AN IMPROVED MODEL OF DONATIONS TO NONPROFIT ORGANIZATIONS

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ABSTRACT
Informational intermediaries, so called "watchdog agencies", publish information on nonprofit organization (NPO) inefficiency that is calculated from NPO financial disclosures. The stated intent of the watchdog agencies is to provide this information to potential donors to incorporate into their donation decision making. The watchdog agencies publish four measures of nonprofit organization inefficiency, calculated from NPO financial disclosures. However, only one of these measures, "donation price" (total expenses / program expenses), has been extensively tested in the literature and another of these measures, "cost to raise a dollar" (fundraising expenses / donations) has never been tested. Furthermore, no study has applied econometric methods to develop a "best parsimonious" model of donations among the many possible models that include one or more of these measures of NPO inefficiency. We develop a best parsimonious model, defined as the model with the highest coefficient of determination that does not suffer from excessive multicollinearity or significant omitted correlated variables misspecification. We find that a model that includes two of the four measures of inefficiency, "cost to raise a dollar" (fundraising expenses / donations) and "administrative inefficiency" (administrative expenses / total expenses) is the best parsimonious model. Results from testing this model suggest that a 1% increase in fundraising inefficiency and administrative inefficiency is associated with a 0.84% and 0.12% decrease in donations, respectively.

INTRODUCTION

Secular U.S. nonprofit organizations (NPOs) with gross receipts of at least $500,000 or total assets of $1,250,000 at the end of a tax year must submit an annual informational tax form, Form 990, to the U.S. government (IRS, 2009). On these forms, NPOs must classify their expenses into three mutually exclusive and collectively exhaustive categories: program, administration, and fundraising. NPOs also are required to make their tax filings readily available to the public as a means of providing information considered to be useful to the public in its donation decisions. Private organizations that serve as informational intermediaries, so-called "watchdog" agencies, publish performance measures, including accounting inefficiency measures, calculated from the NPOs' tax forms. Collectively, the watchdog agencies publish the following four measures of NPO inefficiency, calculated directly from NPO financial disclosures: price of giving (PRICE), defined as total expenses / program expenses, administrative inefficiency (ADEFF), defined as administrative expenses / total expenses, fundraising

inefficiency (FREFF), defined as fundraising expenses / total expenses, and "cost to raise a dollar" (FUND), defined as fundraising expenses / donations.

A substantial body of research in the accounting, economics, and public administration literatures, reviewed below, examines factors that affect donations to NPOs at the organization level as a function of organizational factors. These studies document a significant negative relation between donations and NPO inefficiency. However, the vast majority of these studies test models that include only one measure of inefficiency, PRICE, and many of the studies omit certain other factors known to impact donations. Therefore, the models tested in all prior studies potentially suffer from misspecification from omitting correlated factors such as other published inefficiency measures. We advance the literature on the effects that NPO organizational factors have on donations to NPOs by developing and testing a model that suffers less from the omitted correlated variables problem and that explains much more of the variance in donations.

The results of this paper should be of interest to researchers of NPO financial disclosures and to managers and directors of NPOs. Researchers would have a better-specified model of donations to use in testing additional factors affecting donations. Managers and directors of the large NPOs tested in this paper would have improved evidence on which of the four inefficiency measures, published by the watchdog agencies, affect donations and would have a better estimate of the effect of these inefficiency measures on donations to their NPOs.

The remainder of this paper is organized as follows: the relevant literature is reviewed in section 2, empirical specifications are discussed in section 3, the data are discussed in section 4, results are discussed in section 5, and a summary and conclusions are presented in section 6.

LITERATURE REVIEW

This section discusses the numerous studies that examine the effects of NPO organizational factors, including the factors of interest – accounting inefficiency measures calculated directly from NPO financial disclosures, on donations at the organizational level.

The seminal paper in this literature is Weisbrod and Dominguez (1986). They develop a model of donations to a given NPO as a function of the organizational factors price, advertising, and quality. They define price as 1 / (1 - (f + a)), where f is the proportion of donations spent on fundraising, and a is the proportion of donations spent on administration. However, the Weisbrod and Dominguez (1986) definition of price does not correspond to "donation price" or any other inefficiency ratio published by the U.S. watchdog agencies. Furthermore, because of data limitations, Weisbrod and Dominguez (1986) specify price in the model they test as 1 / (1 – f). They use fundraising expenses to proxy for advertising, age of the organization to proxy for quality, include an age-fundraising interaction term because age may impact the effectiveness of fundraising, and test their model in log-log form

