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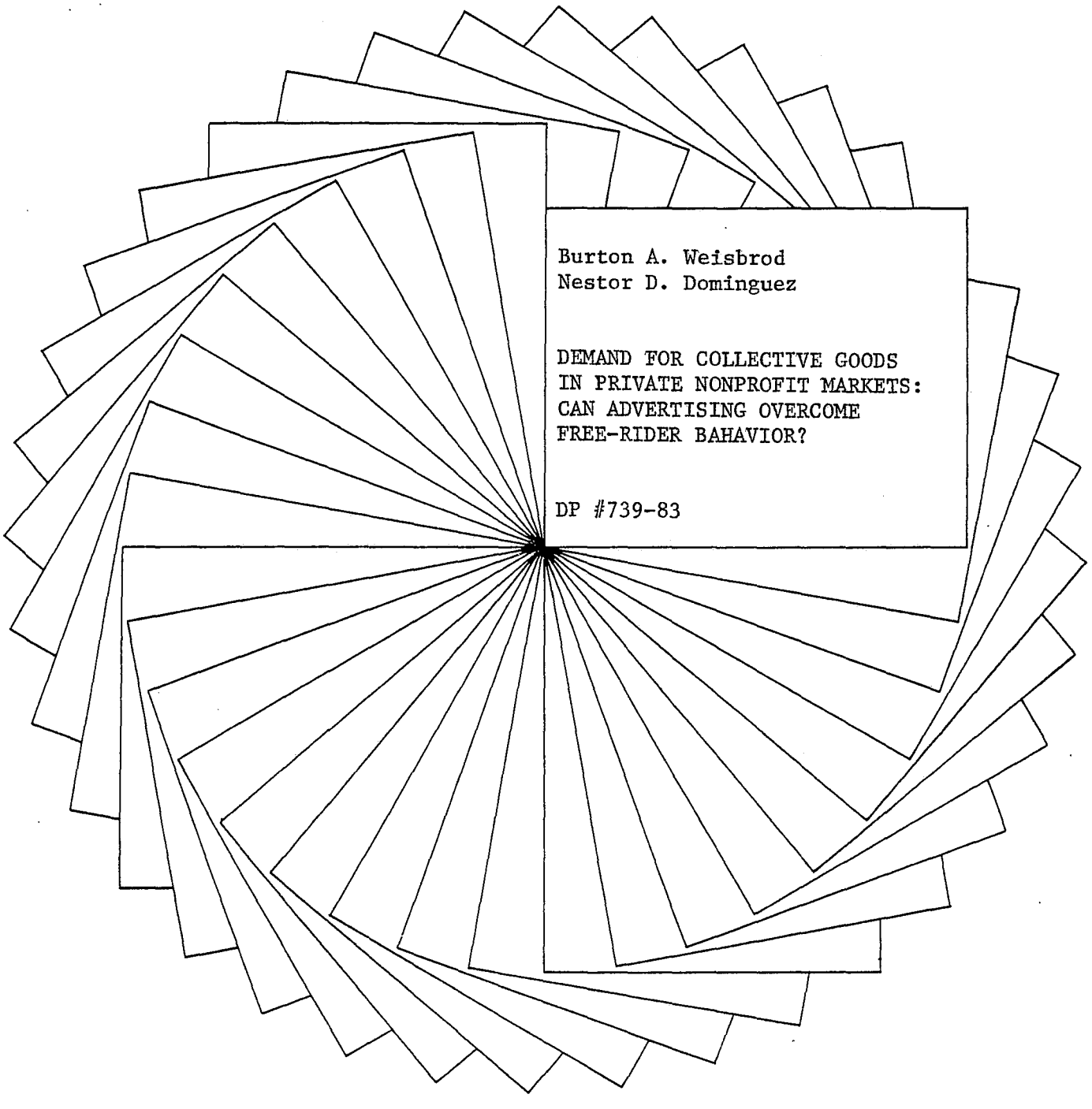

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DEMAND FOR COLLECTIVE GOODS
IN PRIVATE NONPROFIT MARKETS:
CAN ADVERTISING OVERCOME
FREE-RIDER BAHAVIOR?

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Demand for Collective Goods in Private Nonprofit Markets: Can Advertising Overcome Free-Rider Behavior?

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ABSTRACT

This paper concerns the nature of the factors that influence donations to private nonprofit organizations. We estimate the demand functions facing private, nonprofit, collective-goods providers of a number of commodities, such as library and museum services, hospital care, and disease research. We test the hypothesis that voluntary giving--donations of money--is responsive to price and to advertising (fund-raising) expenditures, as is the case with "ordinary" private goods. The responsiveness of donations to conventional market variables is of broad theoretic relevance because it relates to the severity of free-rider behavior. Our empirical work, using IRS data, indicates that as with private goods, revenues do respond positively to advertising expenditures and negatively to price. These findings suggest that free-rider behavior can be overcome.

