possible motivations for voluntary giving. The next chapter develops a formal utility maximization model and hypotheses relative to that model about the response of the residents of Sweet Grass County to the likelihood that the local hospital would close. The result of that response is a foundation from which income is channelled to the hospital for the purpose of supplementing its income.

CHAPTER 4

THEORY and HYPOTHESES

Theory

Utility theory rests on the hypothesis of income constrained individual utility maximization. The following section introduces an individual utility function which is consistent with charitable behavior. The assumption that the first and second order conditions for a maximum of this function are satisfied yields testable implications about observed charitable giving behavior.

Assume a utility function for individual i such that

$$(1) \qquad U_i = U(x, z, U_j(z))$$

where x is the bundle of private goods consumed by individual i, z is the level of available hospital care, and $U_j(z)$ is the utility function of individual j with respect to z. The level of hospital care is defined as

$$(2) \qquad z = z_i + \Sigma z_j + g$$

where z_i is the contribution of individual i to the supply of the level of care, z_j is the sum of the contributions of all

other individuals, and g is some exogenous source of funding such as sale of a private good produced jointly with z or a government subsidy.

The utility function is assumed to be monotonically increasing in all its arguments and twice continuously differentiable. It is further assumed that $U_j(z)$ is separable from x and z, that is,

$$U_i = U(x,z) + U(U_j(z)). \tag{3}$$

The parameters of the model include the income level of the individual, denoted by y, the price of x, denoted by p, and g and z_j. The marginal utility of income in this model is positive if we assume nonsatiety in consumption because a larger income allows greater consumption of x.

The utility function is maximized subject to two constraints. The first is the budget constraint which is defined as

$$y = p^*x + z_i. \tag{4}$$

The second is the constraint created by the level of hospital care defined in (2). The problem can also be treated as one of unconstrained maximization if the constraints are

substituted directly back into the function for the appropriate arguments.

In order to keep the notation as simple as possible, in the utility function $U(U_j(z))$ is denoted as $h(z)$. Thus, substituting into the original function using Eqs. 3 and 4,

$$(5) \qquad U_i = U([y-z_i]/p,\ z_i+\Sigma z_j+g) + h(z_i+\Sigma z_j+g).$$

First order conditions require that

$$(6) \qquad \partial U/\partial zi = -(1/p)*u_x + u_z + h_z = 0$$

where u_k is the first partial derivative of U with respect to k, where k = x,z, and h_z is the first partial derivative of h(z). The second order conditions for optimization are

$$(7) \qquad \partial^2 U/\partial z_i^2 = (1/p*p)*u_{xx} + u_{zz} + h_{zz} - (1/p)*2_{xz} < 0.$$

The terms u_{xx}, u_{zz}, and h_{zz} are negative if an individual has diminishing marginal utility in each of the three arguments; that is, as consumption increases, the rate of increase in utility from consuming additional units of x, z, or h decreases. This assumption is a reasonable one; hence, the only condition of possible concern is the cross effect between

x and z, u_{xz}. Since x represents the individual's total private good consumption, it is also reasonable to assume that this cross effect is small. Consumption of z is likely to be a complement to some private goods such as health food and exercise equipment, a substitute for others such as ambulance insurance, and independent in consumption from most such as clothing or entertainment. Therefore it is likely that u_{xz} is small and the second order conditions are satisfied. This assumption permits the derivation of useful comparative statics results.

Comparative Statics

The change in individual i's donation with respect to a change in his income level is given by the following equation

$$(8) \qquad \frac{\partial z_i}{\partial y} = -\frac{(1/p)*u_{xz} - (1/p^2)*u_{xx}}{(1/p^2)*u_{xx} + u_{zz} + h_{zz} - (2/p)*u_{xz}}$$

The second order conditions imply that the denominator of this expression is negative. Thus, the sign of the complete expression depends upon the sign of the numerator. When g and z_j are exogenous, z_i is such that an increase in z_i causes an increase in z. If z is a normal good, we expect the income effect to be positive. In order for this assumption to be

true the numerator must be positive, which always occurs when $u_{11} < 0$ and u_{12} is sufficiently small (or positive).

The change in i's donation with respect to a change in the level of g is given by the equation

$$(9) \qquad \frac{\partial z_i}{\partial g} = - \frac{u_{12} + h_{12} - (1/p) * u_{11}}{(1/p^2) * u_{11} + u_{12} + h_{12} - (2/p) * u_{11}}$$

Again the sign of the expression depends upon the sign of the numerator on the right hand side because, as shown above, the sign of the denominator is negative. From the definition of z (Eq.2) it follows that $\partial z_i/\partial g$ is negative. As others increase their donations or as g increases, the individual tends to provide less z_i, and we would expect the partial derivative $\partial z_i/\partial g$ to be negative also. The numerator must be negative for this to be true. This will occur under the condition that $u_{12} + h_{12} < 0$, which is implied by the assumptions that each is negative, and u_{12} is small or positive.

The comparative static result for a change in donation z_i with respect to a change in the level of the donations of others, Σz_j, is identical to (9) since, mathematically, g and Σz_j play the same role. These effects suggest that the individual's donation, the donations of others, and the

exogenous source g are all perfect substitutes for one another in the provision of z. Empirical support for this hypothesis has been provided by Roberts (1984).