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, fundraising expenses, government support, age, autonomous income, and legacies (bequests). They specify price as "donation price"; i.e., total expenses / program expenses (PRICE), which is the reciprocal of the "program spending ratio" accounting inefficiency measure reported by the watchdog agencies. 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), health sample (-1.422), religion sample (-3.044), and social welfare sample (-1.549), but not significant in their overseas sample. The main contribution of this paper is the use of a specification of accounting inefficiency, PRICE, that is directly related to an accounting inefficiency measure published by the watchdog agencies, and their use of autonomous income, equivalent to income generated from selling program services, and legacies, based on the hypothesis that such revenues may "crowd-in" or "crowd-out" donations. Okten and Weisbrod (2000) test a two-stage least squares first differences model on a panel data set of over 6,000 U.S. NPOs from 1982-94. They test the Posnett and Sandler (1989) model but (mis)specify price in the same way as Weisbrod and Dominguez (1986). Specifying price this way, they

implicitly assume that administration expenses are zero, which is not valid for the vast majority of organizations. Furthermore, this specification of price does not correspond to any of the accounting inefficiency measures the watchdog agencies publish. Tinkelman (2004) adds a size control to the log-log Okten and Weisbrod (2000) model, specifying price in the same way as Weisbrod and Dominguez (1986), and tests the model in levels form using OLS on 6,552 observations of U.S. NPOs from 1982-1994, except for 1984. The purpose of Tinkelman's paper is to reperform and improve on the Okten and Weisbrod model to infer manager's fundraising strategies. The results of these studies are not presented here because the specification of price they use is does not correspond to any of the performance measures published by the U.S. watchdog agencies.

Callen (1994) tests the Posnett and Sandler (1989) model, but without legacies and without the age-fundraising interaction effect because it introduces excessive multicollinearity, 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. Khanna, Posnett, and Sandler (1995) improve on prior studies by using a more sophisticated error-components model on large UK NPOs.

Tinkelman (1998) adds, to the Posnett and Sandler (1989) model, ratings from one of the watchdog agencies and total assets as a size control, separates program service revenue from other revenue, drops the age-fundraising interaction term because of excessive multicollinearity, and tests data on 191 large U.S. NPOs for 1991 and 1992. He finds PRICE to be significantly negative in each year (-0.89 for 1991 and -1.48 for 1992). The main purpose of Tinkelman's paper is to improve the model by adding a size control and testing watchdog ratings, which he finds to be insignificantly related to donations, and to test whether financial statement users are affected by joint-cost disclosures by NPOs, finding that they are.

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). The main purpose of this paper is to provide further evidence on the effects of PRICE and identify some of the factors that impact the sensitivity of donations to PRICE.

Greenlee and Brown (1999) test a semi-log model consisting of lagged donations, fundraising inefficiency (FREFF, defined as fundraising expenses / total expenses, which is identical to one of the watchdog inefficiency measures) and administrative inefficiency, which they specify as: administrative expenses / (program expenses + administrative expenses using 1992-94 data for 700 U.S. NPOs. However, their model departs substantially from the other models, omitting factors known to affect donations: fundraising expenses, government support, size, and age. They find that administrative inefficiency has a significant negative effect on donations and FREFF has a perverse significantly positive effect on donations, most likely because they omit fundraising itself in the model.

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). The magnitude of their linear model coefficients cannot be compared directly to that of the studies that test a log-log model. The main contribution of this paper is to test the effects of PRICE using an improved methodology that attempts to control for endogeneity in the model.

Frumkin and Kim (2001) test a log-log model that includes ADEFF as the accounting inefficiency measure. However, importantly ADEFF is not logged and they omit age, wealth, and program service revenue. They find that ADEFF 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 Okten and Weisbrod (2000) model but without the age-fundraising interaction term because of excessive multicollinearity. They specify donation price as total expenses / program expenses (PRICE and test three industry-specific samples. 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. The main purpose of their paper is to replicate the Okten and Weisbrod (2004) paper and compare results obtained from specifying price as they do with results obtained from specifying accounting inefficiency as total expenses / program expenses (PRICE).

Marudas (2004) tests data on 1,239 U.S. NPOs from 1986-94 using the Tinkelman (1998) log-log model but with the addition of "years of available assets," defined as (net assets) / (total expenses – fundraising expenses)) and considered to be a measure of NPO wealth. He finds PRICE to be significantly negative in two of his six subsamples**.** The main contribution of this paper is to improve on the model by providing the theoretical basis for including "years of available assets" (WEALTH) in the model, testing this variable, and finding that it is significantly negatively related to donations for four of six subsamples.

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). The main purpose of this paper is to test the sensitivity of results to different specifications of "years of available assets" as a proxy for organizational wealth.

