Capital Structure of Nonprofit Organisations: A Dynamic Framework

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Abstract The existing literature on nonprofit capital structure is sparse and principally focuses on static theories. This paper takes a novel approach and models capital structure in a dynamic framework, mirroring recent work in the for-profit literature. This is motivated by the fact that, given the restricted nature of nonprofit organisation (NPO) capital, it is false to assume that observed leverage ratios are optimal and instead we should model the process as an adjustment to an organisation specific time varying target. Using a sample of 8380 US NPOs, this study presents estimates of the speed of adjustment suggesting somewhat high adjustment costs. We also show that agency costs, financial deficit and cash flow are important in determining target capital structure and the decision to borrow.

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1 Introduction

Scholars of the nonprofit (NP) sector would all agree with a statement made by Wedig in 1994; "The literature has abstracted away from a range of behaviours which might be termed corporate financial in nature" (p. 258). This gap, identified by a host of other authors (Bowman (2002), Jegers and Vershueren (2006) (JV)), is rather surprising given the overwhelming importance of financial decisions for the successful operation of any organisation. Therefore, understanding financial decisions, is "central to understanding how these organisations efficiently pursue their philanthropic objective" (Wedig 1994, p. 258). Currently there are a mere 7 papers on nonprofit capital structure which signals a serious deficit.

The major objective of this paper is to fill some of this gap by investigating empirically and discussing theoretically the capital structure of nonprofit organisations. We first begin with an elucidation of what makes nonprofit finance unique, as well as a discussion of applying traditional theories, based on the profit organisations (POs) literature. It is observed that NPOs operate in an environment of incomplete markets and restricted capital which motivates the study of leverage decisions in a dynamic framework. We derive a partial adjustment model and focus on understanding the process and determinants of total leverage as well as financial leverage (where debt that takes the form of formal negotiated contracts).

Using a panel of 8380 US 501(c)(3) NPOs over the period 1988-2005 and Blundell and Bond's (1998) system GMM dynamic panel estimator, we find support for a model with a modestly sluggish adjustment process. In this framework we investigate several hypotheses regarding the determinants of a time varying NPO specific target. Significant among these are financial deficit, cash flow over total assets to measure equity constraints and total salaries over total assets as a proxy for agency costs. We extend our study of dynamics by endogenizing the speed of adjustment to investigate whether macroeconomic factors impact this process. Finally, observing that many NPOs do not borrow using formal financial instruments, we employ a fixed effects logit specification to discover which of our determinants motivate this decision.

2 Capital Structure Theories - New and Old

Capital structure refers to the mixture of financing sources i.e. liabilities and assets. As the theoretical literature on NPO capital structure is still in its infancy, initial forays into the field have relied on existing PO theories (see surveys by Harris and Raviv (1991), Masulis (1988)). In this section we first elucidate the unique features of NPO corporate finance followed by a discussion of new and existing theories.

2.1 Uniqueness of Nonprofit Finance

The NPO form is generally defined through the non-distribution constraint coined by Hansmann (1980), stating that NPOs are precluded from distributing financial surplus from operation. Thus, NPOs lack private ownership or stock trading on an equity market. This constraint allows NPOs to attract private donations which are tax-deductible, as well as being exempt from corporate profit tax and other taxes[1].

Just as in POs we can distinguish between two major sources of capital - debt and equity. Unlike in the realm of POs, we must recognise that lack of an equity market for the NPO residual implies inherently an incomplete markets framework.

Equity

Despite the aforementioned equity gap, there are distinct internal and external sources of equity for the NPO. The latter includes primarily donative capital that is solicited from a well functioning philanthropy market[2]. In this context, Wedig(1994) develops a framework that treats donors as equity holders and donations as external equity, where dividend is paid out in kind[3]. Such dividend-in-kind is neither alienable nor perfectly substitutable for cash dividends. Instead it provides marginal utility at a decreasing rate. However, this is a weak metaphor as, given heterogeneous donors, dividend-in-kind is not comparable on a per dollar invested basis and in some sense accrues automatically and not at the discretion of

any board. Furthermore, it is important to recognise that donative capital is often restricted and in general the arbitrage of returns on assets of similar characteristics is meaningless, and, therefore, so is the opportunity cost of capital.

