Nonprofit Taxable Activities, Production Complementarities, and Joint Cost Allocations

Abstract *- Nonprofit organizations earn both tax–exempt and taxable revenues. Nonprofits may have a natural aversion to engaging in ancillary activities and, as a result, taxable ventures need to provide higher returns than alternative investments. A nonprofits' ability to exploit production complementarities may increase the return to taxable activities and explain the extent to which it engages in taxable ventures. This paper uses tax return data to test the theory that complementarities encourage taxable activities. Complementarities can lower production costs and make it easier for a nonprofit to allocate joint costs from tax–exempt to taxable activities. I find support for both hypotheses.*

INTRODUCTION

Nonprofit organizations are becoming a large and important sector of society. In 1995, the revenues of nonprofits amounted to more than 12 percent of Gross Domestic Product (Meckstroth and Arnsberger, 1998). In exchange for supplying public goods, nonprofits generally operate free of income, sales, and property taxes. Tax–exempt sources of nonprofit revenues include donations and grants, passive income on investments, and the sales of mission–related products or services. Revenues from sales activities that are unrelated to an organization's primary exempt mission are subject to an unrelated business income tax under IRC §511.[1] Unrelated revenues are nonprofits' fastest growing revenue source, roughly doubling every five years (U.S. Department of the Treasury, 2000). Although the definition of "unrelated" for tax purposes is not always clear, in general unrelated activities are those that do not contribute importantly to an organization's primary exempt mission (Treasury Regulation §1.512(a)–1).

Because taxable activities are by definition unrelated to the charitable purpose, nonprofits may have a natural aversion to them. Prior research suggests that aversion will arise if the marginal contribution of unrelated activities to a nonprofit's overall objective function is negative (Cordes and Weisbrod,

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[1] The tax rates of the federal unrelated business income tax are the same as those of the corporate income tax.

1998). For example, if managers, donors, or other stakeholders disfavor ancillary ventures, the disutility of taxable activities could exceed the utility of any net financial benefits.

In this paper, I assume such aversion exists and has the effect of increasing the required return to taxable activities. I hypothesize that nonprofits overcome this aversion premium by exploiting production complementarities (i.e., the use of existing facilities, production inputs, or knowledge base) between their primary mission–related activities and taxable commercial ventures. The ability to exploit production complementarities can produce premiums for two reasons. First, the presence of complementarities increases the pre–tax return from taxable activities owing to lower production costs. Second, the presence of complementarities can make it easier to allocate joint costs from tax–exempt to taxable activities, thus increasing the after–tax returns to taxable activities. Joint cost allocations arise when a nonprofit allocates a portion of its tax–exempt expenses to its taxable activities in order to reduce its tax liabilities (Cordes and Weisbrod, 1998; Yetman, 2001). The interrelated nature of complementary taxable and tax–exempt production processes increases a nonprofit's ability to allocate costs from tax–exempt to taxable activities (Sansing, 1998).

I use confidential tax return data collected from the nonprofits' IRS Form 990–Ts to construct my measures of joint cost allocations and ability to exploit common cost complementarities. Although nonprofit's annual information return (i.e., the IRS Form 990) is publicly available, it does not contain detailed information about an organization's taxable activities. From a policy perspective, calibrating the effects of complementarities on an organization's propensity to generate taxable revenues is valuable for at least two reasons. First, complementarities can increase overall economic efficiency to the extent they permit a nonprofit to produce products at a lower cost or if the taxable activity utilizes otherwise unused facilities. Second, the incentive to exploit complementarities can cause nonprofits to concentrate their taxable activities into a relatively few economically related categories. Industry observers note that one potential cost of nonprofit commercialization is that unrelated ventures can distract nonprofits from their primary charitable missions in the pursuit of ancillary profits (Weisbrod, 1998). The concentration of taxable activities into a few related categories may, to some extent, mitigate concerns over mission distraction.