Tinkelman and Mankaney (2007) test data on three large samples of U.S. NPOs using the Greenlee and Brown (1999) and Frumkin and Kim (2001) models, and then the Tinkelman (1999) model to which they add fundraising inefficiency (FREFF). Thus, they test the combined effect of ADEFF and FREFF in a more comprehensive model, although they do not include a proxy for organizational wealth. They test a large sample of U.S. NPOs and then, following Tinkelman (1999), delete observations that meet certain criteria indicative of lower sensitivity of administrative inefficiency with donations. These criteria are: receiving less than 10% of their total revenues in the form of donations, receiving less than $100,000 in donations, being fewer than 4 years old, and having implausible data - fundraising or administrative expenses equal to zero. They find that ADEFF and FREFF are significantly negative, -0.06 and -0.54, respectively for the Tinkelman (1999) model, which is the best specified of the three models they test.

Jacobs and Marudas (2009) test a comprehensive model that includes all factors shown in the literature to affect donations and the two accounting measures of inefficiency: PRICE and ADEFF. They find that both ADEFF (-0.12) and PRICE (-0.56) are significantly negatively related to donations in their full sample of a large data set of US NPOs.

Kitching (2009) adds a proxy for auditor quality to a model that includes all factors, except legacies and NPO wealth, known to affect donations but that includes only PRICE as the measure of accounting inefficiency. She finds PRICE to be significantly negatively related to donations (-0.74) in her full sample and finds auditor quality to be significantly positively related to donations. The primary purpose of this paper is to test the hypothesis that auditor quality, proxied by Big 5 versus non-Big 5 auditor, affects donations.

Gordon, Knock, and Neely (2009) model the percentage change in donations as a function of differences in watchdog ratings, PRICE (as the only accounting inefficiency measure), and other control variables, but omit some factors known to affect donations. The primary purpose of their paper is to test whether watchdog agency

ratings have additional information content for donors. They find that the change in ratings is significantly positively related to donations and also find PRICE to be significantly negatively related to donations.

Taken as a whole, these studies provide substantial evidence that PRICE is significantly negatively related to donations to U.S., UK, and Canadian NPOs. Three of the four studies of ADEFF also find ADEFF to be significantly negatively related to donations. One of the two studies, Greenlee and Brown (1999), that tests FREFF finds it to be significantly positively related to donations, but this is likely the result of having omitted fundraising expense itself in the model. The other study, Tinkelman and Mankaney (2007), finds FREFF to be significantly negatively related to donations. However, no prior study has tested the accounting inefficiency measure "cost to raise a dollar", FUND (fundraising expenses / donations), another inefficiency measure published by the watchdog agencies.

EMPIRICAL SPECIFICATIONS

This section is organized in the following way. First, we identify and test a model with all organizational factors shown in the literature to affect donations (except legacies and watchdog agencies for which data is not available) and one accounting inefficiency measure, PRICE using data for the *NonProfit Times 100* from 2000-09, the latest available data. This testing is done to determine the extent to which results are similar to the results of prior papers that use different data sets in an effort to mitigate potential criticism that the model we develop is dependent on the particular data set we use.

Second, we add ADEFF to the model, since it is the accounting inefficiency measure most tested, other than PRICE. We assess the extent of multicollinearity using variance inflation factors and misspecification from omitted correlated variables using the Ramsey (1969) RESET method.

Third, finding significant misspecification from omitted correlated variables, we add the two other accounting inefficiency measures published by the watchdog agencies, FREFF (fundraising expenses / total expenses), and FUND (fundraising expenses / donations), to reduce the misspecification from omitted correlated variables. Prior studies have refrained from testing PRICE, ADEFF, and FREFF in a single model because these variables are perfectly collinear in pure form. However, it is important to note that the three variables in logged form, although possibly highly correlated, are not perfectly collinear.

Fourth, finding multicollinearity excessive, from including both FREFF and FUND in the model, and finding PRICE no longer significant, we test the model with ADEFF and FREFF as the only accounting inefficiency variables and then with ADEFF and FUND as the only accounting inefficiency variables, assess the extent of multicollinearity and misspecification from omitted correlated variables and compare the explanatory power of each model as measured by the coefficient of determination to arrive at the "best" parsimonious model.