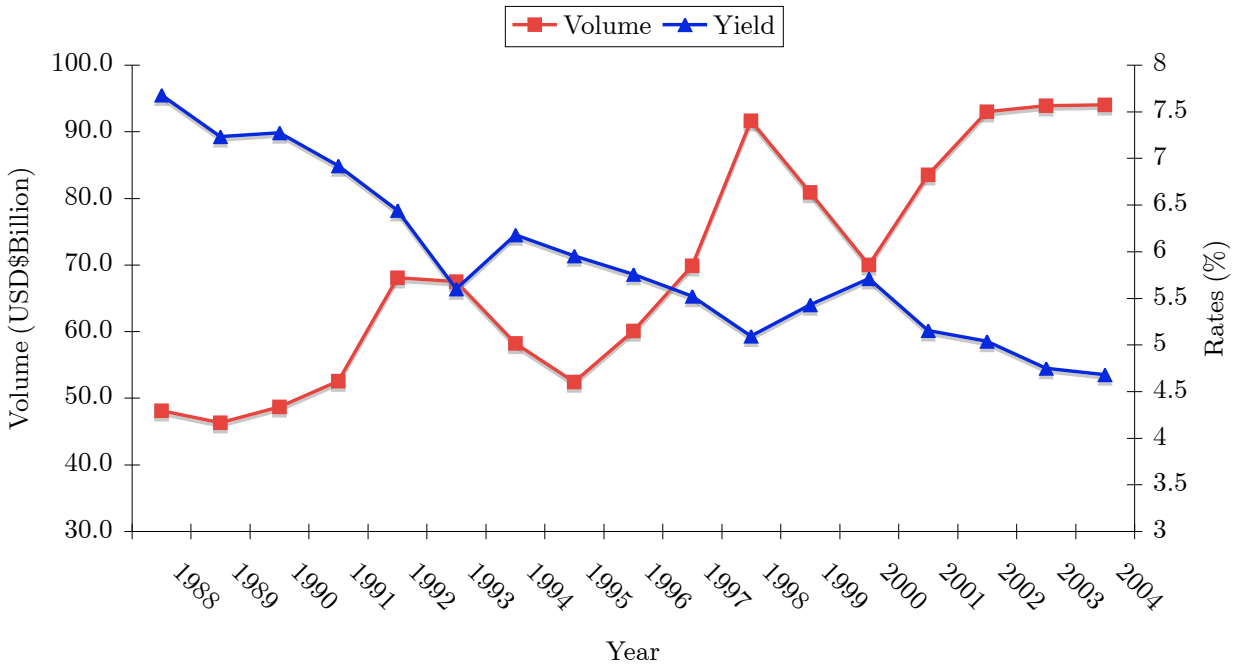
Internal equity can take two forms. The first, which is also found in POs, is fund balance. The second, is the NPO endowment[4] which consists of perpetual investments, the returns on which are used for precautionary savings (Fisman and Hubbard (2005)) and investment. Recognising the importance of the endowment Bowman(2002) proposes that NPOs be thought of as holding companies - made up of an operating company and a supporting mutual fund.

Debt

Both market and non-market debt constitute NPO borrowing channels. Market debt is assessed on a commercial basis and hence investor's required rate of return is established in the market. Non-market debt on the other hand is mostly sourced from individuals with close links to the NPO. Covenants and rates on such loans depend on the utility functions of providers and will often be more generous than market rates. Market debt instruments are similar to those found in POs and include mortgages, bank loans and regular bond covenants. The difference is found in NPOs' access to cheaper tax-exempt private activity bonds[5] (see Figure 1), issued through state or local authority to fund "qualified" projects[6]. In 1986 Congress restricted the volume of issues for each NPO to $150 million (hospitals were excluded), lifting the restriction only in 1997. Figure 1 demonstrates that the total nominal volume of issues in the US, though fluctuating due to interest rates, has grown 96% over the period 1988-2004.

It is significant to note that Federal law barrs creditors from legally prosecuting financially unstable NPOs, yet allows NPOs to file for voluntary bankruptcy in order to liquidate. While such procedures are unlikely to recover lent funds they mean that NPOs are not always solvent. Despite a virtually non-existent direct cost of bankruptcy it can be argued that

Figure 1: Private Activity Tax-Exempt Bond Volume



Source: Federal Reserve Board Satstical Release, H.15 Slected Interest Rates; IRS SOI Bulletin Summer 1999, 2005,2006

indirect bankruptcy costs, especially in terms of social value, are huge. The reason for this is that reputation is arguably the most valuable asset a NPO has. Near bankruptcy might force a NPO to reduce program expenditures and therefore jeopardise reputational capital and hence any future donor support.

Given NPOs' tax-exemption, market debt looses one of its traditional benefits - the tax shield, which arises through the tax-deductibility of interest payments[7]. However, many authors (Wedig (1996), Fisman and Hubbard (2005)) point out that the ability to borrow at tax-exempt rates benefits NPOs with an indirect tax shield. Hence, NPOs either borrow funds in tax-exempt markets and invests these in higher yielding assets or gain indirect arbitrage profits through substitution of internal funds. Restrictions on such borrowing mentioned above lies in attempts to prevent such activities because it is deemed anti-competitive.