Demand for Collective Goods in Private Nonprofit Markets: Can Advertising Overcome Free-Rider Behavior?

When private market failures occur, contemporary economic theory posits--normatively and positively--a major role for government. By implying the existence of only two institutional forms, the orthodox theory of markets has tended to overlook the potential and actual roles of decentralized private but "nonprofit" organizations.[1] The role of nonprofit organizations, however, has not been lost on political decision-makers. The Economic Recovery Tax Act of 1981, for example, was accompanied by statements from President Reagan calling upon the private nonprofit sector to expand its activities in areas where government involvement was being reduced.[2]

Private nonprofit organizations, as providers of collective goods but lacking the power to tax, confront free-rider problems in their fund-raising activities (i.e., individuals do not pay for goods because they can obtain access to them without paying). In this paper we seek to determine the nature of the factors that influence donations to private nonprofit organizations. Specifically, we estimate the demand function facing these collective-good providers for a number of commodities. We test the hypothesis that voluntary giving--donations of money--is responsive to private and to advertising expenditures, as are "ordinary" private goods.

The responsiveness of donations to conventional market variables is of broad theoretic relevance because it relates to the severity of free-rider behavior. Insofar as private providers of collective goods can

overcome such behavior through advertising (fund-raising expenditures), then reliance on government is not necessary.

Other authors have estimated demands for nonprofit output, but their approach has been different in several important respects.[3] First, they have estimated the parameters of the demand function for the output of an industry, while we estimate the demand function facing the individual firm. Second, they have ignored fund-raising expenditures, which can be expected to affect donations both directly--as a form of advertising--and indirectly, through its effect on the "price" of output. And third, we use a new panel of firm data to explicitly account for interfirm variation in the quality of output, and thereby derive efficient estimates of the relevant parameters.

These differences in specification and methodology have implications for the policy questions that can be addressed. (1) We can estimate effects on donations of changes in such firm-controlled variables as administrative and advertising expenses. (2) While we do not explicitly examine tax-rate effects, our estimates can shed light on them, as we explain below. In light of estimates that the Economic Recovery Tax Act of 1981 will cause significant reductions in private giving (Clotfelter and Salamon, 1981), these questions are particularly relevant at this time. (3) Beyond this contemporary focus, however, we seek to better understand the nature and strength of the forces affecting charitable giving, of which tax rates are only one.

This paper first postulates a model for the representative nonprofit firm in a given industry, then develops the empirical specification and variables. After describing the data employed, in the last section we present and discuss the results.

ECONOMIC MODEL

Our view of nonprofit firms is of organizations satisfying private demands for collective goods or action; individuals give "contributions" of money[4] in return for an agreed-upon level of provision. A statement of the economic or social motives for voluntary donations by "rational" economic agents is a logical prerequisite to defining a demand function for the collective-type goods provided by nonprofits. By specifying the objective function and constraints of the donor, we identify which variables enter into the individual's demand function.

The main difficulty in positing the usual utility-maximizing framework is that it does not adequately deal with the free-rider behavior which is common in situations involving the provision of collective-type goods. In spite of this reservation, some authors have argued that neoclassical utility maximization does provide a framework to predict voluntary "purchases" of collective goods once one recognizes that much seemingly altruistic behavior provides nonnegligible benefits to the donor.[5]

We postulate a market demand function for a particular type of collective-good output which depends, as usual, on price, quality, and consumer information. The latter is proxied by the age of the organization and the advertising to which the donor is subjected. Firms offer the most attractive price and quality combination they can, and advertise in order to elicit more contributions. We assume that donors perceive their contribution to output to be proportional to the amount of money given. This proportion is the same for all donors, large and small, if the firm produces under constant returns to scale.

Donations are important for nonprofit firms precisely because the collective-good nature of the goods we consider makes sales of output a limited source of revenue. In another study now in progress by Weisbrod and Jerald Schiff, it was found from IRS tax-return data that for the 1,946 nonprofit organizations serving the poor in 1976, more than 82 percent of their total revenues were in the form of "contributions, gifts and grants" and only 17 percent from "sales and receipts." Part of the latter, moreover, is doubtless donations in the form of "sales" at above-market prices, and the "receipts" portion includes revenues from interest, dividends, rents, and miscellaneous sources. We expect the distribution of revenue by source to vary with the degree of collectiveness of output--those goods approaching a Samuelsonian pure public good can be expected to receive a lower percentage of their operating revenues in the form of "sales," while purely private goods receive all their revenues from sales.[6] Nonprofit providers of collective goods search for donations in the same sense that profit-maximizing firms search for sales in private markets.