Following the line of research that tests only one specification of accounting inefficiency, PRICE, on donations, we start with the Marudas and Jacobs (2006) model. We use this model because it is the most comprehensive model; it includes all factors, except legacies and watchdog rating because of data limitations, for which there is evidence in the literature of an effect on donations at the organizational level, but with PRICE as the only specification of accounting inefficiency. We test this model to compare results from using our data set, from the *NonProfit Times 100*, with results of prior research that uses different NPO data sets. Consistent with prior studies, we use the log-log form of the model. This form of the model has generally been found to be better-specified for U.S. data than the linear form of the model (Tinkelman, 1998 and 1999; Marudas, 2004; Marudas and Jacobs, 2004). Furthermore, using the log transformation of the variable mitigates the effects of outliers and is consistent with the presumed underlying relation between the independent variables and the dependent variable, that of continually diminishing marginal effects. The model is tested using pooled cross-sectional data and then tested using the Fama-MacBeth (1973) method, which tests each year of data separately and averages the results across years. Since two methods yield qualitatively similar results, we report Fama-MacBeth results only.

$$lnDON_{i,t} = b0 + b1lnPRICE_{i,t-1} + b2lnFR_{i,t-1} + b3lnGOV_{i,t-1} + b4lnPREV_{i,t-1} + b5lnAGE_{i,t} + b6lnWEALTH_{i,t} + b7lnTOTASS_{i,t} + u_{i,t}$$

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 inception, WEALTH 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.

Results are presented in Table 1. Results from the Fama-MacBeth method and from testing pooled cross-sectional data show PRICE to be significantly negative (-3.1 and -2.8, respectively) and all other variables in the model to be significant with signs consistent with prior studies. The coefficients of determination (0.48 and 0.40, respectively) are also similar to those of prior studies.

Table 1
Results from Testing the PRICE Model

$$lnDON_{i,t} = b0 + b1lnPRICE_{i,t-1} + b2lnFR_{i,t-1} + b3lnGOV_{i,t-1} + b4lnPREV_{i,t-1} + b5lnAGE_{i,t} + b6lnWEALTH_{i,t} + b7lnTOTASS_{i,t} + u_{i,t} \quad (1)$$

	Fama-MacBeth		Pooled Cross-section	
	coefficient	standard error	coefficient	standard error
PRICE	-3.12***	0.40	-2.85***	0.37
FR	0.27***	0.03	0.19***	0.03
GOV	-0.02***	0.00	-0.01***	0.00
PREV	-0.01***	0.00	-0.01***	0.00
TOTASS	0.32***	0.02	0.32***	0.04
WEALTH	-0.25***	0.02	-0.23***	0.03
AGE	-0.41***	0.05	-0.37***	0.06
CONSTANT	10.7***	0.57	11.57***	0.64
N	75.5 (mean)		755	
R-Squared	0.48 (mean)		0.40	

PRICE is total expenses / program expenses.
FR is fundraising expenses.
GOV is government support.
PREV is program service revenue.
TOTASS is total assets at the beginning of the year.
WEALTH is "years of available assets" at the beginning of the year, considered to be a measure of wealth and specified as (total net assets - permanently restricted net assets) / (total expenses - fundraising expenses)).
AGE is years since the organization was founded.
Fama-Macbeth coefficients are the means of the coefficients of 10 yearly cross-sectional regressions and reported standard errors are the means of the standard errors of the coefficients of 10 yearly cross-sectional regressions.
For pooled cross-sectional regression, heteroscedasticity-corrected robust standard error and t values are reported.
*** indicates significance at the 1% level or better.

These results are highly consistent with results from prior studies that tested similar models, with PRICE as the only accounting inefficiency measure, and suggest that the data set that we use is sufficiently similar to the NPO data sets used in prior studies. We also examine the coefficient estimates on PRICE across years to assess how

stable it is across time. Results for each year are presented in the first four columns of Table 2. PRICE is consistently significantly negative each year from 2000-09, except for 2007, where it is negative but not significant.

Table 2
Stability of the Significance of PRICE

Year	PRICE coefficient	N	R-Squared	RESET F Test	p-value
2000	-1.82**	63	0.49	0.47	0.70
2001	-3.14***	72	0.51	1.18	0.33
2002	-3.32***	73	0.61	5.47	0.00
2003	-2.46***	73	0.38	4.36	0.01
2004	-2.54***	82	0.51	0.92	0.44
2005	-5.75***	80	0.54	1.43	0.24
2006	-4.41***	73	0.55	6.13	0.00
2007	-0.88	82	0.36	8.05	0.00
2008	-3.28**	83	0.39	0.41	0.74
2009	-3.58**	74	0.40	0.30	0.82
Average	-3.12***	75.5	0.48	2.87	0.33

The Ramsey RESET F test is conducted using the fitted values of donations, where Ho: model has no omitted variables. p-value is for the RESET F test.
** indicates significance at the 5% significance level.
*** indicates significance at the 1% significance level or better.