Results support the hypotheses that the ability to exploit production complementarities in my sample of organizations provides incentives to earn additional taxable revenues. On average, 62 percent of educational and 56 percent of medical nonprofits are able to exploit production complementarities, while only 12 percent of charitable nonprofits have a similar ability. The incentives provided by complementarities increases taxable revenues by 45 percent for educational nonprofits, 30 percent for medical nonprofits, and 87 percent for charitable nonprofits. Supplemental analysis finds that nonprofit type and age (both of which are publicly available pieces of information) can be used to construct reasonable proxies of a nonprofit's ability to exploit production complementarities.

DATA

The database I use for my empirical analysis is a sub–sample of the National Center for Charitable Statistics (NCCS) database which itself is a sub–sample of all nonprofits. The NCCS database includes all nonprofits with total assets of $10 million or more, plus a stratified random sample of smaller organizations, for a total annual sample of approximately 12,000 nonprofits. Although the NCCS

sub–sample includes data for only about 8 percent of the 150,000 form 990s filed annually, it accounts for over 85 percent of total assets and revenues of all nonprofits. Included in the 1995 NCCS sub–sample are 2,316 nonprofits that reported earning taxable revenues. Due to size–weighted sampling, these 2,316 nonprofits, which include only 25 percent of all nonprofits that reported taxable activity, collectively account for over 85 percent of total taxable revenues earned.

In response to a written request sent to all 2,316 nonprofits that reported earning taxable revenues in 1995, 703 nonprofits voluntarily supplied matching sets of their forms 990 and 990–T. Although three consecutive years of data were requested, an average of 2.6 returns per nonprofit were supplied, making a pooled sample of 1,824 observations. The sample contains a relatively small 8 percent of all nonprofits that earned taxable revenues by number but captures an average of 33 percent of the total taxable revenues earned for each of 1995, 1996, and 1997.[2]

EMPIRICAL ANALYSIS

Primary Estimation Model

In order to determine the effects of complementarities and joint cost allocations on a nonprofit's propensity to earn taxable revenues, I estimate the following empirical model:

$$[1]\quad Tax\_Rev_i = \alpha + \beta_1 Complement_i + \beta_2 Joint\_Costs_i + \beta_3 Complement_i \times Joint\_Costs_i + \beta_4 Assets_i + \beta_5 Assets^2{}_i + \beta_6 Corptax_i + \beta_7 Grants_i + \varepsilon_i.$$

The primary variables of interest are the extent of complementarities (*Complement*) and the interaction of *Complement* with the amount of excess costs allocated from tax–exempt to taxable activities (*Complement* × *Joint_Costs*). A positive and statistically significant estimate for β_1 suggests that the ability to exploit production complementarities encourages nonprofits to produce additional taxable output. A positive and statistically significant coefficient estimate for β_3 suggests that the enhanced ability to allocated joint costs from tax–exempt to taxable activities in the presence of complementarities likewise encourages nonprofits to produce additional taxable output. I include *Assets* to control for organization size and *Grants* to control for possible crowding out effects that can occur with alternative revenue sources. I include the income tax rate faced by the organization (*Corptax*) to determine if higher tax rates deter nonprofits from earning taxable revenues. Because I expect the effects to vary by industry type, I estimate equation [1] separately for each of three nonprofit types (i.e., educational, medical, and charitable).

The dependent variable, *Tax_Rev*, is the amount of taxable revenues as reported on the nonprofit's tax return, the IRS Form 990–T. Complement is an indicator variable equal to one if the nonprofit's taxable and tax–exempt activities could reasonably use similar production inputs or know–how, and zero otherwise. I created this variable for each nonprofit in the sample based on descriptions from line H of Form 990–T. The instructions to the IRS Form 990–T require nonprofits to provide a brief description of their taxable activity on this line.[3] A few (67) firms did not provide a description of their taxable activities and, as a result, were eliminated

[2] Sample representativeness tests suggests that the sample is not jointly different from the population across total assets, total revenues, taxable revenues, total expenses and total donations.