We assume that nonprofit firms are well-informed about their own outputs, but donors find it costly to determine both price, which we define and discuss below, and quality. Donors are subject to uncertainty regarding the qualities of the collective good being purchased with their contributions--for example, if the organization claims to provide "charity to the poor." The cost, in time and money, of determining the qualities of a particular firm's output increases the price as perceived by the donor.

In short, asymmetry of information between suppliers and consumers is a frequent, if not typical, case in markets where donors are the principal source of revenue. Whether the collective good entails transfers such as "charity to the poor," or a good involving a complex technology such as scientific research, the prospective donor is typically at an informational disadvantage.

Asymmetrical information between seller and buyer is likely to have important implications for modeling the behavior of nonprofit enterprise. In proprietary-goods markets, transfer of information on the qualities of a firm's output is often accomplished through product advertising (Nelson, 1970, 1974). In the case of collective goods provided by private nonprofit organizations, we assume that fund-raising activities play the same role, providing donors with information on the organization's activities. We thus expect that, ceteris paribus, fund-raising will increase the level of charitable contributions by shifting outward donor's demand curves for the collective good.[7] Given the consumer-information problem, we also expect that the "reputation" of the donee will affect donors' willingness to donate; we describe below our proxy for reputation.

In the markets for "charity" and "disease research"--to cite two examples on which we focus below--the prospective donor is typically ill-informed about two variables. They are the qualities of an organization's output, and the marginal social product of his or her contribution. The latter is partly a consequence of uncertainty about how the firm spends the contributions it collects. We expect donors to regard administrative and fund-raising expenditures as detracting from

the amount of final output they are purchasing with their donations (although it is arguable that donors may not object to the use of their contributions to raise still more contributions).

Fund-raising expenditures thus have countervailing effects: they reduce donors' information costs, which increases donations, but they also increase the "price" of purchasing a marginal unit of final output (a dollar going to the poor or to medical research), and this decreases donations. The net effect of the increased information to the donor and the decreased direct marginal product of the donation will determine the size and the sign of the elasticity of contributions with respect to fund-raising expenditures. Our empirical work examines the outcome of these effects.

The consumer often can choose from governmental as well as nonprofit suppliers--and proprietary suppliers as well, to the extent that free-rider behavior does not effectively preclude them. Therefore, the prices of these alternatives are relevant to the demand function for collective goods (Weisbrod, 1975). The potential for government provision suggests that government may "crowd out" private charity (Abrams and Schmitz, 1978). Indeed, there is every reason to suspect that the levels of collective goods provided by nonprofit firms and by governments are the outcome of a simultaneous process.

EMPIRICAL SPECIFICATION

These concepts and relationships suggest the following model for the demand of the output of the ith nonprofit firm in year t:

$$(1) \quad LogDON_{it} = \beta_0 + \beta_1 LogFUND_{i,t-1} + \beta_2 LogPRICE_{i,t-1} + \beta_3 AGE_{it} + \beta_4 AGE_{it} \times LogFUND_{i,t-1} + V_{it}$$

where

$$V_{it} = a_i + e_{it}.^8$$

The dependent variable in equation (1), LogDON, is the natural logarithm of the nominal dollar amount of "contributions, gifts and grants" received by the organization. The regressor variable LogFUND measures the expenditures on fund-raising. Since LogFUND enters with a one-year lag, we are assuming that only expenditures in the immediately preceding year directly affect demand facing the firm. In other words, we visualize potential donors subjected to fund-raising campaigns in one period responding, if at all, in the following period. LogPRICE is the natural logarithm of the "price" of contributing to the firm, defined below. It also enters in lagged form because it is reasonable to assume that donors respond to the most recent price information available to them, which is from the preceding period. Additional properties of PRICE are examined below.

A more complex lag structure can be imagined for the effects of both FUND and PRICE. For example, insofar as a firm builds up a stock of good will from fund-raising efforts, it would be appropriate to include more distant values of FUND and PRICE.

The variable AGE in equation (1) is intended to capture the effects of reputation, which are a result of past fund-raising/information efforts, and the historical price of donating in conjunction with the

quality provided by the firm. Specifically, AGE is the number of years the firm has existed as a nonprofit entity and proxies the information conveyed to prospective donors about the firm's reputation. This variable enters both directly and interactively with the firm's fund-raising expenditures in the previous period because, we believe, the effectiveness of recent adverising and, therefore, the level of donations varies systematically with the reputation of the firm.

The a_i term captures the effect of omitted variables mentioned in the previous section, such as the price of substitute goods provided by the government, or by other nonprofit or proprietary firms, and the unmeasured qualities of the firm's output that AGE alone does not capture.[9] Our assumption regarding the residual term, e_{it}, is the standard one: e_{it} is a normally distributed random variable with a mean of zero and variance, S_e^2, distributed independently across i and t.