Suppose that a parameter theta, θ, exists such that a change in θ effects a change in marginal utility with respect to z. This parameter is defined by the conditions in Eqs. (10) and (11):

$$(10) \qquad \partial^2 U/\partial z \partial \theta > 0 \quad \text{and}$$

$$(11) \qquad \partial^2 U/\partial x \partial \theta = 0 \; ; \quad \partial^2 U/\partial h \partial \theta = 0.$$

A change in θ effects an individual's marginal utility from the consumption of z, but not his marginal utility from consumption of either x or h. These conditions imply that

$$(12) \qquad \frac{\partial z_i}{\partial \theta} = \frac{u_{z\theta}}{(1/p^2)\cdot u_{zz} + u_{zz} + h_{zz} - (2/p)\cdot u_{zz}} > 0$$

If the elements of θ can be identified, then it is possible to make predictions about the change in z_i with respect to the changes in θ. It remains to select elements for θ and to test the hypotheses associated with these elements. The following section suggests such elements.

Hypotheses

For the individual living in or around Sweet Grass County, the availability of hospital care is a source of utility, z. This good is produced jointly with patient care currently consumed by individuals admitted to the hospital. The income derived from patient care has been the major source of support for the hospital since its construction in 1953. Between 1953 and 1988 modest donations and memorials were made from time to time, but they were not substantial.

For the reasons discussed in Chapter 2, increasing costs and dwindling income created a financial crisis that threatened the survival of the hospital and the availability of hospital care. Hospital closure would result in the cessation of current patient care and would remove any expected benefits that would accrue to future care of any and all residents. In the previous section it was suggested that there exists a parameter or set of parameters, θ, such that the utility of the individual with respect to the availability of hospital care is affected by its elements. The change in the individual household's donation level with respect to a change in exogenous supply is clearly negative; that is, a decrease in exogenous supply causes an increase in household

donations. It remains to identify the elements of θ that affect the level of giving for those households.

The greater the probability that a member of the household will consume hospital care, the more beneficial is hospital care availability to that household. Identification of the household characteristics that influence its benefits may be helpful in predicting how much that household would be willing to pay to ensure that hospital care is available. These characteristics are elements in the parameter set discussed above. With regard to a particular health care facility these household characteristics might be expected to include:

1) Access to the facility in question
2) Distance to an alternate facility
3) Satisfaction with the provider(s) at the facility
4) History of illness in the household
5) Risk of accidental injury
6) Household size
7) Age of household members

The models of voluntary giving discussed in Chapter 3 indicate that in some cases an individual's utility may be interdependent with the utility of others. It seems reasonable to assume that, typically, the closer the

relationship between individuals, the stronger the interdependence. For these individuals, the availability of health care to others is an important factor in their estimation of its value to them. "Altruistic" benefits seem likely to be greater to those who have extended family in the area served by the health care facility. However, absence of such family does not rule out altruism in an individual's decision to support the foundation. Upbringing, religious training, and feelings of empathy for others tend to motivate altruistic actions intended to benefit everyone.

The more commonly assumed economic motive of profit maximization also affects an individual's contribution decision. For those who own businesses for which the area's residents are the principal clients or customers, a donation may represent advertising. Concern about the economic health of the community may prompt a positive donation, although there is a strong free rider incentive to let others keep the hospital a viable employer. Greater profits imply an increase in utility through positive marginal utility of income as discussed in the previous section.

Finally, income strongly influences the ability of a household to give to the foundation. For a given household size, the budget constraint allows those with higher incomes to make larger contributions if they so choose. As the number

of household members increases, the per capita income for any given income level falls and the ability to make a large contribution decreases.

In this chapter a model of utility maximization yielding testable hypotheses was developed. The next chapter discusses the data and the development of variables indicated by the above theory and hypotheses.

CHAPTER 5

DATA AND VARIABLES

The Data

Sweet Grass County, Montana, is a rural community with approximately 3300 residents. More than half the population resides in Big Timber, the county's only town. The board of the local hospital arranged for a survey to be answered by these residents in order to ascertain support for the facility. Armed with the results of this survey (MontanaAHEC, 1988), the board hired a professional fund raiser to conduct a drive to establish a foundation. Funds from this foundation would be used to help the hospital to cover its operation costs.

The fund raiser organized a team of twenty-three people considered by hospital board members to be influential in the county. The community was divided into perceived income and/or wealth groups, and each team member was asked to contact one group of people. Virtually everyone, whether a permanent or part-time resident, who was viewed as capable of contributing financial assets or influencing others who could make a substantial contribution, was contacted in person by a team member. A network to contact all the remaining members of the community was later organized. During the last few

days of the drive, volunteers used telephones to reach anyone who had not previously been contacted. In addition, the local newspaper included pledge forms once each week during the drive. It is unlikely that many people having anything at all to do with Sweet Grass County during this time were unaware that the drive was being conducted. Given the general availability of information about the drive, it is reasonable to assume that each household made a conscious decision to make either a positive or zero contribution to the fund.

Social pressures that encouraged county residents to avoid being free riders stemmed from two sources. First, the composition of the fund drive team was designed to create such pressure. Second, the names of contributors who gave five hundred dollars or more were published in the local newspaper. Johnson notes that "the individual living in a small community who attempts a free ride on the charitable contributions of others will be confronted with higher social pressures than one living in a large community" (1973). The structure of the drive was such that an individual's failure to make a substantial donation became public knowledge by the absence of his name on the donor's list in the newspaper.

The data set is the resident population of Sweet Grass County. A survey questionnaire about household characteristics (Appendix A) was sent to all the individuals,

families, and commercial businesses for whom/which there was a pledge card or record in the files of the Sweet Grass County Health Care Foundation. Unless there was a clerical error during the drive, this includes all the donations that occurred before the drive officially concluded. There were 586 such entries in the records. Some donations were given by organizations such as churches and garden clubs. These groups were not included because our interest is in household behavior. Ten contributors have died since the drive ended and current addresses could not be found for another two. For these reasons, questionnaires were sent to 547 households and businesses. A total of 310 replies produced 268 questionnaires that were complete and 30 more that included answers to all but the question about annual income.