2.2 Modigliani and Miller Theory for NPO

No discussion of capital structure theory can begin without considering the benchmark of such theories in the PO world - the Modigliani Miller (1958) Proposition - that under certain conditions[8] leverage is irrelevant for firm valuation. Fundamentally these conditions specify no distortions and perfect and complete capital markets. A risk-class arbitrage proof establishes that two firms with identical (risk adjusted) cash flows can not have differing total value in the market. Otherwise investors can, by using "home-made" leverage, gain an arbitrage profit. Capital structure research since the publication of this result has focused on relaxing the conditions and investigating the interplay between leverage and firm value.

Somewhat surprisingly, no attempt has been made in the literature to apply the M&M proposition to the realm of NPOs. The reason for this is evident from the inherent incomplete markets nature of NPO capital structure. Hence, we can not invoke arbitrage arguments, even if a dividend-in-kind framework can be argued for. Formally, even if debt markets are complete, an "investor" can not sell a "donation" like he can a share.

2.3 Static Tradeoff Theory

Once M&M assumptions[9] are relaxed, the classic Static Tradeoff Theory sees POs trading off the benefit of debt in the form of the tax-shield against the expected bankruptcy costs of high leverage. As noted before, the NPO does not benefit from a direct debt tax-shield and indirect bankruptcy costs are considered extremely high. Even when accounting for a restricted indirect tax-arbitrage-shield, the large costs of debt suggest an all equity capital structure.

However, observing positive NPO leverage ratios force a shift from classic trade-off theory to seeking further benefits of debt issuance. A simple answer could be that, given incomplete markets, debt is necessary to fill a funding gap. Another potential avenue lies in Agency Theory, for example Jensen's (1986) free cash flow hypothesis (see below).

2.4 Asymmetric information and the Pecking Order Theory

With the advent of information economics theorists began to apply the concepts of asymmetric information to capital structure - an extremely fruitful exercise. One competing theory claims that managers have a preference for certain forms of finance, forming a pecking order, based on informational costs (Myers (1984)). The standard claim sees managers preferring internal funds and only turning to debt followed by more expensive equity once these are exhausted.

NPOs' pecking order is only partially informed by informational concerns. Bowman (2002) suggests the following preference in NPOs; retained earnings should be used first, followed by borrowing and finally endowment funds. A preference for retained earnings is explained by NPO managers being averse to default risk and having limited access to other funding. The second preferences is explained by the indirect arbitrage arguments above[10]. Finally, earnings will be preferred to endowment since conversion of assets involves transaction costs. Jegers (1997) proposes an alternative ranking arguing that NPO's prefer internal funds followed by equity then debt, non-market being preferred to market debt.

Pecking order considerations are reflected below when we develop the ideas of equity and debt constraints as well as in our discussion of agency costs.

3 Dynamic Framework

This section breaks from an elucidation of the theories behind NPO finance and analyses capital structure behaviour in a dynamic target adjustment framework. Such models have recently become popular in PO capital structure research (Titman and Tsyplakov (2006), Goldstein et al (2001)). We motivate a target approach by noting that tradeoff allows an illumination of the benefits and costs of leverage. In addition, survey evidence from POs suggests targets are used in practice[11]. Furthermore, NPO adjustment costs are potentially large because capital is often restricted e.g. from donations or tax-exempt borrowing. Thus,

Myers states:

> "If adjustment costs are large, so that some firms take extended excursions away from their targets, then we ought to give less attention to refining our static tradeoff stories and relatively more to understanding what the adjustment costs are, why they are so important and how rational managers would respond to them" (1977 p. 587)

3.1 Model

To model this hypothesis we specify a partial target adjustment model, adopting the novel approach of Drobetz and Wanzenried (2006), and De Miguel and Pindado (2001). We assume that target leverage ratio for NPO i at time t is given by L^*_{it}, which is a linear function of a set of k explanatory variables X_{jit} (where $j = 1, 2, ..., k$) including a constant[12]:

$$L^*_{it} = \sum_{j=1}^{k} \beta_j X_{jit} \tag{1}$$

Observed leverage ratios, given costly adjustment, evolve according to the following partial adjustment equation:

$$\Delta L_{it} = \lambda(L^*_{it} - L_{i,t-1}) \tag{2}$$

where λ measures the speed of adjustment to the target debt ratio. If $\lambda > 0$ ($\lambda = 0$), there is (no) adjustment towards a target and, if $\lambda < 1$ ($\lambda \geqslant 1$), there are positive (no) adjustment costs[13]. Given our discussion of potentially high adjustment costs a first hypothesis can be formulated:

H_1: NPOs will have sluggish convergence to target debt ratios implying high adjustment costs i.e. λ substantially less than 1.