Next, we apply the Ramsey (1969) RESET method for assessing misspecification from omitted correlated variables. Results from applying this method to the model in equation (1) are presented in the last two columns of Table 2. The p-values are for the null hypothesis that the model has no omitted correlated variables. The results indicate that for four of the ten years (2002-03 and 2006-07), there is significant (at the 10% level or better) misspecification of the model from omitted correlated variables. This is not surprising since there is evidence in the literature that some other accounting inefficiency measures impact donations and since the watchdog agencies publish three accounting inefficiency measures in addition to PRICE. Therefore, we include an additional measure of accounting inefficiency, ADEFF, defined as administrative expenses / total expenses. We add this measure of accounting inefficiency, to the model in equation (1), because it has been included in models of prior studies of determinants of donations (Greenlee and Brown, 1999; Frumkin and Kim, 2000; Tinkelman and Mankaney, 2007; Jacobs and Marudas, 2009). Thus, the next model we test is

$$\ln DON_{i,t} = b0 + b1\ln PRICE_{i,t-1} + b2\ln ADEFF_{i,t-1} + b3\ln FR_{i,t-1} + b4\ln GOV_{i,t-1} + b5\ln PREV_{i,t-1} + b6\ln AGE_{i,t} + b7\ln WEALTH_{i,t} + b8\ln TOTASS_{i,t} + u_{i,t} \quad (2)$$

where i indicates NPO, t indicates year, DON is donations, PRICE is total expenses / program expenses, ADEFF is administrative expenses / total expenses, FR is fundraising expense, GOV is government support, PREV is program service revenue, AGE is years since inception, WEALTH 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.

Results from testing the model and applying the Fama-MacBeth method are presented in Table 3. To assess the extent of multicollinearity, we examined variance inflation factors, which are all below 10, indicating no significant multicollinearity in the model. The results show that adding ADEFF to the model increases the

coefficient of determination from 0.48, from testing the model with PRICE alone, to 0.61. This indicates that ADEFF is significant in explaining variation in donations.

Table 3
Results from Testing the Model with PRICE and ADEFF

$$lnDONi,t = b0 + b1lnPRICEi,t-1 + b2lnADEFFi,t-1 + b3lnFRi,t-1 + b4lnGOVi,t-1 + b5lnPREVi,t + b6lnAGEi,t + b7lnWEALTHi,t + b8lnTOTASSi,t + ui,t$$

	coefficient	t-value	p-value
PRICE	0.54	1.04	0.33
ADEFF	-0.52***	-20.07	0.00
FR	0.25***	7.73	0.00
GOV	-0.01***	-3.63	0.01
PREV	-0.00**	-2.24	0.05
TOTASS	0.41***	18.24	0.00
WEALTH	-0.24***	-10.78	0.00
AGE	-0.26***	-6.30	0.00
CONSTANT	6.36***	11.58	0.00
N	75.5 (mean)		
R-Squared	0.61 (mean)		

PRICE is total expenses / program expenses.
ADEFF is administrative expenses / total expenses.
FR is fundraising expenses.
GOV is government support.
PREV is program service revenue.
TOTASS is total assets at the beginning of the year.
WEALTH 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)).
AGE is years since the organization was founded.
Reported coefficients are the means of the coefficients of 10 yearly cross-sectional regressions and reported t-values and p-values are the means of 10 yearly cross-sectional regressions.
** indicates significance at the 5% significance level.
*** indicates significance at the 1% significance level or better.

Furthermore, results from testing the model on each year of cross-sectional data, presented in Table 4, show that ADEFF is significantly negative in each of the ten years of data. PRICE, however, is not statistically significant in any of the ten years except 2007, when it is perversely significantly positive. These results in Table 4 indicate that including ADEFF in the model makes PRICE redundant in explaining donations.

Table 4
Yearly Regression Results from the PRICE and ADEFF Model

$$lnDONi,t = b0 + b1lnPRICEi,t-1 + b2lnADEFFi,t-1 + b3lnFRi,t-1 + b4lnGOVi,t-1 + b5lnPREVi,t-1 + b6lnAGEi,t + b7lnWEALTHi,t + b8lnTOTASSi,t + ui,t$$

Year	PRICE	ADEFF	N	R-Squared	Reset F Test	P-value
2000	0.07	-0.43***	63	0.5611	2.13	0.108

2001	-0.85	-0.54***	72	0.6249	1.67	0.182
2002	-0.77	-0.38***	73	0.6675	9.71	0.000
2003	0.87	-0.49***	73	0.4930	3.39	0.024
2004	1.51	-0.59***	82	0.6703	2.04	0.116
2005	-1.63	-0.54***	80	0.6853	2.64	0.056
2006	-0.38	-0.51***	73	0.6750	5.69	0.002
2007	4.03***	-0.60***	82	0.5624	2.82	0.045
2008	2.51	-0.68***	83	0.6117	0.24	0.871
2009	0.01	-0.48***	74	0.5389	0.53	0.664
mean	0.54	-0.52***	75.5	0.6090	3.09	0.207

Adding ADEFF to the model explains more of the variance in donations. However, results from applying the Ramsey RESET to each of the ten years of data, as presented in the last two columns of Table 4, indicates that in five years there is a significant (at the 10% level or better) misspecification of the model from omitted correlated variables. This indicates that adding other accounting inefficiency measures may improve the model.