Survey Questionnaire

The questionnaire presented in Appendix A was designed to gather factual information concerning three possible motives for giving to the foundation that are suggested by the model. The first of these motives is altruism (see, for example, Clotfelter, 1985; Posnett and Sandler, 1986; Collard, 1978). Altruism is defined in this context as the interdependence of an individual's utility function with those of others. Physical proximity to the hospital is necessary for the

effective demand for the care from that facility to exist. For those contributors who indicated that they do not reside in the county for any part of the year[1], the motive is probably altruism. The first question in the questionnaire was intended to include nonresidents who may have had reason to hear about and donate to the foundation. Reasons could include nostalgia of past residents, or friends and relatives living in the county.

One proxy for an apparently altruistic argument in an individual's utility function is the overt act of past generosity to other charities from which the individual is unlikely to receive direct personal benefits (Clotfelter, 1985). Questions two and three in the questionnaire ask about past giving of money and/or time. It is expected that a positive response to the questions would indicate altruism and thus a positive effect in the individual's level of giving. Questions four and five concern participation in a religious group or charity. The Judeo-Christian ethic that pervades the religious environment in Sweet Grass County stresses the need to be concerned about the welfare of others. Active religious

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[1]. Of those contributors who responded to the questionnaire all but nine were permanent or part-time residents of Sweet Grass County. Thus the variation in this variable is so minimal that it was excluded from estimations in this study.

participation or contributions could indicate such a tendency. Direct spiritual benefits could also be the goal of a contributor who gives for others' sake, but separation of this motive from altruism is impossible. It is expected that affirmative answers to these questions would be indicative of higher levels of household giving.

The expectation of direct economic benefits comprises the second possible motive. Question six inquires about ownership in a commercial business that is not a ranch or farm. Given the publication of donor names in the local paper, a generous donation affords a form of advertising for the business at no extra cost beyond the donation itself. Moreover, in a community as small as Sweet Grass County, the loss of the hospital as an employer would have repercussions on the local economy. Real estate agents note that health care facilities are seen as an important factor in attracting prospective residents. Business owners may see the survival of the hospital as important to their economic profits. Ownership of a business is therefore expected to affect the level of giving in a positive direction. Question nine, which asks whether or not the household's primary income earner is self-employed, is intended to include those professionals such as lawyers and physicians who do not consider themselves to be business

owners, per se, but nevertheless would benefit from a positive donation for the same reasons as the business owner.

The third motive is the expectation of direct health benefits. Replies to the remaining questions provide information about the household's effective demand for hospital care. Those individuals who face a high risk of ill health or accidental injury are expected to have a greater demand for the availability of hospital care. A history of health problems (Question sixteen) or employment in the fields of agriculture or forestry (Question eight) are evidence of high risks. Increases in distance from other hospitals or emergency facilities (Questions eighteen and nineteen) increase the risk of higher physical costs from illness or injury due to the increased time required to obtain treatment and the increase in the travel cost component of health care expenditures if use of these other facilities were to become necessary. The farther away the alternative facility, the greater the demand for the local hospital is likely to be. The households's level of giving is expected to rise with a history of serious illness in the family, with employment in a high risk industry, and with increasing distance from an alternative facility.

In Chapter 4 the list of probable parameters which affect an individual's utility from the availability of hospital care

included satisfaction with the health care providers at the specific facility. Question seventeen, which concerns usage of the hospital and the medical clinic is intended to provide information about the contributor's satisfaction. It is expected that the household's level of giving for the availability of hospital care would rise with increasing use of the health care facilities. Unfortunately, since hospital and clinic use also depend on the state of the individual's health, the answer to this question provides a proxy that is not specific in information about provider satisfaction.

Certain household characteristics are also expected to affect donations. Those mentioned repeatedly by the professional fund raisers were the presence of children in the household and extended family such as grandchildren and/or older parents in the area. In Sweet Grass County the continued existence of the hospital affects to some degree the viability of the medical clinic and the nursing home because these facilities require resident physicians. The number of people in the household could have a dual and contradictory effect on the level of giving. As household size increases, so does the likelihood that at least one of the household members will consume hospital care. The result is a greater effective demand for the availability of hospital care and a higher level of giving. However, given a fixed household

income level, per capita income falls as household size increases. This income effect on the level of giving would be expected to be negative.

The age of the individual is seen by some (Kingma, 1989, Weisbrod and Dominguez, 1986, and Glenday et al, 1986) to be an indicator of his level of giving. The older the prospective donor, the more likely is that individual to contribute positively.

Finally the level of household income is an important factor in determining the level of giving. As income rises, so does the ability to give, and the expectation of a higher level of giving follows. This effect is compounded by the fact that the price of giving falls as income rises due to the income tax structure.

A fourth motive likely to be affecting an individual's donation is social status. In a community drive for a project such as this, the goodwill generated by doing one's "fair share" (Margolis, 1982) is a direct benefit worthy of notice. It is akin to advertising benefits noted above that accrue to business owners, but it relates to social, not business, profits. Unfortunately it is very difficult to obtain factual information that would indicate the sensitivity of the individual to this motive. For the purposes of this thesis, therefore, it is assumed that the social pressures to donate

are distributed equally across all residents. A topic for further research might be the estimation of the explanatory power of different types of social pressures across fund drives.