The price offered by the firm in each period, $PRICE_{i,t-1}$, is defined as the cost to a donor of purchasing one dollar's worth of the organization's output. In previous research the price-of-giving has typically been defined as 1 - T, where T is the marginal income tax rate facing a donor who itemizes in the case of a contribution to a tax-deductible organization, and PRICE = 1 in the case of a nondeductible contribution, or a contribution by a person who does not itemize.[10] Since we assume that the donor wishes to contribute a dollar of output rather than a dollar of revenue, the price of a contribution reflects expenditures that are not associated with direct changes in output--namely, fund-raising and administrative expenditures.

Recognizing that fund-raising costs may be an expenditure that the donor does not wish to subsidize yields a specification in which $PRICE_{i,t-1}$ is an increasing function of the degree to which the firm's revenue goes for fund-raising expenditures. We anticipate that this variable will exert a negative effect on donations. We recognize that a donor might desire to see his or her donation used for fund-raising if that was expected to generate a larger volume of output; we hypothesize, however, that, on balance, prospective donors react negatively to this information.[11]

In sum, the price of giving depends on both (a) the cost to the donors of giving, which depends on the tax status of the organization (whether donations to it are deductible to the donor), on whether the donor itemizes, and on the donor's marginal tax rate; and on (b) the efficiency of the firm in turning donations into final output. In previous econometric work on charitable giving, a great deal of attention has been focused on the effects of changing the marginal income tax rates confronting a prospective donor.

We broaden the concept of price, emphasizing the price of giving not a dollar, but a dollar's worth of output at the margin. The smaller the share of an incremental dollar of revenue that the organization devotes to final output--i.e., the larger the share that it devotes (or is expected to devote) to administration and fund-raising--the greater is the price of output.

Let F and A denote, respectively, the expenditure on fund-raising and administration associated with the <u>marginal</u> dollar of charity. Combining our output-oriented concept of price with the traditional tax-rate focus,

we redefine price as the after-tax cost of purchasing a unit (dollar) of final output:

$$PRICE = (1 - T)/(1 - (A + F)),$$

where the term $1/(1 - (A + F))$ is the amount the donor must pay the firm for the marginal dollar's worth of output.[12] Consider the example of a firm that spends 40 percent of its last dollar of donations revenue on advertising, and let the average marginal tax bracket of potential donors to this firm be 0.3. For that firm the price of one dollar of ouput is $PRICE = (1 - 0.3)/(1 - 0.4) = 1.17$. That is, the donor must give up \$1.17 of after-tax income to provide an additional dollar of final output. It is noteworthy that a reduction in advertising expenditures from 40 percent to 30 percent of an organization's donations at the margin is equivalent to a decrease in a donor's marginal tax rate from 0.3 to 0.18; that is, both combinations--40 percent and 0.3, or 30 percent and 0.18--imply essentially the same PRICE.

In the empirical work which follows we make two assumptions regarding PRICE: (1) we assume that the percentage of revenue devoted to administrative expenditures is zero--an assumption made only because data on these expenses are not available; and (2) we assume that potential donors act as if average and marginal fund-raising expenses per dollar of donations are equal (that is, F = FUND/DON), which implies that average and marginal PRICE are identical. This assumption is consistent with the view that donors generally view themselves as giving an insignificant fraction of the firm's total resources and, thus, believe that their donation will not affect PRICE.

Hence our operational definition of the price of donating a dollar's worth of output is:

$$PRICE = (1 - T)/(1 - F) = (1 - T)/(1 - FUND/DON).$$

Incorporating this operational measure of PRICE into equation (1) and rewriting, the equation to be estimated is:

$$(2) \quad LogDON_{it} = C_0 + \beta_1 LogFUND_{i,t-1} + \beta_2 Log(1/(1 - FUND_{i,t-1}/DON_{i,t-1})) + \beta_3 AGE_{it} + \beta_4 AGE_{it} \times LogFUND_{i,t-1} + a_i + e_{it}$$

where $C_0 = \beta_0 + \beta_2 Log(1 - T)$.

The tax rate effect, $\beta_2 Log(1 - T)$, is absorbed into the constant term since all donors, whatever their respective marginal tax bracket, confront that same T whichever tax-deductible organization they donate to. Thus, the allocation of giving to various tax-deductible organizations responds only to the fund-raising component of PRICE.

DATA

Our data set is a panel which includes several samples of nonprofit, "tax-exempt" organizations filing IRS Form 990 tax returns for the four years 1973 to 1976. For the purpose of estimating the donations functions we selected seven activities, or industries, from four major areas where nonprofit organizations are prominent: health, education, welfare, and cultural activities.