[3] Consider a hospital that earns taxable medical laboratory revenues such as outsourcing laboratory tests for private (non–hospital affiliated) physicians. Because it is reasonable to assume that this hospital also uses its laboratory to produce tax–exempt revenues (i.e., lab services for currently admitted patients), the hospital

from the dataset. The method I used to construct the Complement variable likely results in some measurement error. In reality, the extent of complementarity between a nonprofit's taxable and tax–exempt activities is likely to be continuous, rather than discrete. I characterize this variable as dichotomous because it would be difficult to parsimoniously derive a continuous measure.[4]

The variable *Joint_Costs* is the estimated amounts of joint costs that a nonprofit reallocates from its tax–exempt to its taxable activities. By allocating joint costs from tax–exempt to taxable activities, nonprofits can increase the after–tax returns to taxable commercial ventures. The relationship between joint cost allocations and taxable revenues may be endogenous as higher levels of taxable revenues can lead to higher joint cost allocations simply because there are more costs. One way to mitigate this effect is to include a control for size or to scale the continuous variables by some relative size measure. The empirical models in this paper use both approaches. An alternative method is to use two–stage least squares where the values of joint cost allocations that enter the empirical model are fitted values of a regression of joint cost allocations on various exogenous variables. I also undertook this method with little change in inferences.[5]

The estimates for *Joint_Costs* are from Yetman (2001), who uses various models to partition expenses between taxable and tax–exempt activities. The modeling process involves regressing total expenses on taxable revenues and tax–exempt revenues, and then multiplying the regression coefficient estimates by total expenses to derive estimates of taxable and tax–exempt variable expenses. Total expenses and tax–exempt revenues are from the IRS Form 990 while taxable revenues are from the IRS Form 990–T. This first step partitions variable expenses between taxable and tax–exempt activities, leaving fixed expenses unallocated. Because IRS regulations permit nonprofits to allocate both common variable and fixed expenses to their taxable activities, the modeling procedure allocates all remaining expenses (ostensibly fixed expenses) to taxable and tax–exempt activities based on average revenues. The difference between the amount of estimated taxable expenses using this estimation process and those reported on the nonprofits' tax returns are an estimate of joint cost allocations.[6] Although these joint cost allocations are based on plausible economic models, they likely contain measurement error. To the extent that the measurement error is random in the cross–section, the related coefficient estimates are biased towards zero.

It is important to note that the models used to estimate *Joint_Costs* assume that the quantity of tax–exempt output produced is proportional to the amount of tax–exempt revenues earned, yet many nonprofits provide their tax–exempt outputs for free or at reduced rates suggesting that tax–exempt revenues are not proportional to tax–exempt quantities. Generally Accepted Accounting Principles (GAAP) address this concern by requiring that educational and medical nonprofits include in gross revenues the amounts of free or reduced–fee outputs

could use its existing facilities and know–how to generate the taxable revenues and would be coded as complementary. Nonprofits also provide taxable activity codes on the publicly available IRS 990, although the codes are largely not usable because the descriptions are imprecise (i.e., "Rental Activity").

[4] In alternative tests I limited the analysis to those observations that earn at least 90 percent (or 50 percent) of their taxable revenues from a single taxable revenue type. The inferences of the results under these alternatives are not materially different from those presented in the paper.

[5] First stage exogenous regressors for *Joint_Costs* are similar to those used by prior taxpayer compliance studies and include measures of tax rates, financial need, donations, paid preparer status, and audit risk.

[6] See Appendix A for a more detailed description of the allocation estimation procedure.

for their primary outputs (i.e., medical care and student tuition) or at least report these amounts elsewhere in the IRS Form 990 if revenues are shown net of reduced fee arrangements. Therefore, for educational and medical nonprofits, the amount of taxable revenues that enter my models is reasonably proportional to quantities supplied even if some quantity is given away or sold at reduced rates. With respect to charitable nonprofits, there is variation in the way that they report their reduced fee arrangements (i.e., some include the fee reductions in gross revenues while others do not). Because of this, I limit my analysis of charitable nonprofits to observations where their IRS Form 990 indicates that they include forgone revenues from reduced fee arrangements in their total revenue figure (i.e., the nonprofit reports some amounts of grants on line 22 of their IRS Form 990).