The information from the questionnaire allowed the development of the dependent variable and fourteen independent variables. A list containing definitions of these variables is presented in Table 1. Further explanation is needed for some of the variables listed. The self-employment variable PSE has a unit value if the respondent is self-employed but does not work in an agricultural or forestry occupation. The variable INCD was included in the estimation procedures to enable the use of thirty observations which gave otherwise full information but excluded information about income. The class variables, VIS and INC, were entered as continuous variables. The rationale is provided by a result developed by Aigner and others. "In a linear regression contest, the pseudo-specification error one commits when a continuous independent variable is categorized and the true model is linear does not appear to be very serious in the uniform, normal and beta cases for even a modest number of intervals.."(Aigner et al, 1975).

The above discussion describes the data population, the method of sampling, and the variables developed from the

sample. Chapter 6 discusses estimation procedures and problems, concluding with the results.

CHAPTER 6

ESTIMATION PROCEDURES AND RESULTS

Limited dependent variable models are of two types. In both cases the dependent variable is observed only beyond some limiting value. When the independent variables are observed for both limit and nonlimit values of the dependent variable the model is called a censored regression model. A truncated regression model, however, is further complicated by the absence of observations on the independent variables whenever the dependent variable is at the limit value.

The objective of this thesis is to test hypotheses about the nature of the relationship between the dependent variable y (the amount of a household's donation to the S.G. Health Care Foundation) and a vector X of independent variables (household characteristics such as household size, income, employment field). The data from the Sweet Grass Health Care Foundation includes observations on the independent variables only when the value of the dependent variable is greater than zero. This sample selectivity results in a regression model that is truncated at zero. The effect of this truncation is that OLS yields biased estimates of parameter coefficients for the total population (Maddala, 1983).

Maximum likelihood methods represent the appropriate estimation procedures for this model. The density function of a truncated dependent variable y_i is given by

$$(13) \qquad f(y_i) = \frac{(1/\sigma)\,\phi[(y_i - \beta' x_i)/\sigma]}{\Phi(-\beta' x_i/\sigma)} \quad \text{if } y_i > 0$$

$$fy_i = 0 \qquad \text{otherwise}$$

where ϕ is the density function and Φ is the distribution function of the standard normal. The log-likelihood function for the truncated model is

$$(14) \qquad \log L = -N \log[(2\pi)^{\frac{1}{2}}\sigma] - \tfrac{1}{2}\Sigma(y_i - \beta' x_i/\sigma)^2 - \Sigma \log \Phi\left(\frac{-\beta' x_i}{\sigma}\right)$$

The maximum likelihood function estimation procedure depends on the assumption that the disturbance term is distributed normally. If this assumption is valid, then the likelihood function is globally concave, justifying the use of inconsistent OLS estimators as the starting values for the ML procedure.

LIMDEP is a set of software programs designed by Greene to estimate coefficients in models which have limited dependent variables. Preliminary estimations using this software package proved unsatisfactory. Both the LIMDEP truncation procedure and the LIMDEP sample selection with incidental truncation procedure were attempted. However in each case one or both of the following estimation problems occurred. Either the Hessian matrices became singular during iterations or convergence did not occur. Utilization of different algothrithmic procedures[1] to identify the maximum of the likelihood function also failed to provide a solution to the problem. New starting values computed from Weighted Least Squares (WLS) to correct for heteroskedasticity in the data produced no better results. In a personal communication, Greene suggested that convergence failure probably occurred

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[1] The algorithms available in the software programs included in LIMDEP are the following:

1. Newton: $b_t = b_{t-1} - H_{t-1} * g_{t-1}$
2. BHHH: $b_t = b_{t-1} - \lambda_{t-1} * H_{t-1} * g_{t-1}$
3. DFP: $b_t = b_{t-1} - \lambda_{t-1} * H_{t-1} * g_{t-1}$
4. Steepest Descent: $b_t = b_{t-1} - \lambda_{t-1} * g_{t-1}$

where H is an estimate of the variance matrix of the coefficient estimates or the inverse of the Hessians, g is the gradient, and λ is the step length found by the line search. The number of the iteration is denoted by t; t-1 implies the value computed at the previous iteration. (LIMDEP: Greene, 1989)

because of the range of the dependent variable. However transformations of the dependent variable to reduce its range also proved unsuccessful. Following Greene's suggestion, only OLS procedures were used to estimate the parameters of the model.

Estimation using OLS procedures reduces the scope of information provided by the analysis. It is no longer appropriate to interpret the estimated regression as a model to explain and predict charitable giving across the entire population (which includes both contributors and noncontributors). In this context, coefficients estimated by OLS generally are biased toward zero. The information provided by the OLS model concerns only the level of giving among the subpopulation of those who chose to contribute to the foundation fund.

OLS Procedures

The rationale for and descriptions of the explanatory variables were presented in the previous chapter. These variables and their definitions appear in Table 1. In the initial model estimated using OLS, the level of a household's donation (Y) was assumed to be a linear function of all the explanatory variables in Table 1, including ALT1, ALT2, BUS, AFI, PSE, FAM, HLD, NCH, AGE, HIS, VIS, DIS, INC, AND INCD.

Numerous alternative models utilizing different functional forms and combinations of the above variables also were estimated. In general a linear function appeared to perform as well as any other functional form.