The IRS Form 990 tax return allows each organization to state up to three "activity" codes (the average number of activities listed was 1.8) from a list of some 250, designating the principal functions of the firm, and the instructions asked the respondents to list the most important activity first. Our assignments of organizations to particular industries was based on the first-listed activity only. The activity categories we examined are listed, along with sample sizes and means of selected variables, in Appendix Table A.

We included only firms to which contributions were tax deductible because we believe that the nature of the output of these firms is significantly different from that of nondeductible firms.[13] Thus, our data apply to all organizations in the specified industries filing a Form 990 return and exempted from the corporate income tax under Section 501(c)(3) of the Internal Revenue Code, the principal section under which the tax-deductible organizations are defined. Our operational measure of AGE is the number of years the firm has existed as a tax-exempt entity. Specifically, it is the number of years since the IRS issued its exemption ruling.

Many of the nonprofit firms in our sample serve essentially local clientele--e.g., most hospitals. Others, such as medical research, are national in scope and clientele. Still others, such as some schools and colleges, are between these two extremes. Ideally, we would like to estimate the demand function for firms in each "market area." Several problems arise: first, the appropriate subnational samples are difficult to define objectively; and second, subnational samples quickly run into sample size problems. We have treated each of the "industries" as if it

were national, each firm in that industry being assumed to compete for donations with every other firm in the industry. We are thus implicitly assuming that, insofar as there are local-market effects, they do not bias our estimated coefficients.

EMPIRICAL RESULTS

The elasticities of particular interest are the price elasticity of contributions, β_2, and the total elasticity of fund-raising expenditures, g_e. Differentiating equation (2) with respect to $\text{LogFUND}_{i,t-1}$ and manipulating, the total fund-raising elasticity of demand is:

$$(3) \qquad g_e = \beta_1 + \beta_4 \text{AGE}_{it} + \beta_2 Y_{i,t-1},$$

where

$$Y_{i,t-1} = \text{FUND}_{i,t-1}/(\text{DON}_{it} - \text{FUND}_{i,t-1}).$$

We call g_e a "total" elasticity because it includes not only the direct effect of fund-raising, β_1, and the interactive effect of fund-raising with AGE, β_4, but also the indirect effect operating through the effect of fund-raising on price, $\beta_2 Y_{i,t-1}$. Thus, g_e is the percentage change in charitable contributions this year stemming from a one percent increase in last year's fund-raising expenditures, adjusting for the firm's age and for the change in the price of contributing that results from added fund-raising.

Also of interest is the age effect,

$$g_a = \beta_3 + \beta_4 \text{LogFUND}_{i,t-1},$$

which is another total derivative composed of a direct effect of AGE plus a term reflecting the interaction of AGE with fund-raising expenditures.

We have evaluated g_e and g_a at the mean values of AGE in 1975, and at the mean values of the other, lagged variables, in the preceding year. Thus, our results apply around the midpoint of the sample period, 1973-76.

Random Effects

The GLS estimates in Table 1 reflect a model in which each firm is a unit of observation covering the sample period for the dependent variable, 1974-76. (The data cover four years, but since our model includes lagged independent variables, we have only three years of useful observations on the dependent variable.) Our estimates of donation elasticities for fund-raising (column 1) range from a low of 0.21 in the education sector (schools, etc.)--indicating that a one percent increase in fund-raising would increase donations by 0.21 percent--to a high of over twice that magnitude for "Art Exhibit, Museum, Zoo, etc." and nearly that high for "Scientific Research (Diseases.)" All estimated elasticities are significant at the .10 level or better.

The positive elasticities indicate that in each industry donations would increase if fund-raising expenditures were increased. If the expenditure elasticities are applied to the mean levels of donations and fund-raising by industry, shown in Appendix Table A, our findings imply that a marginal dollar of fund-raising would lead to an increase in donations of the following magnitudes (rounded to a full dollar):

Table 1

Coefficients (Standard Errors) from Random Effects Model, Equation 2

Dependent Variable: LogDON

	Total Expenditure Elasticity (g_e)	Total Age Elasticity (g_a)	Price Elasticity (β_2)	Constant (C_0)	Sample N
	(1)	(2)	(3)	(4)	(5)
Library (61)	.32* (.04)	.03* (.01)	-.07* (.04)	.08	530
Art Exhibit, Museum, Zoo, etc., (60, 91)	.46* (.05)	.08* (.01)	-.03 (.02)	.11	278
Supplying Goods and Services to the Poor and Aged (560, 575)	.23* (.07)	.05* (.03)	-.02 (.02)	3.40	216
Hospital[a] (150)	.36* (.02)	.07* (.01)	-.02* (.01)	-.17	2044
Aid to the Handicapped (160)	.25* (.02)	.02* (.01)	-.01 (.01)	.64	1358
Scientific Research (Diseases) (161)	.39* (.02)	.05* (.01)	-.05* (.01)	.34	2020
School, College Trade School[b] (30)	.21* (.06)	.07* (.02)	.01 (.03)	.53	111

[a]A 75 percent sample.