λ itself can also be modeled endogenously:

$$\lambda_{it} = \alpha_0 + \sum_{j=1}^{p} \alpha_j Q_{jt} \tag{3}$$

where α_0 is a constant and Q_t is a vector of p determinants of the speed of adjustment, primarily macroeconomic variables (hence the t subscript). If all $\alpha_j = 0$ then adjustment speeds are constant.

3.2 Determinants of Target Capital Structure - X_{jit}

Here we consider the variables that are thought to determine target capital structure, basing our analysis on existing static models[14]. In what follows we present hypotheses relating to both financial and total leverage.

Agency

NPOs suffer from agency costs similarly to PO, especially given that the nature of their output precludes the use of incentive contracts. However, as Caers et al (2006) show, the extent of these problems is far from clear. Many authors argue that NPO principal agent relationships are actually described best by Stewardship Theory - which sees parties agreeing on goals rather than the usual agency conflicts. While further discussion[15] is beyond the scope of this paper, for current purposes it suffices to assume that some forms of management expropriation could arise in large NPOs.

We thus turn to Jensen's free-cash flow hypothesis (mentioned in JV) in exploring how agency problems in NPOs relate to leverage. NPO principals (the board) should issue debt in order to tie up any cash flows above those needed for positive net present (social) value investments. Thereby avoiding expropriation by opportunistic managers. Such borrowing often takes the form of formal debt securities due to the ability of external monitoring by investors. Thus,

H_{2a}: NPOs with higher agency problems will have higher target leverage, *ceteris paribus*.

Equity Constraint

JV argue that one of the key determinants of target capital structure is the availability of equity, or constraints on equity. These arise because, as noted by several authors (notably JV and Wedig (1988)), the cost of equity for NPOs is probably lower than the cost of debt. However, given incomplete markets equity is likely to be scarce and hence subject to quantity constraints. If an NPO operates under tighter constraints it is likely to borrow more to make up the funding shortfall. In this way equity constraints in some way account for pecking order considerations, Thus

H_{2b}: NPOs subject to stronger equity constraints are likely to have higher leverage ratios *ceteris paribus*.

Borrowing Constraints

Because many NPOs face constraints imposed by capital markets borrowing is not always an option. Amongst other reasons, such constraints are primarily related to assessment of the creditworthiness of the organisation. Thus,

H_{2c}: NPOs with a tighter borrowing constraints will have lower target leverage ratios, *ceteris paribus*.

However given the large size of the NPOs studied in this paper, we may expect H_{2c} not to apply on grounds of negligible borrowing constraints

Direct/Indirect Bankruptcy Costs

While direct bankruptcy costs are low, given a lack of involuntary financial liquidation,

indirect costs are potentially high. Such costs will deter borrowing. Unfortunately, it is next to impossible to measure indirect costs as this would involve estimation of social value, a hitherto speculative exercise.

Endowment

Endowments act as buffer funds for NPOs by providing precautionary saving as well as mitigating NPOs' limited access to capital markets. In addition, endowment assets can be a vehicle for acquisition of an indirect tax-shield. Gentry (2002) finds that, for hospitals, endowment assets are positive predictors of borrowing in tax-exempt markets. The interplay of endowment leverage ratios is complicated; higher endowment funds means lower target leverage ratios while the presence of such funds could imply tax-arbitrage and hence a higher ratio. Thus,

H_{2d}: NPOs with more endowment will have lower or higher target leverage ratios, *ceteris paribus*.

Fixed Assets

Fixed assets as a key determinant of creditworthiness. Firstly they provide collateral and, secondly, a large value of fixed assets is likely to imply a history of successful debt repayment. Hence, we would expect leverage ratios to be positively related to the level of such assets.

H_{2e}: NPOs with more fixed assets will have higher target leverage ratio, *ceteris paribus*.

Donations

Following Bowman(2002), we also investigate the effect of donations on capital structure. While more contributions decrease the need for borrowing, a large ratio of contributions to

total revenue could completely change the nature of the NPO's behaviour. JV explicitly include dummies to account for this. Hence we can't discern a clear effect.

H_{2f}: NPOs that rely more on donations will have lower or higher target leverage, *ceteris paribus*.

Size

In general larger NPOs have better access to capital markets but might not need further funds. Furthermore, including size in regressions serves as a good control. Thus,

H_{2g}: Larger NPOs will have higher target leverage, *ceteris paribus*.

Financial Deficit

The extent of borrowing will depend on the necessity of external funds. We thus expect a NPO with a larger gap between available funds and those needed to cover mission related expenses, to be more disposed to borrowing. Hence,

H_{2h}: Larger the financial deficit the higher target leverage, *ceteris paribus*.

Arbitrage Rate

As we noted above NPOs often borrow at tax-exempt rates to earn an indirect arbitrage. This can be captured by noting the difference in the yield on such bonds and the yield attainable by investing the proceeds (or some internal funds) in (nearly) risk-free assets. Thus,

H_{2i}: The higher the arbitrage spread the higher target leverage, *ceteris paribus*.