Heteroskedasticity pervaded all of the estimated models. Tests for heteroskedasticity[3] were performed and in all cases led to rejection of the null hypothesis of no heteroskedasticity at the 5% level of significance. When heteroskedasticity is present the OLS assumption of constant variance in the disturbances is violated. The resulting estimated standard error is biased and inconsistent, and t-statistics for the model are biased unless a correction to the data is made. This correction can be accomplished by estimating the variance of each disturbance term and dividing the observations on each variable (including the constant term and the dependent variable) by the square root of the estimated variance for each observation. Such a transformation of the data allots greater "weight" to observations that have smaller variances. Accordingly, an

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[3] Tests for heteroskedasticity in SHAZAM include the following regressions:

i.	e**2 on yhat	
ii.	e**2 on yhat**2	
iii.	e**2 on log(yhat**2)	
iv.	e**2 on X	(Breusch-Goldfeld-Pagan test)
v.	e** on lag(e**2)	(ARCH test)
vi.	log(e**2) on X	(Harvey test)
vii.	abs(e) on X	(Glejser test)

attempt was made to ascertain the source of the heteroskedasticity so that the appropriate disturbance model could be estimated.

For each model that was estimated the residuals (e) were saved for further analysis. Plots of the residuals indicated quadratic relationships between the residuals and INC and between the residuals and the predicted values of the dependent variable (yhat) from each model. Intuitively the most likely source of heteroskedasticity seems to be the income variable. However, for each model regressions of absolute values of the residuals on predicted values for the dependent variable (yhat) and the squares of predicted values (yhat-squared) explained the variation in the residuals somewhat better than did regressions of absolute values of the residuals on INC and INC-squared. R-squared values for the former were higher than those for the latter in every case. This result indicates that there may be several sources of heteroskedasticity.

For each residual estimation model, predicted values were obtained. Predicted values from the regression of the OLS residuals on yhat and yhat-squared model are denoted by rhat; those from the regression of the OLS residuals on INC and INC-squared are denoted by ehat. The inverses of these values were used as weights to adjust the data for heteroskedasticity

in separate WLS models of the donation amount for each OLS model that was estimated. Thus each model estimated with the donation amount as the left-hand side variable is estimated in three ways: 1) the unadjusted OLS model, 2) a model adjusted by multiplying the left-hand side and the right-hand side of the equation to be estimated by the inverse of the relevant ehat, and 3) a model adjusted by multiplying the left-and right-hand sides of the equation to be estimated by the inverse of the relevant rhat.

Results from two of the regression models estimated are discussed in detail below. The most general model included all of the independent variables listed in Table 1. A more parsimonious model includes only the variables that were robust (with the exception of INCD which was included in all of the models to allow inclusion of observations in which INC was missing but which otherwise had full information) in all the regression models. The reduced model was estimated as a linear function and included BUS, AFI, PSE, HLD, NCH, INC, and INCD as explanatory variables. Table 2 lists the estimated coefficients for each variable from the general model unadjusted for heteroskedasticity and for both corrections of the general model. Similar results are presented for the reduced model in Table 3. Summary statistics for all the

variables are contained in Table 4, as are the F-statistics calculated for each unadjusted model for hypothesis tests.

Results of the General Model

Altruism as represented by the variable ALT1 (past giving history as suggested by Clotfelter) is insignificant in the model and thus appears to have no effect on a household's level of giving. The parameter for the alternative measure of altruism ALT2 (religious membership or contributions) also is insignificant in the model. These results indicate that religious participation by the contributors has no influence on the level of their donations to the foundation. However, by themselves, they do not imply that altruism has no effect on the decision about whether or not to give. As discussed above, the results of this study are relevant only to households that had already decided to give a positive donation, and results can only be interpreted in that context.

Donation levels are positively related to ownership of a nonagricultural business. The variable BUS (indicating ownership) was significant at the 99% confidence level in all three versions of the model. This variable represents the expectation of income gains, either through the continued survival of the hospital as a viable business or the advertising afforded by the publication of the business

owner's name in the list of contributors. The variable PSE (indicating self-employment as specified in Table 1) is also significant at the 99% confidence level and appears to have a positive effect on donation levels. This result implies that those professionals represented by the variable PSE also expect direct economic benefits to follow from their contribution.

The parameter associated with AFI, which is an indicator of employment in agriculture or forestry, was significant at the 99% confidence level. AFI was intended to be a measure of the risk-status of the individual with regard to accidental injury. However, its explanatory power when contrasted with that of other measures of health risk suggests that other information might be contained in the variable. Given the large number of ranches in Sweet Grass County one explanation is that most of the unit values for AFI indicate ranch owners. Ranch property and capital represent a measure of wealth that may be positively related to a household's ability to give in much the same way as income.

Other variables measuring health risks were HIS (history of family health problems) and DIS (maximum distance to nearest alternative hospital). The parameters associated with these variables were insignificant in the unadjusted model, although that associated with DIS was significant at the 95%

confidence level when the data were adjusted for heteroskedasticity using the inverse of rhat. However, on balance, this result was not robust to model specification, and health risk measures do not appear to have an appreciable influence on household giving. It is important, however, to remember that these results are not applicable to the decision about whether or not to give at all, but only to the level of the donation of those who have decided to give.

Many families have lived in Sweet Grass County for several generations. The variable FAM indicates extended family in the area, and is intended to test the importance of having extended family who might require the hospital's services. Although FAM was insignificant at the 95% confidence level and thus does not appear to be influential in determining donation level, again it may affect the decision about giving or not giving.

The presence of children in the household has a positive effect on the level of donation. The parameter associated with NCH (number of children in the household) is significant at the 99% confidence level in the unadjusted model and at the 95% confidence level in the adjusted models. Children tend to get infections and have accidents that require medical attention. This fact apparently motivates a higher level of

giving for the availability of hospital care and other services that may be dependent on it.

