IMPACT OF ORGANIZATIONAL SIZE MEASURES ON RELATIONSHIP BETWEEN ORGANIZATIONAL INEFFICIENCY AND DONATIONS

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Abstract

Twelve studies examine the effects of an accounting measure of nonprofit organizational (NPO) inefficiency on donations to NPOs. Many studies include a size control in their models, specifying size as total assets, total revenues, or program expenses. No study examines sensitivity of results, from a given model, to these three different size specifications. We test the Marudas and Jacobs (2006) model on Nonprofit Times 100 data, specifying organizational size as total assets, as total revenues, and as program expenses. We compare results from using each of these size specifications. Surprisingly, results are extremely sensitive to specification of organizational size.

Keywords: Nonprofits, donations, inefficiency, size, sensitivity

Introduction

Secular U.S. nonprofit organizations (NPOs) with revenues of at least $25,000 in a fiscal year are required by law to submit annual informational tax forms, IRS Forms 990, to the U.S. government (Internal Revenue Service, 2006). NPOs are required, on the Form 990, to classify their expenses into three mutually exclusive and collectively exhaustive categories: program, management and general (administration), and fundraising. NPOs also are required to make these forms readily available to the public in order to provide information considered to be useful to the public in its donation decisions. Informational intermediaries, so-called "watchdog" agencies, such as the American Institute of Philanthropy and the Better Business Bureau publish performance measures calculated from the NPOs' Forms 990.

Eleven studies examine the effect of the reciprocal of a certain well-publicized measure of nonprofit organizational (NPO) efficiency, the "program spending ratio" on donations to U.S. NPOs (Posnett & Sandler, 1989; Callen, 1994; Khanna, Posnett & Sandler, 1995; Tinkelman, 1998 and 1999; Khanna & Sandler, 2000; Jacobs & Marudas, 2004; Marudas, 2004; Marudas & Jacobs, 2006; Jacobs & Marudas, 2006; and Marudas & Jacobs, 2007). The reciprocal of "program spending" that is tested is called the "price of giving", a measure of organizational inefficiency, and is defined as total expenses / program expenses. The eleven studies test models of donations to NPOs as a function of NPO characteristics. Some of these studies include a size control in their model, but some studies specify size as total assets and other studies specify size as total revenues. An additional study, Frumkin and Kim (2001), tests an alternative measure of inefficiency, "administrative inefficiency", defined as administrative expenses / total expenses, and specifies size in another way, as program expense. No study examines the sensitivity of results, from a given model, to the different specifications of size. Furthermore, the latest data used in any of the prior studies is from 2001.

We advance the literature on the effects that NPO organizational factors have on donations to NPOs in the following ways.

1. We provide updated evidence on the effect that the "price of giving", a measure of NPO inefficiency, has on donations to large US NPOs. The latest data that any prior study uses is from 2001. However, we test data from 2004-2005 on the Nonprofit Times 100, the 100 US NPOs with the greatest total revenues where at least 10% of total revenues come from donations. Because this data comes from large NPOs and the data set has been compiled by a major national public accounting firm, it is likely to be more reliable than other data sets used in prior studies.
2. We test the sensitivity of results to using different specifications of organizational size in a particular model taken from the literature. Using the Marudas and Jacobs (2006) model, we specify organizational size as total assets, then as total revenues, and then as program expenses, and we compare the results from using these different specifications of organizational size.

Literature Review

In this section, we review studies that examine the effects of a particular specification of NPO organizational inefficiency, the "price of giving" on donations at the organizational level. We also include one study that uses an alternative measure of organizational inefficiency, administrative inefficiency, because it specifies organizational size as program expenses. At the end of this section, a table summarizing the literature is presented.

Posnett and Sandler (1989) test 1985 data for a sample of the 300 largest United Kingdom (UK) NPOs using a log-log model consisting of "price of giving" (PRICE), fundraising expenses, government support, age, an age-fundraising interaction term, autonomous income, and legacies (bequests). They test a full sample and four industry-specific samples and find PRICE to be very large and significantly negative in their full sample (-2.018). Callen (1994) tests the Posnett and Sandler (1989) model, but without legacies, on 1986 data for 72 Canadian health NPOs. He finds PRICE (-0.302) to be significantly negative.