3.3 Determinants of the Speed of Adjustment to the Target Capital Structure - Q_{jt}

Drobetz and Wanzenried (2006) show that economy wide factors, specifically the stage of the business cycle or more precisely agent's expectations of business cycle fluctuations, have an impact on the speed of adjustment. In order to capture this we propose using two macroeconomic factors - the term spread and the short term (ST) interest rate.

The term spread, defined as the spread between yields on long term and short term US government bonds, is generally assumed to be a good predictor of the phases of future business cycles. As argued in the literature[16], a negatively (positively) sloping yield curve is a relatively robust predictor of recessions (upswings). Generally, an economic upswing implies higher cash flows and asset valuation, easier access to capital markets and hence faster adjustment of capital structure.

ST rates motivate debt issuance because, firstly, debt is cheaper and, secondly, credit market conditions are more receptive. It is also plausible to assume that NPOs time market interest rates implying smoother adjustment when rates ST rates are lower.

The above discussion motivates the following two hypotheses. Importantly both are not theoretically grounded and merely serve as questions posed to the data. Therefore,

H_3a: Do higher term spreads imply faster adjustment speeds, *ceteris paribus*?
H_3b: Does a higher short term rate imply slower adjustment speeds, *ceteris paribus*?

4 Empirical Analysis

4.1 Empirical Literature

The empirical research on NPO capital structure is severely lacking, not extending far beyond the two major papers that we have so far been drawing on. The first, Bowman (2002), tests,

Table 1: Distribution of Assets in the Sample

1%	5%	10%	25%	50%	75%	90%	99%
0.104	0.906	2.141	11.200	32.800	84.300	208.000	1,150.000

Notes: All figures in USD millions

in a static framework, the Pecking Order Theory against the Static Trade-off Theory on a cross section of NPOs from 1991-1994. The author concludes strongly in favour of the static trade-off hypothesis and places an emphasis on endowment effects. The second, JV, is a study of the determinants of capital structure of Californian NPOs. The authors focus on equity costs, borrowing constraints and agency and test using a sample of 22,776 NPOs from the IRS's Core files. In addition, there exist several papers relating speficially to hospitals, but often their results and ideas are hard to generalise to the entire nonprofit universe.

4.2 Data

This paper employes SOI data for the US for 1988 - 2005 drawn from 501(c)(3) Form 990 tax returns[17] made available by the NCCS[18]. Each annual SOI file includes on average 10,000 NPOs, but not necessarily the same ones each year, forming a stratified sample which includes all NPOs with more than $10 million in assets ($30 million after 2000), along with a random sample of smaller organisations ($25,000 to $10 million).

In the process of constructing a panel, we were forced to drop the majority of smaller NPOs[19] giving rise to the total asset level distribution in Table 1. Panel data is used because, besides offering a larger sample size, it allows us to explicitly control for the effects of unobserved heterogeneity which is likely to be extremely important in NPOs.

The sample was cleaned to exclude NPOs flagged out of scope by NCCS. We also drop those NPOs with unknown classification and those not in major 7 NTEE classification groups[20]. Following other authors, mutual benefit organisations were dropped as they are dominated by TIAA-CREF. Finally it was necessary to remove observations for organisations

that had errors in their statements[21]. For statistical reasons, extreme values of observations of the key variables were removed[22]. All dollar values were deflated using a implicit price deflator[23]. Finally, in order to apply our dynamic framework it was necessary to exclude organisations for which we had less than 10 years of observations. The final sample contains an unbalanced panel of 8380 NPOs over an average 14.8 years, giving 124,177 observations.

4.3 Variables

In this section we describe how each of the determinants and variables alluded to above are measured. All values are end of fiscal year. It is important to note at this stage the proxy nature of most of the variables; this is very common in capital structure research.

4.3.1 Dependent Variables

Leverage

Capital structure (Lev) is defined as:

$$Lev = total\ liabilities^{24}/total\ assets$$

These variables are inevitably reported at book value. The existence of market values for most of them is not even conceivable[25]. This variable, as pointed out in JV, is noisy as certain assets and liabilities accrue automatically.

Financial Leverage

Following JV we also use financial leverage defined as

$$FLev = (Tax\text{-}exempt\ bonds + Mortgages\ and\ notes\ payable)/total\ assets$$

which measures borrowing ratios that involve formal financial contracts. Firstly, the value of tax-exempt bond liabilities is only available in our data from 1993 onwards. Secondly, since over 34.14% of our sample report no financial leverage, we run regressions only on non-zero

values of this variable. This leaves a second unbalanced panel of 6386 NPOs, totaling 57,552 observations.

We also define a dummy variable $FlevD$ which takes the value of 1 if financial leverage is positive and 0 otherwise. We use the latter variable in our investigating of the determinants of formal borrowing.