Kingma, (1989), and Glenday et al, (1986), point to the importance of increasing age as a predictor of charitable giving. The results of their empirical studies indicate a positive relationship with giving and age. However, advanced age and eligibility for Medicare do not appear to have influenced the level of giving in this case. The t-statistic for the parameter associated with AGE, which indicates the presence of household members at least sixty-five years old, is insignificant in the estimated models. This may not be the case in Sweet Grass County where many of the older residents are dependent on Social Security for their living expenses. However, the question of whether or not advanced age affects the decision about giving or not giving to the foundation cannot be addressed here.

The positive sign of the estimated parameter for INC indicates that the level of giving increases as household income increases. INC is significant at the 99% confidence level in all three versions of the model. Holding all other variables constant, households with higher incomes give larger amounts. This result is consistent with the literature in which the model defines the donation itself as a normal good (Kingma 1989, Steinberg 1987); in other words, the donation

itself enters the individual's utility function directly. Inherent in the income effect is the price effect relative to the price of giving. As income level rises, the price of giving falls because of tax effects.

For a given income level, however, the size of the donation decreases as the size of the household increases. The rationale is similar to that for INC. As household size increases, per capita income decreases for any given household income. Not only are fewer funds available for giving after living expenses are paid, but also for any given household income, the tax effect on price is weaker households with more exemptions to claim.

The missing INC observations did not appear to have affected the results. The dummy variable INCD indicating missing income level observations was significant only in the model in which the data were adjusted by ehat (the predicted residual from the regression of the residuals on INC and INC-squared) and only at the 90% level. The signs of the estimated coefficients for all the variables that were significant at the 95% confidence level were consistent with the hypotheses in Chapter Two. The insignificance of many of the variables included in the model in no way diminishes the possiblity of their influencing the extensive margin decision about giving or not giving to the foundation. The truncation

of the model introduces a bias of the OLS estimates towards zero and alters the validity of hypothesis-testing when applied to the total population.

Analysis of Results

Evidence from the OLS regressions reveals that the vector X of independent variables does not explain a high percentage of the variation in donation amounts. R-squared values of less than .25 indicate that much of the variation results from causes other than those examined in this study. However, this is not to say that no relationship exists between the donation level and the variables in X. An F-test of the null hypothesis of no relationship in the full model led to rejection of that hypothesis at the 99% confidence level. Tests based on the reduced model produced similar results. Additional hypothesis testing was conducted to ascertain the importance of the subset of variables excluded from the reduced model. The null hypothesis that the excluded variables produced no effect on the level of giving could not be rejected at the 95% confidence level. Computation of the F-statistics for the adjusted trials was not possible because of the nature of the software program. Shazam procedures require that trials be run with the constant term suppressed

when using Weighted Least Squares, resulting in an error sum of squares that is not well-defined.

This chapter has presented the econometric methodology and results of the study's testing of parameters that affected the level of positive donations to the Sweet Grass Health Care Foundation. A summary of and conclusions about the study appear in the next and final chapter.

CHAPTER 7

SUMMARY AND CONCLUSIONS

Summary

When federal regulations adversely affected revenues at the local hospital in Sweet Grass County, Montana, residents established a foundation fund to help the hospital meet its costs of operation. Although the incentive is strong to free ride on the contributions of others to assure the availability of hospital care, nearly six hundred households contributed in excess of eight hundred thousand dollars to this cause. The purpose of this study has been to test the explanatory power of certain variables thought to influence voluntary contributions to the fund.

Chapter 2 contains a short history of US government policy with respect to hospital funding and discusses the implications of recent policy changes for the financial viability of hospitals in rural areas. Chapter 3 provides a review of the literature on option pricing and voluntary giving in relation to incentives for private donations for the provision of access to health care. A theoretical utility maximization model of individual voluntary giving is presented in Chapter 4. In the model utility is a function of three

arguments: a Hicksian composite purely private commodity, the availability of hospital care to the individual, and the utility of others with respect to hospital care availability. Comparative static analysis was used to develop a set of hypotheses about various determinants of voluntary giving for hospital care availability.

The data and sampling methods used in this study are described in Chapter 5. The data population consists of all county residents, but only those who contributed to the foundation fund were surveyed by a questionnaire. Responses to the inquiries in the questionnaire provided information about those variables that are likely to influence charitable donations for the support of access to rural health care. Chapter 5 also describes the construction of the specific variables used in the empirical analysis of the determinants of charitable giving.

Estimation methods and results are presented and discussed in chapter 6. Sample selection bias in the data required the use of truncated regression model estimation procedures. Unfortunately, trials using maximum likelihood techniques to correct for the truncation across the population failed to provide estimates of model parameters. Thus ordinary least squares methods were used to obtain the results described in the chapter. The estimation models include three

groups of variables that affect an individual's utility. The first group contains two proxies for altruism. The second group consists of variables that indicate the potential for direct benefits to the individual in the form of increased consumption of other goods. The third group consists of variables that affect the benefits directly received or the costs directly incurred by the indidivual with respect to health care services. All variables that were significant at the 95% confidence level had estimated coefficients whose signs were consistent with the hypotheses developed in chapter 4 about their potential effects on levels of giving.