[b]A 20 percent sample.

*Significant at the .10 level or better.

Industry	Increased Donations
Library	$18
Art, Zoo, Museum	10
Aid to Poor and Aged	2
Hospital	9
Aid to Handicapped	4
Disease Research	7
Schools	3

The finding that in each of these industries a marginal fund-raising dollar would bring more than a dollar in added donations suggests that these organizations do not seek to maximize their money receipts. This is not consistent with a model of nonprofit organizations as budget maximizers (Niskanen, 1975) unless revenue from other sources were negatively affected by increases in donations.

Our findings are consistent, however, with a model in which the quality of output is an argument in the nonprofit organization's objective function (Newhouse, 1970). An organization might find that raising, and spending, money beyond some level is not consistent with providing the quality of output that is preferred by its managers and trustees. It is noteworthy that the organizations helping the "poor and aged" come closest of all the industries examined to maximizing net revenue from fund-raising. Since those organizations are engaged in providing goods and services to the needy, we might expect them to be less concerned about output quality, and more willing than the other organizations studied to trade off quality for quantity, since they may feel that within broad limits, more is better regardless of quality.

The price elasticity estimates (column 3) are less conclusive. We find all demand elasticities to be quite inelastic. They range from 0.01 (not significantly different from zero) in the education sector to -0.07

(significant) for libraries. These low price-elasticity estimates indicate that, at least over the price range we observe, donors' demands are not highly sensitive to our "efficiency" definition of price. We doubt that this is really because donors are uninterested in "price" but rather that, because we measured it as a function of the percentage of donations spent on fund-raising, donors do not hold strong views that fund-raising is an inefficient use of funds. Donors may perceive the scale at which most projects must be undertaken as well beyond their own means, and so they may see funding-raising expenditures as necessary for generating a useful level of total contributions.

It is also possible that donors find it difficult to observe price and, therefore, do not condition their donations on it. The essential component of the price variable, the percentage of revenue that is used for fund-raising, is used by some firms in their promotional efforts, and it is even regulated by some states--Connecticut, Illinois, Kansas, Maryland, and Rhode Island, for example, impose a 25 percent limit, and New Hampshire has a 15 percent limit (Hopkins, 1977, p. 168). Still, it is not as widely advertised as is the organization's functions or the nature of the recipient group. Although we observe price in the IRS data, if most donors do not receive the information from advertising, or by direct inquiry, the estimated relationship between price and donations should be found to be weaker than if price were widely known for each organization.

Another hypothesis embedded in our model is that in nonprofit markets the age of the firm provides information about quality. We postulate that donors take the longevity of the firm as a signal of the degree to

which it actually provides the quality of output it purports to supply. Our estimates of the total age effect in Table 1 (column 2) show that in every one of the seven industries studied, the age effect on donations is positive and significant, as hypothesized. A 10 percent increase in age (about 1-2 years) is associated with an average of 0.5 percent increase in donations at the sample means.

OLS Estimates

For comparative purposes we present in Table 2 the estimates from an OLS model. They reflect the implicit constraint that the variance of the firm-specific effect is zero and, thus, makes no use of the information embodied in the within-group variation in our panel. This essentially treats a firm in each year as a different firm, which we regard as inappropriate.

The expenditure elasticity estimates show relatively moderate differences from those in Table 1, and no consistent pattern. An organization's reputation--or age--continues to show small but significant positive effects; survivorship--itself a market test--is associated with increased donations as it was in the preferred random effects model.

The most important differences in the OLS estimates are the price elasticities and the precision with which they are estimated. The OLS results point unambiguously to absolutely larger and consistently significant negative effects of price on donations, although the coefficients remain inelastic. The estimators are close to what others (Clotfelter and Steuerle, 1981) have found, though from quite different models and not from the perspective of an individual organization.

Table 2

OLS Estimates (Standard Errors)
Equation 2

Dependent Variable: LoxDON

	Total Expenditure Elasticity (g_e)	Total Age Elasticity (g_a)	Price Elasticity (β_2)	Constant (C_0)	R^2	Sample N
	(1)	(2)	(3)	(4)	(5)	(6)
Library (61)	.40* (.05)	.03* (.02)	-.38* (.02)	1.62	.27	1590
Art Exhibit, Museum, Zoo, etc., (60, 91)	.38* (.06)	.05* (.01)	-.35* (.03)	1.58	.38	834
Supplying Goods and Services to the Poor and Aged (560, 575)	.31* (.10)	.04 (.03)	-.29* (.03)	1.68	.20	648
Hospital[a] (150)	.52* (.03)	.04* (.01)	-.37* (.01)	2.03	.30	6132
Aid to the Handicapped (160)	.19* (.03)	.01 (.01)	-.36* (.01)	2.35	.27	4074
Scientific Research (Diseases) (161)	.13* (.02)	.03* (.01)	-.49* (.01)	2.54	.41	6060
School, College, Trade School[b] (30)	.22* (.08)	.06* (.03)	-.25* (.04)	1.52	.21	333

[a]A 75 percent sample.