Khanna, Posnett and Sandler (1995) test data on 159 of "the most prominent UK charities" for the period 1983-90 in a one-way fixed effects linear model using the Posnett and Sandler (1989) model, but without the age-fundraising interaction term because it introduces excessive multicollinearity. They find PRICE to be significantly negative in their full sample (-1.28), but not significant in any of their industry-specific samples, health, overseas, religion, or social welfare. The magnitude of their linear model coefficients, however, cannot be compared directly to that of the other studies that test a log-log model.

Tinkelman (1998) is the first to include a size control, specified as total assets, in the model he tests. He modifies the Posnett and Sandler (1989) model by adding the size control, total assets, adding ratings from one of the watchdog agencies, separating program service revenue from other revenue, and by dropping the age-fundraising interaction term because of excessive multicollinearity. He tests data on 191 large U.S. NPOs for 1991 and 1992 and finds PRICE to be significantly negative in each year (-0.89 for 1991 and -1.48 for 1992). Tinkelman (1999) tests data on over 3,000 U.S. NPOs for 1993 and 1994 using the Tinkelman (1998) model, but without agency ratings, and finds PRICE to be significantly negative in each year (-0.55 for 1993 and -0.53 for 1994).

Khanna and Sandler (2000) test the Khanna, Posnett and Sandler (1994) model on panel data for 159 of the largest UK charities from 1984-92 using a one-way fixed effects endogenous model in linear form, although the log of age is used. They find PRICE to be significantly negative in their full sample (-2.808), overseas sample (-14.270), and social welfare sample (-1.613), but not significant in their health or religion samples. The magnitude of their linear model coefficients cannot be compared directly to that of the studies that test a log-log model.

Frumkin and Kim (2001) test a log-log model consisting of an alternative specification of organizational inefficiency - administrative efficiency (ADMIN) - program expenses, fundraising expenses, total revenues, and government support. However, without explanation, they do not take the log of ADMIN and they omit age and program service revenues. They find that ADMIN has no significant effect on donations.

Marudas and Jacobs (2004) test a panel data set of 838 large U.S. NPOs from 1985-94 using a two-stage least squares two-way fixed effects model similar to the Tinkelman (1998) model but without a size control. They find PRICE to be significantly negative (-1.32) in their scientific research sample, significantly positive (0.08) in their hospitals sample, and not significant in their education sample. Marudas (2004) tests data on 1,239 U.S. NPOs from 1986-94 using the Tinkelman (1998) model but with the addition of "years of available assets," considered to be a measure of NPO wealth. He finds PRICE to be significantly negative in his education sample (-0.70), but not significant in the other industry-specific samples he tests – arts, health, human services, philanthropic, and "other". Marudas and Jacobs (2006) test data on the NPOs in the Nonprofit Times 100 for 1999-2001 using the Marudas (2004) model in levels form. They find PRICE to be significantly negative (-1.74). Jacobs and Marudas (2006) test data on the NPOs in the Nonprofit Times 100 for 2001-2002, using a modification of the Marudas (2004) model in levels form. They specify organizational size as total revenues and omit wealth. Although the objective of the paper was not to examine the effect of PRICE on donations, their results indicate that PRICE is significantly negative (-1.15). Marudas and Jacobs (2007) test data on the 606 US arts NPOs for 2001-2 using the Jacobs and Marudas (2006) model. Although the objective of the paper was not to examine the effect of PRICE on donations, their results indicate that PRICE is not significant for arts NPOs.