Conclusions

This study has examined the empirical determinants of giving in the context of charitable donations to a rural hospital. The sampling procedure, coupled with the convergence problems encountered in estimating truncated models, implies that the results of the analysis are relevant only to decisions by individuals about levels of giving once the decision to make any donation at all has been made. In this context, altruism variables had no effect on household donations. This finding is new. No previous study has explored the effects of altruism on levels of donations although Clotfelter has asserted that altruistic motives

should be important in the decision to make charitable contributions. No evidence for such an effect is found here, although it must be emphasized that this study's results shed no light on the determinants of the decision about whether or not to make any donation at all.

In common with other studies, this analysis showed that variables associated with the expectation of direct private economic benefits from giving (such as those associated with advertising) had a positive effect on levels of donations. Other things being equal, owners of commercial businesses and self-employed professionals were found to give more than others.

The ability to give also, as expected, positively affected donations. Households with higher incomes gave more while households with identical incomes but more members and lower per capita incomes gave less.

Mixed results were obtained with respect to variables that act as proxies for household health care benefits associated with better access to health care. Donation levels were positively associated with the number of children in the household (an indicator of need for basic and emergency health care). However, in contrast to other studies, no evidence of any age effect was found. Households with older members did not give more than those with younger members. Nor was there

any evidence that households in which one or more members suffered from or had a history of chronic health problems gave more than others. Distance from alternative sources of health care appeared to influence levels of giving in some models. However, this result was not robust with respect to model specification.

Finally, while employment in a high risk occupation significantly positively affected levels of giving, it is not clear whether risk itself was the detemining factor. The definition of the variable concerning high risk occupations included and was likely dominated by ranching and farming. In many cases, the ranchers and farmers owned the enterprises on which they worked. Thus this variable may really be a proxy for wealth rather than risk.

Voluntary giving appears to be consistent with utility maximization theory. None of the results of this study indicated any contradiction of hypotheses generated from the utility maximization model presented in Chapter 4. However, as noted above, there is no evidence to support the hypothesis that altruism affects levels of volutary donations.

This study has provided interesting insights about the determinants of voluntary donations. However, the analysis could be extended in several useful directions. Most obviously, the data set could be expanded to include

information about households that did not make donations to the foundation. The collection of such data would permit direct tests of hypotheses about the household's decision to make any donation at all. The role of altruism is of particular interest in this context.

A second extension of considerable interest would be a cross-sectional study of fund drives in different locations. The Sweet Grass County foundation drive was phenomenally successful. The drive received donations from over fifty percent of all households in the county at an average of over seventeen hundred dollars from each household that made a donation. Other drives in different regions have not had such spectacular results. A cross section analysis of the determinants of average giving levels might provide empirical tests of the strength of free rider and other effects on giving.

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APPENDICES

APPENDIX A

SWEET GRASS
HEALTH CARE FOUNDATION
SURVEY QUESTIONNAIRE

January 4, 1991

Montana Area Health Education Center
MSU Department of Agricultural Economics and Economics

All responses will be kept confidential

Cover Letter

Adequate health care in rural communities is of fundamental importance to those of us who live there. The role of the community itself can be pivotal in ensuring that facilities are available. The Department of Agricultural Economics and Economics at MSU is carrying out a study of that role and its importance. This survey is an important component of that study.

Sweet Grass County has been selected as the survey area because of the remarkable part played by the community in developing a foundation to support the work of Sweet Grass County Hospital in Big Timber. The results of the study, which is funded in part by the Area Health Education Center, will be used to provide other communities with an understanding of the potential role of the local community in the maintenance of rural health care systems.

The enclosed survey contains a wide range of questions. All responses will be treated as completely confidential. The number at the top of the questionnaire is coded only to identify donations, not individuals. You have already indicated your willingness to help by your contribution to the

foundation. We would very much appreciate your taking a few minutes to answer the following questions.

When you have completed the questionnaire, please put it in the enclosed stamped envelope and mail it by January 28,1991. Thank you.

Health Care Survey Questionnaire

1. Are you a permanent/part-time resident of Sweet Grass County or an adjacent county?

__yes __no

2. Have you made any donations over the past twelve months to national or other non-local charitable organizations, such as the American Heart Association, Boys Ranch, etc.?

__yes __no

3. Do you volunteer your time and talents to civic organizations or outreach groups such as a hospice?

__yes __no

4. Are you affiliated with any church or religious organization?

__yes __no

5. Do you donate time and/or money to a church or religious organization?

__yes __no

6. Do you wholly or partially own a business other than a ranch or farm in Sweet Grass County?

__yes __no

7. If you own such a business, did you donate to the Health Care Foundation as a business entity or as an individual/family?

__yes __no

8. Is agriculture or forestry a primary source of your household's income?

__yes __no

9. Is your household's primary income earner self-employed?

__yes __no

10. How many children do you have living in Sweet Grass County or the surrounding area for at least part of the year?

__yes __no

11. How many grandchildren do you have living in Sweet Grass County of surrounding area for at least part of the year?

__yes __no

12. Do you have parents or grandparents living in Sweet Grass County or a nearby area?

__yes __no

13. Do you have any other elderly relatives for whom you are responsible living in the area?

__yes __no

14. How many people live in your household?_____

15. How many of those people are in each of the following age ranges?

0- 5 years	_____
6-18 years	_____
19-35 years	_____
36-49 years	_____
50-65 years	_____
65+ years	_____

16. Do you or any other member of your household have a medical history of health problems such as heart disease, asthma, or other debilitating condition?

__yes __no

17. How many times have you or members of your household used the Sweet Grass Family Medicine hospital and/or clinic in the past twelve months?