[b]A 20 percent sample.

*Significant at the .10 level or better.

Table 3

Original Coefficients (Standard Errors) from Random Effects Model
Equation 2

Dependent Variable: LogDON

	β_1	β_2	β_3	β_4	C_0	Sample
Library (61)	.289* (.041)	-.065* (.014)	.033* (.012)	.033 (.002)	.075 (.259)	530
Art Exhibit, Museum, Zoo, etc., (60, 91)	.423* (.051)	-.026 (.018)	.077* (.014)	.002 (.002)	.107 (.298)	278
Supplying Goods and Services to the Poor and Aged (560, 575)	.196* (.037)	-.020 (.021)	.053* (.028)	.011* (.005)	.655* (.259)	216
Hospital[a] (150)	.316* (.021)	-.024* (.007)	.066* (.006)	.002* (.001)	-.170 (.150)	2044
Aid to the Handicapped (160)	.220* (.017)	-.007 (.008)	.023* (.007)	.002* (.001)	.644* (.125)	1358
Scientific Research (Diseases) (161)	.343* (.017)	-.049* (.008)	.051* (.006)	.003* (.001)	.343* (.119)	2020
School, College, Trade School[b] (30)	.194* (.062)	.007 (.026)	.073* (.025)	.001 (.003)	.532 (.481)	111

[a]A 75 percent sample.

[b]A 20 percent sample.

*Significant at the .10 level or better.

Table 4

Original OLS Coefficients (Standard Errors)
Equation 2

Dependent Variable: LogDON

	β_1	β_2	β_3	β_4	C_0	R^2	Sample
Library (61)	.491* (.055)	-.381* (.018)	.035* (.013)	.003 (.003)	1.617	.27	1590
Art Exhibit, Museum, Zoo, etc., (60, 91)	.563* (.061)	-.351* (.025)	.052* (.014)	-.002 (.003)	1.583	.38	834
Supplying Goods and Services to the Poor and Aged (560, 575)	.337* (.053)	-.294* (.031)	.037 (.029)	.007 (.006)	1.676	.20	648
Hospital[a] (150)	.566* (.029)	-.367* (.010)	.044* (.006)	.001 (.001)	2.028	.30	6132
Aid to the Handicapped (160)	.465* (.024)	-.356* (.012)	.012* (.006)	.001 (.001)	2.346	.27	4074
Scientific Research (Diseases) (161)	.554* (.021)	-.485* (.010)	.024* (.005)	-.002 (.001)	2.537	.41	6060
School, College, Trade School[b] (30)	.282* (.081)	-.246* (.042)	.057* (.023)	-.001 (.005)	1.516	.21	333

[a]A 75 percent sample.

[b]A 20 percent sample.

*Significant at the .10 level or better.

Considering all three of the independent variables--individually and interactively--we can explain between 20 and 41 percent of the variance in donations to the hundreds, and from some industries, thousands, of organizations in our seven samples.

CONCLUSION

Can nonprofit firms reasonably be viewed as searching for "markets" for collective-type outputs, with their revenues from donations being analogous to sales revenues in private-good markets? We have postulated demand for the output of these firms as a function of price, quality, and information, to see if donors respond in markets for private nonprofit provision of collective goods as they do in markets for private goods. The results, overall, are strongly supportive: (1) "advertising," in the form of fund-raising, does increase nonprofit organizations' donations revenues, just as it increases proprietary firms' sales revenues--or, at least, those nonprofits for which advertising is effective tend to engage in it; (2) the "price" of donating does affect the amount donated to an organization, in the expected negative direction; and (3) an organization's reputation, as proxied by its age, does lead to increased donations.

What seems particularly noteworthy is that even for industries providing collective goods--that is, goods having substantial external benefits--voluntary "purchases" do respond. Just as with private goods, contributions vary positively with respect to advertising and reputation, and negatively with respect to price. Free-rider behavior can be overcome.