Table 1

Summary of relevant research

STUDY	DATA	METHOD*	VARIABLES
Marudas and Jacobs (2007)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV, lnTOTREV
Jacobs and Marudas (2006)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV, lnTOTREV
Marudas and Jacobs (2006)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV, lnY, lnTOTASS
Marudas (2004)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV, lnY, lnTOTASS
Marudas and Jacobs (2004)	US	2SLS two-way fixed effects	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV
Frumkin and Kim (2001)	US	One-way fixed effects	ADMIN, lnPROG, lnFR, lnTOTREV, lnGOV
Khanna and Sandler (2000)	UK	One-way endogenous fixed effects	PRICE, FR, lnAGE, LEG, GOV, AI

Tinkelman (1999)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, lnGOV, lnPREV, lnOTH, lnTOTASS
Tinkelman (1998)	US	OLS in levels form	lnPRICE, lnFR, lnAGE, RATE, lnGOV, lnPREV, lnOTH, lnTOTASS
Khanna, Posnett, and Sandler (1995)	UK	One-way fixed effects	PRICE, FR, AGE, LEG, GOV, AI
Callen (1994)	Canada	OLS in levels form	lnPRICE, lnFR, lnAGE, ln(AGE x FR), lnGOV, lnAI
Posnett and Sandler (1989)	UK	OLS in levels form	lnPRICE, lnFR, lnAGE, ln(AGE x FR), lnLEG, lnGOV, lnAI

*OLS is ordinary least squares and 2SLS is two-stage least squares.
ADMIN is administrative expenses / total expenses
AGE is age since inception of the organization, except for Tinkelman (1998) and (1999), where it is years since first filing a New York State tax return and Marudas and Jacobs (2007) where it is years since first filing a US Federal tax return.
AI is autonomous income (investments, rents, program services, and other income).
DON is donations.
FR is fundraising expenses.
GOV is government support.
LEG is legacies (bequests).
OTH is AI less PREV.
PREV is program service revenue.
PRICE is total expenses / program expenses.
PROG is program expenses.
RATE is the Better Business Bureau watchdog agency ratings of NPOs.
TOTASS is total assets.
TOTREV is total revenues.
Y is "years of available assets," considered to be a measure of NPO wealth, and is (net assets - permanently restricted net assets) / (total expenses - FR).

Empirical Specifications

Following the line of research studies that tests the effects of PRICE on donations, we first test the Marudas and Jacobs (2006) model using recent data from 2004-5 for NPOs included in the Nonprofit Times 100. This model is

$$\ln DON_{i,t} = b_0 + b_1 \ln PRICE_{i,t-1} + b_2 \ln FR_{i,t-1} + b_3 \ln GOV_{i,t-1} + b_4 \ln PREV_{i,t-1} + b_5 \ln AGE_{i,t} + b_6 \ln Y_{i,t} + b_7 \ln TOTASS_{i,t-1} + u_{i,t} \quad (1)$$

where i indicates NPO, t indicates year, DON is donations, PRICE is total expenses / program expenses, FR is fundraising expense, GOV is government support, PREV is program service revenue, AGE is years since the inception of the NPO, Y is years of available assets at the beginning of the year, considered to be a measure of wealth and

specified as (net assets – permanently restricted net assets) / (total expenses – fundraising expenses), TOTASS is total assets at the beginning of the year, and u is error.

Next, we test the same model except that we specify organizational size as lagged total revenues (TOTREV), instead of total assets. Thus, the model becomes

$$\ln DON_{i,t} = b_0 + b_1 \ln PRICE_{i,t-1} + b_2 \ln FR_{i,t-1} + b_3 \ln GOV_{i,t-1} + b_4 \ln PREV_{i,t-1} + b_5 \ln AGE_{i,t} + b_6 \ln Y_{i,t} + b_7 \ln TOTREV_{i,t-1} + u_{i,t} \quad (2)$$

Next, we test the same model except that we specify organizational size as lagged program expenses (PROG), instead of total assets. Thus, the model becomes

$$\ln DON_{i,t} = b_0 + b_1 \ln PRICE_{i,t-1} + b_2 \ln FR_{i,t-1} + b_3 \ln GOV_{i,t-1} + b_4 \ln PREV_{i,t-1} + b_5 \ln AGE_{i,t} + b_6 \ln Y_{i,t} + b_7 \ln PROG_{i,t-1} + u_{i,t} \quad (3)$$