To determine whether the part of PRICE correlated with ADEFF (PRICE_PRED) or the part of PRICE uncorrelated with ADEFF (PRICE_RES) explains donations significantly, we apply two-stage regression. In the first stage, we regress PRICE on ADEFF only and save the residuals (PRICE_RES) and predicted value (PRICE_PRED). In the second stage, we regress DON on PRICE_RES, PRICE_PRED and the control variables.

Table 5
Fama-Macbeth Regression of Donation
with Decomposed PRICE

	coefficient	t-value	p-value
PRICE_RES	0.54	1.04	0.33
PRICE_PRED	-7.92***	-15.13	0.00
FR	0.25***	7.73	0.00
GOV	-0.01***	-3.63	0.01
PREV	-0.00**	-2.24	0.05
TOTASS	0.41***	18.24	0.00
WEALTH	-0.24***	-10.78	0.00
AGE	-0.26***	-6.30	0.00
CONSTANT	9.25***	17.58	0.00
N	75.5 (mean)		
R-Squared	0.6090 (mean)		

PRICE_RES and PRICE_PRED are residuals and fitted values from regressing PRICE on ADEFF only. Reported coefficients are the mean coefficients of 10 yearly cross-sectional regressions and t-values and p-values are the means of 10 yearly cross-section regressions.
* indicates significance at 10% significance level.
** indicates significance at 5% significance level.
*** indicates significance at 1% significance level.

Interestingly, results presented in Table 5 show that it is the part of PRICE correlated with ADEFF (PRICE_PRED) that is significantly related to DON with a predicted negative sign. In contrast, the part of

PRICE uncorrelated with ADEFF (PRICE_RES) is not significant and has a positive sign. Thus, the negative sign and statistical significance found in the previous studies is shown to be due to the part of PRICE correlated with ADEFF (PRICE_PRED). The uncorrelated part of PRICE is not significant in explaining donations.

Because of the significant misspecification from omitted correlated variables, we add to the model in equation (2), the two additional accounting inefficiency measures published by the watchdog agencies, namely FREFF (fundraising expenses / total expenses) and FUND (fundraising expenses / total donations). Thus, the next model we test is

$$lnDONi,t = b0 + b1lnADEFFi,t-1 + b2lnFREFFi,t-1 + b3lnFUNDi,t-1 + b4lnPRICEi,t-1 + b5lnFRi,t-1 + b6lnGOVi,t + b7lnPREVi,t-1 + b8lnAGEi,t + b9lnWEALTHi,t + b10lnTOTASSi,t + ui,t \quad (3)$$

where i indicates NPO, t indicates year, DON is donations, ADEFF is administrative expenses / total expenses, FREFF is fundraising expenses / total expenses, FUND is fundraising expenses / donations, PRICE is total expenses / program expenses, FR is fundraising expense, GOV is government support, PREV is program service revenue, AGE is years since inception, WEALTH 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.

Table 6
Results from Testing the Model with all Four Accounting Inefficiency Measures

$$lnDONi,t = b0 + b1lnADEFFi,t-1 + b2lnFREFFi,t-1 + b3lnFUNDi,t-1 + b4lnPRICEi,t-1 + b5lnFRi,t-1 + b6lnGOVi,t-1 + b7lnPREVi,t-1 + b8lnAGEi,t + b9lnWEALTHi,t + b10lnTOTASSi,t + ui,t$$

	coefficient	t-value	p-value
PRICE	0.15	0.64	0.54
ADEFF	-0.09**	-2.95	0.02
FREFF	-0.20***	-3.45	0.01
FUND	-0.71***	-8.22	0.00
FR	0.96***	29.23	0.00
GOV	-0.00	-0.64	0.54
PREV	-0.00*	-2.09	0.06
TOTASS	-0.08	-0.54	0.60
WEALTH	0.01	0.55	0.59
AGE	-0.08**	-2.63	0.03
CONSTANT	1.11*	1.99	0.08
N	75.5 (mean)		
R-Squared	0.88 (mean)		

FREFF is fundraising expenses / total expenses.
FUND is fundraising expense / donations.
Reported coefficients are the means of 10 yearly cross-sectional regressions and t-values and p-values are the means of 10 yearly cross-sectional regressions.
* indicates significance at the 10% significance level.
** indicates significance at the 5% significance level.
*** indicates significance at the 1% significance level or better.