Appendix Table A

Means (Standard Deviations) of Selected Variables by Activity Code[a]

	Library (61)	Art Exhibit Zoo, Museum, etc. (60, 91)	Goods and Services to Poor and Aged (560, 575)	Hospital (150)	Aid to the Handicapped (160)	Scientific Research (Diseases) (161)	School, College, Trade School, etc. (30)
1. Donations (in 10,000 1973 $)	7.40 (53.57)	11.09 (62.68)	6.45 (16.90)	19.24 (10.69)	13.35 (108.21)	37.44 (266.60)	12.09 (21.95)
2. Fund-raising (in 10,000 1973 $)	.13 (1.39)	.52 (4.41)	.68 (4.11)	.79 (14.96)	.89 (6.58)	2.01 (25.48)	.94 (4.71)
3. Price	1.037	3.811	1.092	1.067	1.033	1.178	1.013
4. Age (years)	19.31 (11.96)	12.18 (11.65)	7.56 (7.68)	21.69 (12.26)	13.37 (11.14)	13.92 (10.91)	13.99 (9.22)

[a]The actual IRS activity codes are listed in parentheses under each industry. When the proportion of fund-raising expenditures reaches 100% of donations received, price, as we have defined it, becomes infinite; for such cases we have arbitrarily set price = 1000. This extraordinarily large number makes the mean of price a poor measure of central location. We therefore present the median of the price distribution in row 3.

NOTES

[1]See Weisbrod (1975) for a model of nonprofit sector provision of public goods; see also Hansmann (1980).

[2]Clotfelter and Salamon (1981) examined the probable effects of the tax act, in a simulation study. Their central conclusion was that the intent of the act was not consistent with its likely outcome regarding the levels of private giving. In particular, they estimate a net reduction in giving totaling $18.3 billion by the end of 1984.

[3]See Clotfelter and Steuerle (1981) for a recent review of the literature.

[4]Individuals may also volunteer their labor, of course. Our emphasis here is strictly on contributions of money. For a recent examination of contributions of time, see Menchik and Weisbrod (1981).

[5]Hochman and Rodgers (1969), for example, suggest that interpersonal transfers of commodities will increase the welfare of the donor if utility functions are interdependent; Olson (1971) suggests that organizations themselves may use "selective individual incentives" such as peer pressure or rewards jointly supplied with participation to induce behavior that is efficient for the group; and Zeckhauser (1969) argues that collective arrangements will develop in situations where future preferences over public goods are uncertain, since individuals may reduce the risks of future nonsupply by engaging in collective action. Clearly, many forms of nonprofit output such as libraries and museums fit into the framework.

[6]Weisbrod has posited that the "location" of an organization's output on the spectrum from pure private to pure collective can be measured by its "collectiveness index"--the proportion of total revenue coming from "contributions, gifts, and grants." This ranges from zero, the polar private-good case, to unity, the polar collective-good case (Weisbrod, 1980).

[7]Certain types of information may, of course, have the opposite effects, and these will presumably not be provided by the firms involved, although they may be provided by competitors, if the latter possess the adverse information.

[8]The covariance matrix of the residual error term is

$$M = s_e^2 1_T 1_T' + s_a^2 I_T$$

where T is the number of time periods in the panel, and 1_T is a column vector of ones of length T. See Balestra and Nerlove (1966), Maddala (1971), or Mundlak (1978) for estimation details.

[9]See Scheffe (1959) and Balestra and Nerlove (1966). This approach uses the information on the variance of the firm effect to optimally combine the within- and between-group variation when the data consist of a time series of cross-sections. The presence of unobservable differences among firms in the level of quality is modeled by assuming that the a_1 are distributed as a $N(0,s_a^2)$ random variable and are independent across firms. Another possible approach has been to specify a conditional distribution (conditional on the regressors) for the a_i (Mundlak, 1978), or to use the fixed-effects formulation (Maddala, 1971).

[10]See Clotfelter and Steuerle (1981). All the works they examine use this definition of price, sometimes with minor modifications.

[11]The belief by a nonprofit organization that donors care about the extent to which donations are used for fund-raising, and that they prefer a lower to a higher level, is suggested by a recent advertisement of the National Foundation for Cancer Research, September 1978: "The cost of solicitation and administration is expected to be 31% of the gross amount collected. For each $1.00 donated, it is estimated that the amount devoted to research will be $.69."

[12]A preferable concept of price in nonprofit markets is the after-tax amount the individual must pay for a unit of output. PRICE, in this case, is $(1 - T) \cdot MC/(1 - (A + F))$, where MC is the marginal cost of production. We did not employ this concept of price because of the practical difficulties of determining quality of output, and hence MC, across organizations.

[13]Owing to the nature of the estimation technique, only organizations which filed a completed Form 990 in each of the sample years (1973-1976) could be included. In some cases this requirement reduced the sample available for analysis quite significantly. In the case of "School, College, or Trade School," for which only a 20 percent sample was available, a significant portion of firms did not submit a 990 form in at least one year during the sample period; this raises the possibility of selection bias.

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