I include the interaction of *Complement* and *Joint_Cost* to determine if the presence of production complementarities affects the relationship between joint cost allocations and taxable revenues. To the extent that production complementarities enhance a nonprofit's ability to aggregate and allocate costs to its taxable activities, I expect that taxable revenues will be increasing in the interaction of *Joint_Costs* and *Complement*. *Corptax* is a dummy variable equal to 1 if the state corporate income tax rate was above 10 percent and 0 otherwise. Alternate specifications of *Corptax* included a continuous measure and an indicator variable equal to 1 if the state corporate tax rate was in excess of its median value of 8 percent. *Grants* is the ratio of government grants to total donations. Prior studies included these variables to measure variations in taxable activity aversion premiums associated with the decision to earn taxable revenues (Cordes and Weisbrod, 1998; Hines, 1998). This research finds that the probability of earning taxable revenues is increasing in *Corptax* and *Assets* and decreasing in *Grants* and $Assets^2$.

I estimate equation [1] using two different specifications. The first specification uses un–scaled variables with size controls. The second specification scales all variables by total assets. Using alternative scalars including total revenues and total program revenues or logged values does not qualitatively alter the results.[7] Because my data is a pooled cross–section, I include year dummies.

Descriptive Statistics

Table 1 contains the descriptive statistics of the equation [1] regression variables. I reduce the original pooled sample of 1,824 observations to 1,757 (a loss of 67 observations) by requiring a description of the taxable activity on line H of the IRS Form 990–T and by removing influential observations.[8] I further reduce the sample by 357 charitable nonprofit observations that reported zero grants on line 22 of the IRS Form 990, leaving a final analysis sample of 1,400 observations. As discussed above and more thoroughly in Appendix A, the purpose of this final data reduction is to mitigate bias in the estimation and use of the *Joint_Costs* variable. All of the observations in the sample have non–zero values for taxable revenues and joint cost allocations. The distribution of observations across the three sample years varies somewhat, although results (not shown) find that the means of the variables are not different across years.

The mean value for *Complement* is 0.62, 0.56, and 0.12 for educational, medical, and charitable nonprofits, meaning that I coded 298, 400, and 25 observations as

[7] Using logs reduces the sample size to 1,246 observations due to zero or negative values for some variables. The only exception to the similarity of the results is that the coefficient for *Corptax* is significantly negative using this reduced sample.

[8] Observations with a Cook's D in excess of 1.0 are deleted.

TABLE 1
DESCRIPTIVE STATISTICS BY NONPROFIT TYPE

Description	Mean	25 %	Median	75 %
Educational organizations (n = 481)				
Tax_Rev	391	18	123	351
Complement	0.62	0.00	1.00	1.00
Joint_Costs	156	1	48	191
Joint_Costs × Complement	93	0	5	110
Assets	20.05	2.65	6.05	13.43
Corptax	0.20	0.00	0.00	0.00
Grants	0.17	0.00	0.07	0.26
Age	45	34	50	56
Medical organizations (n = 714)				
Tax_Rev	277	20	91	331
Complement	0.56	0.00	1.00	1.00
Joint_Costs	186	11	67	273
Joint_Costs × Complement	138	0	0	155
Assets	11.48	2.91	7.31	14.44
Corptax	0.10	0.00	0.00	0.00
Grants	0.13	0.00	0.00	0.04
Age	39	24	42	52
Charitable organizations (n = 205)				
Tax_Rev	709	28	122	562
Complement	0.12	0.00	0.00	0.00
Joint_Costs	154	−32	13	121
Joint_Costs × Complement	−14	0	0	0
Assets	8	2	3	8
Corptax	7.91	1.93	3.46	7.80
Grants	0.10	0.00	0.00	0.00
Age	0.14	0.00	0.00	0.17