The results from testing the model using the Fama-MacBeth method are presented in Table 6. The mean coefficient of determination increases from 0.48, from the model that includes only PRICE, to 0.88. Interestingly, PRICE is no longer significant. However, multicollinearity in the model is high; variance inflation factors are very high, sometimes over 30, making interpretation of the significance of independent variables problematic.

Therefore, we attempt to develop the "best" parsimonious model; i.e., the model with the highest coefficient of determination that does not suffer from excessive multicollinearity or significant omitted correlated variables misspecification. First, we drop PRICE from the model because, when any of the other three accounting inefficiency measures, ADEFF, FREFF or FUND are present in the model, PRICE becomes insignificant. Thus, we first test the model with the three accounting inefficiency variables as follows

$$\ln DON_{i,t} = b0 + b1\ln ADEFF_{i,t-1} + b2\ln FREFF_{i,t-1} + b3\ln FUND_{i,t-1} + b4\ln FR_{i,t-1} + b5\ln GOV_{i,t-1} + b6\ln PREV_{i,t-1} + b7\ln AGE_{i,t} + b8\ln WEALTH_{i,t} + b9\ln TOTASS_{i,t} + u_{i,t} \quad (4)$$

where i indicates NPO, t indicates year, DON is donations, ADEFF is administrative expenses / total expenses, FREFF is fundraising expenses / total expenses, FUND is fundraising expenses / donations, FR is fundraising expense, GOV is government support, PREV is program service revenue, AGE is years since inception, WEALTH 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.

Although the coefficient of determination remains the same, 0.88, there still is excessive multicollinearity stemming from the high correlation of FUND and FREFF: variance inflation factors are still over 15. Therefore, we must drop one of these two variables. We test the model with ADEFF and FREFF and then test the model with ADEFF and FUND. The variance inflation factors in each of these models does not exceed 10, indicating that multicollinearity is no longer excessive. The results from testing each of these models are presented in Table 7. The model with ADEFF and FREFF has a coefficient of determination of 0.73 whereas the model with ADEFF and FUND has a higher coefficient of determination of 0.87. The only prior study that tests a model with ADEFF and FREFF, Tinkelman and Mankaney (2007), reports significant coefficient estimates on ADEFF and FREFF of -0.06 and -0.54, respectively and an adjusted coefficient of determination of 0.40, whereas we report significant coefficient estimates, shown in Table 7, of -0.24 and -0.76, respectively with an adjusted coefficient of determination of 0.73. This may be because the large sample that Tinkelman and Mankaney (2007) test contains smaller NPOs than the sample we test, which consists of the largest U.S. non-education NPOs.

Table 7
Results from Testing Competing Models

	Coefficient		
	Model 1	Model 2	Model 3
ADEFF	-0.08**	-0.24***	-0.12**
FREFF	-0.19***	-0.76***	-
FUND	-0.71***	-	-0.76***
FR	0.96***	0.91***	0.84***
GOV	-0.00	-0.01***	0.00
PREV	-0.00**	-0.01***	-0.00
TOTASS	-0.01	-0.04	0.08**
WEALTH	0.01	0.07***	-0.06**
AGE	-0.08**	-0.26***	-0.06*

CONSTANT	1.21*	3.27***	1.76*
Avg. N	75.5	75.5	75.5
Avg. R-Squared	0.88	0.73	0.87

Reported coefficients are the means of the 10 yearly cross-sectional regressions and reported standard errors are standard errors of coefficients of 10 yearly cross-sectional regressions.
* indicates significance at 10% significance level.
** indicates significance at 5% significance level.
*** indicates significance at 1% significance level.

Results from applying the Ramsey RESET to each model are presented in Table 8. The results show that the model with ADEFF and FREFF suffers from an omitted correlated variable problem (at the 10% level or better) in six of the ten years of cross sectional regressions, whereas the model with ADEFF and FUND suffers from this problem (at the 10% level or better) in only two of the ten years of cross sectional regressions.

