Attachment H

Propensity Models for Performer and Funder Stratification

Propensity Models for Performer and Funder Stratification

The performer and funder density strata are determined by estimating the propensity that an organization is performing and/or funding research. The dependent variable for the model is a binary measure of whether the organization is a likely performer and/or likely funder, 1 = the organization is identified as a likely performer/funder, 0 otherwise.) Refer to Attachment F. Likely Performer and Funder Sources for the construction of the likely performer and funder flags.

We estimated two models, one based on organizations filing Form-990, 109,798 organizations (1,526 likely performers or funders); and one based on organizations filing Form 990-PF, 18,097 (615 likely performers or funders). Hospitals were excluded from the modeling because they will be a separate stratum and will require steps to deduplicate the frame so as not to overlap with those that are eligible for the Higher Education Research and Development survey (HERD).

For both the Form-990 and Form 990-PF models, we followed the same modeling process:

1) Developed a base model with the classification variables available on the core file and three major financial variables, total revenues, total assets, and gross receipts.

   Base model:
   Major NTEE Grouping (First Character)
   NAICS code Major Sectors (First 2 digits)
   Common Code (last 2 digits of NTEE)
   Foundation Code
   Gross receipts
   Total Revenues
   Total Assets

2) Calculated the individual effects of the financial variables by introducing to the base model one at a time. For each financial variable, evaluated the continuous value (e.g. total investment income), as well as a binary measure reporting a non-zero value for this variable (e.g., 1 = positive net investment income; 0 = nonpositive net investment income).

3) Made all individual effects significant at 0.05 eligible for the final model building.

4) Tested for multicollinearity—removed highly correlated variables or created variations of the variable. For example, program revenue is highly correlated with total revenues so we created a variable to represent the percent of program revenue (program revenue / total revenue).

5) Used stepwise selection to select final variables for model.

The significant model effects for the Form 990 and Form 990-PF models are presented below.

Form 990—Final Model

Variable	DF	WaldChiSq	ProbChiSq
NTEE major group	17	713.59	<.0001
NAICS	10	123.95	<.0001
NTEE Common code	7	111.11	<.0001
Reason for 501(c)(3) status	6	155.48	<.0001
Non-Private Foundation Reason Code	1	42.07	<.0001
Compensation for officers	1	108.44	<.0001
Has positive revenue from sales of securities (0, 1)	1	114.38	<.0001
Has positive royalty income (0,1)	1	70.41	<.0001
Has positive compensation for officers (0,1)	1	62.33	<.0001
Total gross receipts from related activities etc.: 170(b)(1)(A)(iv)+(vi)	1	10.55	0.0012
Has positive net income from special events and activities (0,1)	1	19.56	<.0001
Total gross income from interest etc.: 170(b)(1)(A)(iv)+(vi)	1	21.73	<.0001
Income from investment of tax-exempt bond proceeds	1	9.00	0.0027
Has positive retained earnings (0, 1)	1	21.31	<.0001
Has positive gross receipts from related activities etc.: 170(b)(1)(A)(iv)+(vi) (0,1)	1	24.15	<.0001
Has positive investment income (0,1)	1	19.69	<.0001
Has positive contributions from gifts and grants (0,1)	1	17.29	<.0001
Gross income from fundraising events	1	23.37	<.0001
Has positive tax exempt bond liabilities, end of year (0, 1)	1	19.12	<.0001
Has positive liabilities, end of year (0,1)	1	14.46	0.0001
Has positive gross income from fundraising events (0,1)	1	10.97	0.0009

Notes: 170(b)(1)(A)(iv) an organization which normally receives a substantial part of its support (exclusive of income received in the exercise or performance by such organization of its charitable, educational, or other purpose or function constituting the basis for its exemption under section 501(a) from the United States or any state or political subdivision thereof or from direct or indirect contributions from the general public, and which is organized and operated exclusively to receive, hold, invest, and administer property and to make expenditures to or for the benefit of a college or university which is an organization referred to in clause (ii) of this subparagraph and which is an agency or instrumentality of a state or political subdivision thereof, or which is owned or operated by a state or political subdivision thereof or by an agency or instrumentality of one or more States or political subdivisions.

Form 990-PF—Final Model

Variable	DF	WaldChiSq	ProbChiSq
NTEE major group	12	29.85	0.0029
NAICS	4	14.38	0.0062
Compensation of officers, directors, trustees, etc.	1	56.58	<.0001
Paid compensation to or reimbursed expenses of disqualified person (0,1)	1	12.88	0.0003
Provided a grant to an organization other than charity (0,1)	1	14.69	0.0001
Has positive compensation for officers (0,1)	1	30.33	<.0001
Furnished goods, services, or facilities to a disqualified person (0,1)	1	15.39	<.0001
Has positive other income (0,1)	1	13.13	0.0003
Has positive contributions, gifts, grants paid as per books (0,1)	1	10.98	0.0009
Has positive cash - non-interest-bearing, book value end of year (0,1)	1	13.07	0.0003
Has positive total disbursements for charitable purposes operating and administrative expenses (0,1)	1	17.93	<.0001
Has positive interest on savings and temporary cash investments (0,1)	1	7.46	0.0063
Ratio of total fair market value of assets not for charitable purposes to total assets	1	9.92	0.0016
Has positive tax overpayment to be credited to subsequent year (0,1)	1	7.79	0.0053
Has positive total liabilities, book value end of year (0,1)	1	7.99	0.0047
Total excise tax based on investment income	1	5.38	0.0204
Has positive investments - corporate bonds, book value end of year (0,1)	1	6.70	0.0096
Has positive net investment income (0,1)	1	5.40	0.0202
Has positive assets alternative test (last 4 years) (0,1)	1	6.78	0.0092
Provided a grant to an individual for travel, study, or other similar purposes (0,1)	1	5.77	0.0163
Has positive investments - other, book value end of year (0,1)	1	4.84	0.0278
Has positive total investment operating and administrative expenses (0,1)	1	10.59	0.0011
Investments - U.S. and state government obligations, book value end of year	1	8.38	0.0038