Notes: Tax_Rev_{is} taxable revenues from the Form 990–T, in $thousands. *Complement* is 1 if the taxable and tax exempt activities are closely related in terms of production inputs, 0 otherwise. *Joint_Costs* is the difference between reported tax expenses and expected tax expenses in $thousands where expected tax expenses are from Yetman (2001) and reported tax expenses are from the Form 990–T. *Assets* are the total ending assets of the nonprofit in units of $10 million. *Age* is the age of the nonprofit in years. *Corptax* is an indicator variable equal to 1 if nonprofit is located in a state with an income tax rate higher than 10 percent, 0 otherwise. *Grants* are the ratio of government grants to total donations.

complementary for educational, medical, and charitable nonprofits, respectively. This suggests that educational and medical nonprofits are more able to exploit cost complementarities in the production of their taxable output. A possible alternative explanation is that the method used to produce the *Complement* variable contains more measurement error for charitable nonprofits. Average joint cost allocations are largest for medical nonprofits ($186 thousand) followed by educational ($156 thousand) and charitable ($154 thousand) nonprofits.[9]

Table 2 provides more detail on how these joint cost allocations vary by cost category. For all types of nonprofits, the majority of cost allocations are in the expense category "other". There are two reasons to report allocated expenses as "other" on the income tax return. First, reporting expenses as "other" provides as little information as possible to the tax authorities, possibly preventing a formal inquiry. Second, because "other" expenses could plausibly be any type of expense, the nonprofit retains maximum flexibility to find support for its joint cost allocations

[9] These values are different than the values reported in Yetman (2001) because of reductions in sample size in the current paper due to the items previously noted (i.e., the requirement that a description be present on line H and that charitable nonprofits report some grants on line 22), as well as removing influential observations that have a Cook's D statistic of greater than 1.0.

TABLE 2
CHARACTERISTICS OF JOINT COST ALLOCATIONS BY NONPROFIT TYPE

Description	Mean	25 %	Median	75 %
Educational organizations (n = 481)				
Total joint cost allocations	155,689	1,468	48,323	190,816
Officer's compensation	82	0	0	0
Employee compensation	30,604	0	667	29,585
Employee benefits	4,163	0	0	1,384
Interest expense	591	0	0	0
Depreciation expense	8,092	0	0	4,621
Maintenance expense	4,669	0	0	123
Taxes expense	581	0	0	0
Other expense	121,247	1,860	34,977	135,207
Medical organizations (n = 714)				
Total joint cost allocations	186,395	11,177	66,923	272,756
Officer's compensation	–589	0	0	0
Employee compensation	62,913	0	10,499	99,898
Employee benefits	9,226	0	0	7,797
Interest expense	114	0	0	0
Depreciation expense	3,758	0	0	1,928
Maintenance expense	1,031	0	0	127
Taxes expense	995	0	0	0
Other expense	139,943	8,911	46,401	199,394
Charitable organizations (n = 205)				
Total joint cost allocations	153,837	–31,712	12,565	121,300
Officer's compensation	1,198	0	0	0
Employee compensation	–6,474	0	0	0
Employee benefits	1,493	0	0	0
Interest expense	355	0	0	0
Depreciation expense	2,331	0	0	0
Maintenance expense	526	0	0	0
Taxes expense	908	0	0	0
Other expense	34,773	–28,914	9,690	107,251

Notes: Cost allocations are the difference between reported tax expenses and expected tax expenses where expected tax expenses are from Yetman (2001) and reported tax expenses are from the Form 990–T.