4.3.2 Explanatory Variables

In the following tables the variable definitions are presented.

• Capital Structure Target Determinants

Determinant	**How to measure**	**Variable**	**Formula**	**Effect**
Agency	JV suggest using total salaries as a proxy for potential agency costs. This gives a measure of size and hierarchy[26]	*Sal*	(Officers' compensation + other salaries)/total assets	+
Equity Cost	We need a measure of cash flow. This is simply net income to which we add (subtract) non-cash costs (revenue)	*CF*	Net income + Depreciation/Total assets[27]	–
Borrowing Constraint	NPOs that are related to others are likely to be perceived more credit worthy	*RD*	Dummy variable = 1 if the NPO has some relation to another and = 0 otherwise	+
Endowment	Bowman(2002) proposed proxying endowment assets by total investment	*Endow*	Total investment in securities, fixed assets and other/Total assets	+/-

Determinant	**How to measure**	**Variable**	**Formula**	**Effect**
Arbitrage Spread	The difference between yield on Aaa Mody's rated corporate bonds and state and local bonds	*Arbrate*	Aaa rate - State and local rate	+
Donation	Share of total revenues attributed to donations	*Don*	Total Contrib/Total Revenue[28]	?
Financial Deficit	Finance needs are proxied by program service expenses and the fund balance measures available capital	*Findef*	Prg expenses/Fund Balance[29]	+
Size	Proxied by assets. The logarithmic transformation accounts for the conjecture that small NPOs are particularly affected by a size effect	*Size*	ln(Total Assets)	+
Fixed Assets	This is simply given by Land Buildings and Equipment	*Fix*	LBE/Total Assets	+

• Speed of Adjustment Determinants

Determinant	How to measure	Variable	Effect
Term Spread	Measured as the difference between the yield on 10 year US government bonds and the 3 month constant maturity rate	*Term*	+
ST Interest rate	Rate on 3 month treasury bills in the secondary market	*STrate*	-

Source of Data: Federal Reserve Board Statistical Bulletin H.15

4.4 Descriptive Statistics

Table 2 Panel A presents summary statistics for the determinants of target capital structure. Panel B presents the same statistics for the macroeconomic variables.

Table 2: Descriptive Statistics of explanatory variables (Full sample)

			Std. dev.		
	Mean	Median	Overall	Between	Within
Panel A: Determinants of target capital structure					
Sal	0.307	0.186	0.601	0.512	0.335
CF	0.067	0.063	0.269	0.084	0.257
Endow	0.320	0.236	0.316	0.281	0.146
Fix	0.354	0.366	0.271	0.243	0.128
Don	0.257	0.094	0.385	0.313	0.232
Findef	1.884	0.761	2.818	2.605	1.223
Arbrate	1.631	1.698	0.347	0.082	0.339
Size	17.08	17.31	1.841	1.799	0.436
Panel B: Determinants of speed of adjustment					
STrate	4.41	4.78	1.910	0.424	1.872
Term	1.680	1.540	1.081	0.122	1.075

Table 3 shows the mean, median and cross sectional standard deviation for both measures of leverage over the period 1988 to 2005. The bottom panel of the table depicts the overall mean and the overall, between and within standard deviations. There are several noteworthy observations. Firstly, consistent with movement in interest rates, mean leverage, both financial and total, peaks in 1993-1994 and rises again after 2000. Secondly, confirming the heterogeneity of the sector, we see huge and persistently high standard deviations. Finally the mean total leverage and mean financial leverage for NPOs with positive levels of such borrowing is higher than that found in POs in the US, while the standard deviation is much higher (Wald(1999) calculates mean total debt to assets ratio of US firms to be ca. 23.4% with a 15.1% standard deviation).

4.5 Analysis and Estimation

4.5.1 Specifications

In order to construct testable specifications we must first re-formulate our model. Re-arranging equation (2) gives

$$L_{it} = \lambda L^*_{it} + (1 - \lambda) L_{i,t-1} \tag{4}$$

Now substitute equation (1) into the above and re-arrange, giving our first specification, transformed to include panel fixed effects.

$$L_{it} = \sum_{j=1}^{k} \lambda \beta_j X_{jit} + (1 - \lambda) L_{i,t-1} + d_t + \phi_i + \eta_{it} \tag{5}$$

where d_t are time specific effects, ϕ_i is a NPO specific effect and η_{it} is a white noise disturbance term.