Table 8
Results of the Ramsey RESET Test Applied to the Model with ADEFF and FREFF and the Model with ADEFF and FUND

	ADEFF and FREFF		**ADEFF and FUND**	
Year	RESET F Stat	p-value	RESET F Stat	p-value
2000	2.44	0.08	2.13	0.11
2001	2.18	0.10	1.85	0.15
2002	3.36	0.02	1.21	0.33
2003	3.56	0.09	1.29	0.30
2004	1.36	0.26	5.58	0.00
2005	1.73	0.17	0.51	0.68
2006	4.71	0.01	1.41	0.25
2007	1.44	0.24	10.25	0.00
2008	0.28	0.84	0.62	0.61
2009	4.36	0.01	0.40	0.75

Therefore, we conclude that the "best" parsimonious model of donations is that which includes only ADEFF and FUND, i.e.,

$$\ln DON_{i,t} = b0 + b1\ln ADEFF_{i,t-1} + b2\ln FUND_{i,t-1} + b3\ln FR_{i,t-1} + b4\ln GOV_{i,t} + b5\ln PREV_{i,t} + b6\ln AGE_{i,t} + b7\ln WEALTH_{i,t} + b8\ln TOTASS_{i,t} + u_{i,t} \quad (5)$$

Table 9 shows the results, for all variables in this model, from testing the data from the Nonprofit Times 100 applying the Fama-MacBeth method (which averages the coefficients and standard errors across each of the ten years of data). The results for the control variables – fundraising, governmental support, program service revenue, age, wealth, and size (total assets) are qualitatively similar to the results of prior studies. The only notable quantitative difference from results of prior studies is the coefficient on size (TOTASS), which is substantially smaller in magnitude than those of prior studies. The coefficient of determination is a relatively high 0.87, suggesting that the model explains to a great extent the variation in donations.

Table 9
Results from Testing the "Best Parsimonious" Model

	Coefficient	t-statistic
ADEFF	-0.12**	-2.5
FUND	-0.76***	-8.3
FR	0.84***	12.0
GOV	0.00	0.5
PREV	-0.00	-1.3
AGE	-0.06*	-2.1
WEALTH	-0.06**	-2.8
TOTASS	0.08**	2.7
INTERCEPT	1.76*	2.0
R-squared	0.87	

DATA

We test data from the *NonProfit Times* 100. This is a list, published annually by the *NonProfit Times*, of the 100 U.S. non-education NPOs receiving the most total revenues, at least ten percent of which is from donations. We use these data for the following reasons. First, Tinkelman and Mankaney (2007) suggest that the strength of the relation between ADEFF and donations is significantly greater for U.S. NPOs that receive at least 10% of their revenues in the form of donations than for U.S. NPOs that receive less than 10% of their revenues in the form of donations. Second, the quality of this data is relatively high because the data are compiled and reviewed by Grant Thornton, a major international accounting firm, and the financial statements of all NPOs in the sample are subject to an independent audit. Third, the *NonProfit Times* 100 data are available through 2009. We are not aware of any other more recent readily available data on U.S. NPOs, including the large data set from the National Center for Charitable Statistics, which is available only through 2007.

Since the model requires lagged values of certain variables, only NPOs with data in two successive years can be used. If all NPOs for which data is available appeared on the list in two successive years, then 100 observations would be available for each year. However, the lists for the ten years, 2000-2009, 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 per year, the following usable observations are available for each year:

2000-2001	72
2001-2002	73
2002-2003	72
2003-2004	82
2004-2005	80
2005-2006	73
2006-07	82
2007-08	83
2008-09	74

Since some U.S. NPOs legitimately receive no government support and some NPOs do not sell their program services, there are observations in the data with zero government support or program service revenue. 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.

SUMMARY AND CONCLUSIONS

We advance the literature on the determinants of donations to NPOs by developing an improved model of donations at the organizational level as a function of organizational characteristics. The improvements stem from having examined models with from one to all four measures of accounting inefficiency published by the watchdog agencies and virtually all other organizational variables found in the literature to be significantly

associated with donations. The accounting measures used are calculated from NPO financial disclosures. We find that the improved model is that which includes the accounting inefficiency measures ADEFF (administrative expenses / total expenses) and FUND (fundraising expenses / donations), both significantly negatively associated with donations. There is relatively little misspecification due to omitted correlated variables, no excessive multicollinearity, and a high adjusted coefficient of determination, 0.87, the highest of any model in the literature. Furthermore, no prior study has included FUND in a model of donations.

Results from testing this model suggest that donations to NPOs are very sensitive to one of the financial ratios published by the watchdog agencies, FUND (fundraising expenses / donations); on average, a one percent increase in FUND is associated with a 0.76% decrease in donations. Results also suggest that donations are somewhat sensitive to another of financial ratio published by the watchdog agencies, ADEFF (administrative expenses / total expenses); on average, a one percent increase in ADEFF is associated with a 0.12% decrease in donations.

The implications of this study are important for researchers, and to managers, directors, and regulators of NPOs. Researchers of the determinants of donations should consider using the improved model developed in this paper when testing additional factors hypothesized to affect donations. Furthermore, testing certain factors that could not be tested in this paper because of data limitations, such as watchdog ratings and auditor quality, using the improved model, may provide results that differ significantly from results of prior studies that used different models.

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