if its tax return is eventually audited (Andreoni, Erard, and Feinstein, 1998). The second largest category for joint cost allocations for educational and medical nonprofits is employee compensation expense. This finding is consistent with these types of nonprofits being more able to exploit complementarities because compensation expense is a frequent source of common production costs. For example, hospital medical laboratory employees produce both taxable and tax–exempt products. The third largest category for joint cost allocations for educational and medical nonprofits (and the second largest category for charitable nonprofits) is depreciation expense. Depreciation is particularly susceptible to allocation manipulation because it is a non–cash expense and is inherently an allocation process (Sinitsyn and Weisbrod, 2002). Management must split the depreciation expenses of common production facilities across taxable and tax–exempt outputs, leaving much room for discretion in terms of amount and/or depreciation method chosen such as using a straight line for tax–exempt outputs and an accelerated method for taxable outputs. These findings are interesting because they suggest that complementarities affect the types of costs that nonprofits allocate from their tax–exempt to their taxable activities in order to reduce their tax liabilities.

Regression Results

Table 3 presents the results of estimating equation [1] for the three primary types of nonprofits (educational, medical,

TABLE 3
REGRESSION ANALYSIS OF THE EFFECTS OF JOINT COST ALLOCATIONS AND PRODUCTION COMPLEMENTARITIES ON NONPROFIT TAXABLE REVENUES

$$Tax\_Rev_i = \alpha + \beta_1 Complement_i + \beta_2 Joint\_Costs_i + \beta_3 Complemement_i \times Joint\_Costs_i + \beta_4 Assets_i + \beta_5 Assets^2{}_i + \beta_6 Corptax_i + \beta_7 Grants_i + \varepsilon_i.$$

	Educational nonprofits		Medical nonprofits		Charitable nonprofits	
Variable	Un–scaled	Asset–scaled	Un–scaled	Asset–scaled	Un–scaled	Asset–scaled
Intercept	73,337	0.003	26,000	0.003	566,299	0.019
	(0.98)	(4.75)	(0.87)	(3.30)	(2.82)	(3.57)
Complement	176,336	0.001	76,891	0.003	618,212	0.037
	(2.21)	(1.92)	(2.15)	(3.02)	(1.66)	(2.84)
Joint_Costs	0.03	0.010	0.39	–0.030	–0.11	–0.122
	(0.52)	(0.56)	(6.23)	(–1.40)	(–1.55)	(–2.80)
Complement × *Joint_Costs*	0.71	0.390	0.34	0.420	1.43	1.68
	(5.03)	(5.56)	(4.16)	(7.80)	(3.28)	(4.49)
Assets	–241		7,726		20,849	
	(–0.11)		(4.41)		(0.81)	
Assets^2	1.54E–06		–2.51E–06		2.34 E–6	
	(3.85)		(–2.9)		(0.05)	
Corptax	110,838	0.001	–20,029	0.000	–551,759	–0.02
	(1.18)	(0.84)	(–0.37)	(–0.08)	(–1.38)	(–1.25)
Grants	241,799	–0.001	74,808	–0.002	–65,821	–0.003
	(1.51)	(–0.57)	(1.23)	(–1.05)	(–0.14)	(–0.02)
1996 indicator	–49,116	4,248	–16,1203	0.000	0.001	–0.013
	(–0.54)	(0.11)	(–0.52)	(0.01)	(1.10)	(–1.19)
1997 indicator	–32,502	–45,270	–92,562	–0.000	0.001	–0.012
	(–0.35)	(–1.14)	(–0.30)	(–0.65)	(1.18)	(–1.14)
Adjusted R^2	0.37	0.32	0.02	0.09	0.06	0.12
Observations	481	481	714	714	205	205

Notes: *Tax_Rev* $_{is}$ taxable revenues from the Form 990–T. *Complement* is 1 if the taxable and tax exempt activities are closely related in terms of production inputs, 0 otherwise. *Joint_Costs* are the amount of joint costs allocated from tax–exempt to taxable activities. *Assets* and *Assets*^{2} enter the model in units of $10 million. *Corptax* is an indicator variable equal to 1 if nonprofit is located in a state with an income tax rate higher than 10 percent, 0 otherwise. *Grants* are the ratio of government grants to total donations. T–statistics are in parentheses below the coefficient estimates.