We next try to endogenize the speed of adjustment coefficient λ. In order to keep the estimation problem manageable and avoid multi-collinearity, we apply the two determinants separately one at a time. This implies Q_t is a scalar. Substituting equation (1) and (3) into

Table 3: Descriptive Statistics of Leverage

	Lev (8390 groups)								
Year	Mean	Median	SD.						
1988	36.88	28.60	35.12						
1989	37.67	29.80	35.90						
1990	38.61	30.95	37.26						
1991	39.75	32.52	36.47	**FLev** (8107 groups)			**Flev** (>0) (6386 groups)		
1992	40.04	33.24	35.28	Mean	Median	SD.	Mean	Median	SD.
1993	40.15	33.31	35.13	23.47	8.63	32.29	37.95	32.97	33.71
1994	40.49	34.11	35.11	21.14	9.26	27.78	31.81	25.62	28.66
1995	39.54	32.49	35.88	20.58	9.12	28.05	30.94	24.38	29.36
1996	38.11	30.69	35.93	19.98	8.32	31.17	30.29	23.60	34.07
1997	37.43	29.41	36.41	19.41	7.92	27.00	29.83	23.04	28.46
1998	37.55	29.36	37.60	19.42	7.45	27.50	30.34	23.53	29.16
1999	37.50	29.32	36.32	19.66	7.96	27.74	30.42	23.62	29.38
2000	37.77	29.53	36.84	20.06	9.07	28.01	30.73	23.82	29.56
2001	38.72	30.14	39.72	20.28	9.82	27.58	30.78	24.20	28.84
2002	39.86	32.11	38.52	20.87	10.88	27.38	31.33	25.26	28.24
2003	39.84	32.14	38.90	20.89	11.13	28.81	31.38	25.31	30.29
2004	39.45	31.73	40.34	20.54	11.19	27.11	30.74	25.05	28.05
2005	37.25	30.81	33.88	19.83	12.10	25.14	28.47	23.28	25.73

	Lev	**Flev**	**Flev** (>0)
Overall Mean	38.73	20.31	30.83
Overall Median	31.10	9.42	24.40
Overall Std. dev.	36.82	28.01	29.43
Between Std. dev.	33.90	25.96	27.46
Within Std. dev.	16.26	11.14	11.61

Notes: All numbers are expressed as %; SD. denotes standard deviation

equation (4) gives:

$$L_{it} = (\alpha_0 + \alpha_1 Q_t) \sum_{j=1}^{k} \beta_j X_{jit} + (1 - \alpha_0 + \alpha_1 Q_t) L_{i,t-1} + u_{it} \tag{6}$$

Multiplying out, results in our second specification:

$$L_{it} = (1 - \alpha_0) L_{i,t-1} + \alpha_1 Q_t L_{i,t-1} + \alpha_0 \sum_{j=1}^{k} \beta_j X_{jit} + \sum_{j=1}^{k} \beta_j \alpha_1 Q_t X_{jit} + d_t + \phi_i + u_{it} \tag{7}$$

where ϕ_{it} and d_t are as above and u_{it} is a white noise error term. In this equation, as noted

before, we are mainly interested in the coefficient on the interaction term $Q_t L_{i,t-1}$, namely α_1.

4.5.2 Estimation Technique

The basic problem with estimating our models, containing a lagged dependent variable, is that the traditional OLS and panel estimators will be inconsistent[30]. Hence we apply a different approach. We first difference the data to help remove the NPO specific time invariant effect, ϕ_i. This still leaves the problem that the lagged dependent variable is endogenous since $\Delta L_{i,t-1} = L_{i,t-1} - L_{i,t-2}$ correlates with the $\eta_{i,t-1}$ in $\Delta\eta_{it} = \eta_{it} - \eta_{i,t-1}$. This problem suggests a instrumental variable approach.

Arellano and Bond (1991) suggest a method that employs deeper lags of the level variables as instruments and a Generalised Method of Momements (GMM) framework to obtain a consistent estimator - Dif-GMM estimator. Although Dif-GMM is superior, recent work has shown it suffers from the problem of weak instruments as it ignores information concerning the parameters in the level variables (Arellano and Bover (1995)). A better estimator, developed in Blundell and Bond (1998) proposes using instruments in first differences for the equation in levels and instruments in levels for equation in first difference forming a system GMM estimator (sys-GMM). This has several advantages primarily in that it is more efficient that the Dif-GMM estimator if the dependent variable is persistent (which is likely to be the case of leverage (Drobetz and Wanzenried (2006), Antonious et al (2008)). In addition, because two equations are estimated, apart from controlling for individual fixed effects, variations among firms can be partially retained. Therefore, following Antonious et al (2008) and Lemmon et al (2007), we adopt this estimator for our dynamic model.

In our regressions we use the two step version, which use one-step residuals to construct asymptotically optimal weighting matrices. We also invoke the Windmeijer (2005) adjustment to correct the standard errors for downward bias[31]. Windmeijer (2005) shows that the two-step estimator with corrected standard errors is modestly superior to the one-step

estimator, especially if disturbances are non-spherical (Blundell and Bond (1998)).