Finally, we test the model without any size control. The model is

$$\ln DON_{i,t} = b_0 + b_1 \ln PRICE_{i,t-1} + b_2 \ln FR_{i,t-1} + b_3 \ln GOV_{i,t-1} + b_4 \ln PREV_{i,t-1} + b_5 \ln AGE_{i,t} + b_6 \ln Y_{i,t} + u_{i,t} \quad (4)$$

Data

All data are from the *NonProfit Times* (2004-5), which publishes, annually, its NonProfit Times 100, a list of the 100 non-education U.S. NPOs receiving the most private donations and for which at least ten percent of their total revenue comes from private donations. Since the model requires lagged values of certain variables, only NPOs with data in two successive years can be used. However, the lists for the two years, 2004-5, report data for some NPOs as "not available" and not all remaining NPOs appear on the list in two successive years. Thus, from a maximum possible 100 observations, 82 observations are usable. Since the log of zero is undefined, following the prior research, a nominal amount ($1) is added to every zero value of GOV and PREV; there were no zero values for any of the other variables. Descriptive statistics for the data are provided in Table 2.

Table 2

Descriptive statistics (mean and standard deviation) of the data from the Nonprofit Times 100. All variables are in thousands of dollars, except PRICE, AGE, and Y. Data are from 2004, except for donations, which are from 2005.

N=82	Mean	Standard deviation
DON	$307,940	$464,599
PRICE	1.18	0.11

FR	$24,746	$39,795
GOV	$49,666	$94,346
PREV	$98,044	$341,836
AGE	63	34
Y	1.40	2.17
TOTASS	$743,533	$1,576,944
TOTREV	$445,019	$600,765
PROG	$357,014	$495,241

DON is donations (in thousands of dollars)
PRICE is price (the reciprocal of "program spending") which is total expenses / program expenses
FR is fundraising expense (in thousands of dollars)
GOV is governmental financial support (in thousands of dollars)
PREV is program revenue (in thousands of dollars)
AGE is years since first filing a tax form
Y is (net assets – permanently restricted net assets) / (total expenses - fundraising expenses), considered to be a measure of organizational wealth
TOTASS is total assets at the beginning of the year (in thousands of dollars)
TOTREV is total revenues (in dollars)
PROG is program expenses (in dollars)

Because of significant heteroscedasticity in all years, White's consistent variance-covariance matrix estimator is used to develop confidence intervals (White, 1980). Multi-collinearity, measured by condition indices is moderate (Hair, Anderson, Tatham & Black, 1995). Cook's distance test indicates no influential outliers.

Results and Discussion

Results from testing the four different models in equations (1) through (4) above are presented in Table 3. The first column shows results from testing the model specifying size as total assets, the second column shows results from testing the model specifying size as total revenues, the third column shows results from testing the model specifying size as program expenses, and the fourth column shows results from testing the model with no size control.

Table 3

Regression coefficients from testing the following models in levels form.

$$\ln DON_{i,t} = b_0 + b_1 \ln PRICE_{i,t-1} + b_2 \ln FR_{i,t-1} + b_3 \ln GOV_{i,t-1} + b_4 \ln PREV_{i,t-1} + b_5 \ln AGE_{i,t} + b_6 \ln Y_{i,t} + b_7 \ln TOTASS \text{ (or TOTREV or PROG)}_{i,t-1} + u_{i,t}$$

	TOTASS	TOTREV	PROG	none
PRICE	-4.26***	-1.07	-0.56	-5.09***
t stat.	-4.3	-1.2	-0.6	-4.8
FR	0.28***	0.11*	0.11*	0.40***
t stat.	4.5	2.0	1.9	6.6
GOV	-0.03***	-0.03***	-0.03***	-0.03***
t stat.	-3.5	-4.1	-4.1	-3.1
PREV	-0.00	-0.01	-0.01	0.01
t stat.	-0.2	-1.6	-1.1	0.9
AGE	-0.40***	-0.24**	-0.25**	-0.26*
t stat.	-2.9	-2.4	-2.4	-1.8
Y	-0.27***	-0.05	0.00	-0.08
t stat.	-3.4	-1.0	0.0	-1.2
TOTASS	0.33**			
t stat.	3.8			
TOTREV		0.75***		
t stat.		9.1		
PROG			0.73***	
t stat.			8.1	
INTERCEPT	10.4***	4.1***	4.7***	14.5***
t stat.	7.3	3.1	3.3	14.5
ADJ. R SQ.	0.51	0.72	0.69	0.42