__yes __no

18. What is the distance from your home to the nearest alternative hospital?_____

19. What is the distance from your place of work to the nearest alternative hospital?_____

20. Please indicate the income range that best describes your average household income over the past three years.

$0 - 4,999	___
$5,000 - 9,999	___
$10,000 - 14,999	___
$15,000 - 19,999	___
$20,000 - 24,999	___
$25,000 - 34,999	___
$35,000 - 49,999	___
$50,000 - 69,999	___
$70,000 - 100,000	___
$100,000+	___

APPENDIX B

TABLE 1.
VARIABLES AND DEFINITIONS

VARIABLE	DEFINITION
Y	donation amount expressed in thousands of dollars
ALT1	dummy variable with a value of one if the respondent has donated time or money to another secular charity
ALT2	dummy variable with a value of one if the respondent indicated religious membership or contributions
BUS	dummy variable with a value of one if the respondent has ownership in an area business that is not a farm or ranch
AFI	dummy variable with a value of one if the respondent indicated employment in agriculture or forestry
PSE	dummy variable with a value of one if the respondent indicated self-employment in a nonagricultural, nonforestry field
FAM	dummy variable with a value of one is the respondent has children, grandchildren, parents, grandparents or other older relatives living in the area but not in the household
HLD	continuous variable indicating the number of household members
NCH	continuous variable indicating the number of children eighteen years of age or younger in the household

Table 1., continued

VARIABLE	DEFINITION
AGE	dummy variable with a value of one indicating household members who are at least sixty-five years of age
HIS	dummy variable with a value of one if the respondent indicates a history of health problems in the household
VIS	class variable indicating usage of the hospital and the medical clinic[4]
DIS	continuous variable indicating the distance in miles to the nearest alternative hospital from the respondent's home or place of employment
INC	class variable (see footnote) indicating the level of household annual income measured in thousands of dollars
INCD	dummy variable with a value of one if the respondent failed to indicate an annual income level

[4] refer to discussion of result reached by Aigner et al(1975).

Table 2.
EMPIRICAL RESULTS
Estimated coefficients and t-statistics (in parentheses)
**indicates significance at 5% level; * at 10% level

	MODEL		
variable	basic model	adj/ehat	adj/rhat
ALT1	0.27771 (0.34832)	0.12171 (0.2889)	0.07721 (0.2728)
ALT2	-0.17938 (-0.2788)	0.13879 (0.3725)	0.16622 (0.6622)
BUS	1.6219 (2.7822)**	0.91124 (2.3169)**	0.90349 (2.6236)**
AFI	1.5002 (2.5659)**	0.78295 (2.1745)**	0.85992 (3.5736)**
PSE	1.6274 (2.8562)**	0.94704 (2.9233)**	0.62805 (2.4269)**
FAM	2.0071 (1.2353)	0.84835 (0.8358)	0.73318 (1.2787)
HLD	-1.4436 (-4.010)**	-0.59261 (-2.535)**	-0.36144 (-2.093)**
NCH	1.8240 (3.6322)**	0.67275 (1.9573)**	0.34025 (1.4317)*
AGE	0.62273 (1.9632)**	0.24055 (1.1429)	0.15091 (1.1697)
HIS	-0.60878 (-1.187)	-0.10603 (-0.333)	-0.19356 (-0.953)
VIS	0.05916 (0.8683)	-0.01221 (-0.294)	0.00232 (0.0842)
DIS	0.00196 (0.0984)	0.01245 (1.1357)	0.01182 (1.5570)*
INC	0.06808 (5.6891)**	0.07773 (5.0183)**	0.03090 (3.2089)**
INCD	0.26158 (0.3055)	0.64558 (1.5288)*	0.06759 (0.2110)

Table 3.
EMPIRICAL RESULTS
Estimated coefficients and t-statistics (in parentheses)

	MODEL		
variable	basic model	adj/ehat	adj/rhat
BUS	1.4970 (2.6096)**	0.7775 (2.1296)**	0.6756 (1.9382)**
AFI	1.2852 (2.3176)**	0.7117 (2.2781)**.	0.8808 (4.3338)**
PSE	1.6579 (2.9565)**	0.9696 (3.2390)**	0.7136 (2.8978)**
HLD	-1.2244 (-3.599)**	-0.4468 (-2.024)**	-0.3864 (-3.053)**
NCH	1.3987 (3.1812)**	0.3695 (1.2868)*	0.2809 (1.6863)**
INC	0.0664 (5.5946)**	0.0775 (5.0924)**	0.0383 (4.1763)**
INCD	0.3752 (0.4690)	0.5316 (1.5068)*	0.0451 (0.1676)

** indicates significance at the 5% level
* indicates significance at the 10% level

Table 4.
SUMMARY STATISTICS

var.	MEAN	ST.DEV.	MINIMUM	MAXIMUM
Y	1.7599	4.2202	.02	30.0
ALT1	0.9094	0.2875	0	1
ALT2	0.8524	0.3553	0	1
BUS	0.2383	0.4267	0	1
AFI	0.2852	0.4523	0	1
PSE	0.3121	0.4641	0	1
FAM	0.9799	0.1407	0	1
HLD	2.3591	1.3008	0	8
NCH	0.5705	0.9899	0	4
AGE	0.4899	0.5007	0	1
HIS	0.3188	0.4668	0	1
VIS	4.0336	3.7072	0	10
DIS	35.701	12.448	0	90
INC	23.446	20.724	1	100
INCD	0.1040	0.3058	0	1

	General model	Reduced model
R-squared	0.2275	0.2073
R-squared adj.	0.1893	0.1882
F-statistic	6.4398	12.640
Number of obs.	298	298
Degrees of freedom	283	290