and charitable). The results suggest that, for educational and medical nonprofits (and to a lesser extent, charitable nonprofits as well), the ability to exploit production complementarities provides incentives to earn additional taxable revenues, although the results of the un–scaled model for charitable nonprofits are very marginal (t–statistic of 1.66). These findings support the hypothesis that the presence of complementarities provides nonprofit organizations with an incentive to earn additional taxable revenues. In terms of magnitude, the ability to exploit production complementarities is associated with average additional taxable revenues of $176 thousand and $77 thousand for educational and medical nonprofits, respectively. Although the significance of the coefficient estimate for charitable nonprofits is marginal, it suggests that the ability to exploit complementarities is associated with average additional taxable revenues of $618 thousand. With respect to educational nonprofits, the ability to exploit complementarities almost doubles the amount of taxable revenues earned (i.e., $176 / $391 mean taxable revenues).

For medical nonprofits, the ability to exploit complementarities causes the amount of taxable revenues earned to rise by approximately a third (i.e., $77 / $277 mean taxable revenues). For charitable nonprofits, the marginally statistically significant results suggest that the ability to exploit complementarities causes the amount of taxable revenues earned to rise by approximately 87 percent (i.e., $618 / $709 mean taxable revenues). Further analysis shows that the interaction of joint cost allocations and complementarities is positively associated with taxable revenues for all types of nonprofits in both the scaled and un–scaled models.

With respect to the main effect of *Joint_Costs* I find that in the un–scaled models, joint costs are not associated with taxable revenues for educational and charitable nonprofits, and positively associated for medical nonprofits. With respect to the scaled models, joint costs are not associated with taxable revenues for educational and medical nonprofits, and negatively associated for charitable nonprofits. In all cases the year indicator variables are not statistically different from zero.

As the final part of my analysis, I calibrate the extent to which publicly available data can be used to produce a measure of production complementarities. Cordes and Weisbrod (1998) suggest that nonprofit age could be a reasonable proxy for the presence of complementarities. I estimate the following discrete choice model to determine how well age and nonprofit type can predict the extent of complementarity:

$$[2] \quad Complement_i = \alpha + \beta_1 Educational_i + \beta_2 Medical_i + \beta_3 Age,$$

where *Educational* and *Medical* are indicator variables for the nonprofit type (the omitted category is charitable nonprofits), and *Age* is the age of the nonprofit in years. I present the results of this analysis in Table 4. I conduct this test using the full sample of 1,824 observations less 67 observations that did not report a description of their taxable activity on line H and also excluding observations that were influential (i.e., had a Cooks D statistic greater than 1.0) in the primary regression analy-

TABLE 4
DISCRETE CHOICE MODEL FOR COMPLEMENTARY ACTIVITIES

$Complement_i = \alpha + \beta_1 Educational_i + \beta_2 Medical_i + \beta_3 Age$

Regression Variables:	Full sample	Sub–sample where at least 90% of taxable revenues are of a single type
Intercept	–1.84 (< 0.01)	–1.74 (< 0.01)
Educational nonprofit indicator	1.81 (< 0.01)	1.77 (< 0.01)
Medical nonprofit indicator	2.01 (< 0.01)	2.04 (< 0.01)
Age	0.01 (0.01)	0.01 (0.01)
Observations	1,757	1,466
Psuedo–R^2	0.21	0.21
Predicted Probability Variables:		
Percentage Concordant	70.8	70.9
Percentage Discordant	28.3	28.2

Notes: *Complement* is 1 if the taxable and tax exempt activities are closely related in terms of production inputs and 0 otherwise. *Educational* and *Medical* are indicator variables for the nonprofit type, the omitted category is charitable nonprofits. *Age* is the age of the nonprofit in years. P–values are in parentheses below the coefficient estimates.

sis. As a robustness test, I also estimated the logit model restricting the sample to the 1,466 observations where a single taxable activity type (i.e., rental income) accounts for at least 90 percent of total taxable revenues. The models both predict complementary activities reasonably well with a correct prediction rate of over 70 percent. The coefficient estimates of both models for both the educational and medical indicator variables as well as that for age are positive and significant at the 5 percent level while the intercept is negatively significant at the 5 percent level. The results of the logit analysis suggest that nonprofit type and age (both of which are available in the public–use IRS Form 990 database) are reasonable proxies for the extent to which a nonprofit can exploit its production complementarities in producing taxable output.