***, **, and *, significant at the 1%, 5%, and 10% levels (two-tailed), respectively.
DON is donations (in dollars)
PRICE is total expenses / program expenses
FR is fundraising expenses (in dollars)
GOV is governmental financial support (in dollars)
PREV is program service revenue (in dollars)
AGE is years since the organization's inception

Y is wealth (net assets – permanently restricted net assets) / (total expenses – fundraising expenses)
TOTASS is total assets at the beginning of the year (in dollars)
TOTREV is total revenues (in dollars)
PROG is program expenses (in dollars)

Looking at the results shown in the first column, from testing the model with total assets, PRICE is highly significant and very large (-4.26), as it is in the model with no size control (-5.02), shown in the fourth column. In fact, these are the highest reported coefficients of any study of the effect of PRICE on donations. These results are consistent with the results of prior studies, which find that PRICE has a significant negative effect on donations. However, as shown in the second and third columns, PRICE is not significant in the models that use total revenues or program expenses as a size control. These results are profoundly different from the results when total assets is used or no size control is used. Furthermore, the coefficient on Y ("organizational wealth") is significantly negative (-0.27) when using total assets, consistent with the results of prior studies, but it is not significant in the models using total revenue or program expenses. These results suggest that results of models of donations are profoundly sensitive to choice of size control.

If one were to consider the best model to be that which has the highest adjusted coefficient of determination, then the model with total revenues would be considered to be the best of the four models tested. In this case, the results from the "best" model indicate that PRICE is not significant; i.e., a well-publicized measure of NPO inefficiency does not have an effect on donations to 82 of the 100 largest US NPOs in 2005.

Even if one were not to consider the best model to be that which has the highest adjusted coefficient of determination, there is an additional argument of why total assets, from a theoretical perspective, is not a good size control. Total assets are affected by choice of accounting method and capital-intensiveness of an NPO's operations, while total revenues are not. For example, ceteris paribus, NPOs that capitalize art collections would have much greater total assets than NPOs that do not, even if their total revenues are identical, and NPOs that use land or buildings in their operations would have greater assets than NPOs that do not, even if their total revenues are identical. Total revenues are not affected by the choice of accounting method and capital intensiveness of an NPO's operations. Program expenses is a more precise measure of size of impact on beneficiaries, since an organization that has high total revenues may not spend all of its revenues and may be spending its revenues on administration or fundraising, which presumably has less impact on beneficiaries.

A limitation of this study is that the sample tested is relatively small and contains only the very largest US NPOs for one year. Furthermore, because of the relatively small size of the sample, subsamples of types of NPOs, such as arts, educational, health, are too small to test separately. Future research could examine the sensitivity, to specification of organizational size, of results from testing homogeneous samples of NPOs of a particular type. Prior research suggests that results vary significantly across types of NPOs (e.g., Posnett & Sandler, 1989; Marudas & Jacobs, 2004; Marudas, 2004).

The results discussed above should be of interest to NPO managers and directors. These results suggest that managers and directors of the largest US NPOs may, in their important decisions of how to allocate funds across programs, administration, and fundraising, ignore the impact of their decisions on the price of giving (PRICE). The results also suggest that these NPO managers and directors who believe that organizational inefficiency, as measured by the price of giving (PRICE), affects donations to their NPOs may be making suboptimal decisions.

The results of this study also have important implications for further research and on possible interpretations of prior studies. It may be worthwhile to test the models of prior studies that have used total assets as a size control, using total revenues as a size control to determine whether choice of size control has the same profound impact on the results. Results of this paper show that choice of size control in models of donations to NPOs at the organizational level can have a profound effect on the results of testing such models. Future research could examine the sensitivity of results to choice of size control in larger samples of NPOs, including samples of particular types of NPOs and examine whether the effects of alternative measures of NPO inefficiency, such as administrative inefficiency and fundraising inefficiency are similarly impacted by choice of size control.

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