CONCLUSIONS

Unrelated commercial ventures comprise nonprofits' fastest growing revenue source. Because these activities are frequently not aligned with the nonprofits' primary exempt mission, managers may have a natural aversion to engaging in them. In order to overcome this natural aversion, taxable activities have to provide additional financial returns relative to alternative investments. Results of the analysis find that production complement-arities affect the amount of taxable revenues nonprofits earn. In terms of magnitude, the ability to exploit complementarities is associated with a near doubling of taxable revenues for educational nonprofits, a one–third increase in taxable revenues for medical nonprofits, and an 87 percent increase in taxable revenues for charitable nonprofits (although the result for charitable nonprofits is only marginally statistically significant).

These results have at least two policy implications. First, because nonprofits are encouraged to produce taxable products where complementarities exist, complementarities enhance overall economic efficiency by allowing nonprofits to produce products at a lower cost or more fully use under–utilized facilities. Second, the incentive to focus their taxable activities into areas where complementarities exist likely causes nonprofits to limit the scope of their taxable activities into economically related ventures, partially mitigating concerns that taxable activities distract nonprofits from their exempt missions.

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APPENDIX A

Yetman (2001) derives estimates of nonprofits' tax–motivated expense allocations from tax–exempt to taxable activities using a two–step procedure. In the first step, I use a first–difference regression of total expenses on taxable revenues, tax–exempt revenues, and investment revenues to partition variable expenses:

$$\Delta TOTAL\_EXP_i = \alpha + \beta_1 \Delta TAX\_REV_i + \beta_2 \Delta EXEMPT\_REV_i + \beta_3 \Delta INVEST\_REV_i + \varepsilon_i.$$

The product of the coefficient estimate and the organization–specific amount of taxable revenues is the estimate of variable expenses incurred to generate one dollar of taxable revenues. I use the same procedure to arrive at estimated variable expenses for tax–exempt and investing activities. A critical assumption of the model is that revenues are proportional to quantities. To the extent that some nonprofits give away their exempt outputs or sell them at reduced rates, tax–exempt revenues would not be proportional to tax–exempt quantities. Because Generally Accepted Accounting Principles (GAAP) require that educational and medical nonprofits include in gross revenues the amounts of free or reduced fee outputs (or report these amounts elsewhere in the IRS Form 990 if revenues are shown net of reduced fee arrangements), I was able to largely mitigate any effects of free or reduced fee arrangements on the model. With respect to charitable nonprofits, although GAAP leaves the "gross–up" choice up to the nonprofit, I was able to reasonably partition the sample into those that "gross–up" their tax–exempt revenues and those that do not.

In the second step of the modeling process, the difference between total expenses and the sum of the variable expense components (i.e., organization–specific estimates of variable expenses for taxable, tax–exempt, and investing activities) is an estimate of fixed costs. I partition fixed costs between taxable and tax–exempt activities using average revenues. The model does not allocate any fixed expenses to investing activities. The sum of allocated taxable variable expenses from the first step, plus the allocated taxable fixed expenses from the second step, is the estimate of total taxable expenses. The difference between this estimate of total taxable expenses and those reported by the nonprofits on their respective IRS Form 990–Ts are the estimated joint cost allocations.

This procedure assumes that: (1) expenses are proportional to revenues, (2) the relationship between revenues and expenses is constant within nonprofit types (i.e., medical, educational, and charitable), and (3) variable expenses are incurred on a marginal basis and fixed expenses are incurred on an average revenue basis. The modeling procedure ignores (i.e., holds constant) the possibility that nonprofits can shift revenues across tax–exempt and taxable activities.