In general, internal instrumenting is very helpful in capital structure research where many variables are endogenous. This arises, firstly, because the proxies used might be determined simultaneously with the leverage ratio and, secondly, because there might be delay between decision and execution of capital structure optimisation.

As noted above our estimator is only valid if there is no second order serial correlation in differenced residuals - in every regression we report the Arellano Bond test for this (AB AR(2)) with the null hypothesis of no serial correlation. We also report a Sargan test of overindetifying restrictions to test the validity of our instruments. Several theoretically plausible speficiations concerning the endogeneity of explanatory variables were tested. The best results were achieved for models that assume all variables are ednogenous[32]. This is not uncommon in POs research (Drobetz and Fix (2003)) and it is likely that the NPO's "mission", captured in the error term, is correlated with all the regressors.

4.5.3 Determinants of Target Leverage

The estimation of the dynamic model depends crucially on correct speficiation of target capital structure. Table 4 presents the correlations between all variables. The results confirm that the determinant variables are appropriate to model a time varying structure. Furthermore, we find preliminary evidence for the majority of the hypotheses mentioned. There is as expected high correlation between the two macroeconomic variables, supporting our arguments of including them separately in our regressions[33].

To substantiate these results further we test equation (1) by fixed effects regression. Fixed effects is warranted because we would expect the unobserved effects to be correlated with regressors. This is confirmed by the Hausmann test. The results are presented in Table 5. The effect of all statistically significant variables is in the direction predicted by our hypotheses. Strongly significant Wald tests confirm the relevance of all our variables for a time varying target.

Table 4: Correlation matrix

	Sal	*CF*	*RD*	*Endow*	*Fix*	*Don*	*Findef*	*Size*	*Arbrate*	*Term*	*STrate*
Lev	0.199^{***}	-0.080^{***}	0.109^{***}	-0.431^{***}	0.335^{***}	-0.215^{***}	0.752^{***}	-0.022^{***}	-0.006^{**}	0.0240^{***}	-0.016^{***}
Flev	-0.039^{***}	-0.1518^{***}	0.067^{***}	-0.330^{***}	0.352^{***}	-0.188^{***}	0.593^{***}	-0.165^{***}	0.0066	0.021^{***}	-0.010^{**}
Sal	1.000										
CF	-0.036^{***}	1.000									
RD	-0.028^{***}	0.023^{***}	1.000								
Endow	-0.257^{***}	-0.006^{**}	-0.043^{***}	1.000							
Fix	0.016^{***}	-0.006^{**}	-0.0127^{***}	-0.631^{***}	1.000						
Don	-0.020^{***}	0.007^{***}	-0.161^{***}	0.156^{***}	-0.228^{*}	1.000					
Findef	0.342^{***}	-0.072^{***}	0.054^{***}	-0.383^{***}	0.234^{***}	-0.121^{***}	1.000				
Size	-0.310^{***}	0.017^{***}	0.211^{***}	0.256^{***}	-0.061^{***}	-0.213^{***}	-0.196^{***}	1.000			
Arbrate	0.012^{***}	0.025^{***}	0.130^{***}	-0.062^{***}	0.036^{***}	-0.027^{***}	0.004	-0.080^{***}	1.000		
Term	0.006^{**}	-0.021^{***}	-0.156^{***}	-0.011^{***}	0.012^{***}	0.028^{***}	0.019^{***}	-0.006^{**}	-0.354^{***}	1.000	
STrate	0.010^{***}	0.033^{***}	0.255^{***}	-0.059^{***}	0.035^{***}	-0.043^{***}	-0.007^{**}	-0.072^{***}	0.773^{***}	-0.709^{***}	1.000

****/**/* denotes significance at the 1%/5%/10% level*

Table 5: Fixed effects regressions for capital structure determinants

	Lev	**FLev** (> 0)
Sal	0.030^{***}	-0.036
	(0.011)	(0.024)
CF	-0.028	-0.127^{***}
	(0.023)	(0.036)
Arbrate	-0.001	0.002
	(0.005)	(0.003)
RD	0.005^{***}	0.003
	(0.002)	(0.002)
Endow	-0.066^{***}	0.024^{**}
	(0.009)	(0.012)
Fix	0.049^{***}	0.123^{***}
	(0.011)	(0.015)
Don	-0.001	0.000
	(0.002)	(0.003)
Findef	0.064^{***}	0.029^{***}
	(0.001)	(0.002)
Size	0.038^{***}	0.056^{***}
	(0.005)	(0.013)
Cons	-0.386^{***}	-0.790^{***}
	(0.092)	(0.239)
Number of observ.	124,177	57,552
Number of groups.	8380	6386
R^2 within	0.261	0.116
R^2 between	0.687	0.165
R^2 overall	0.593	0.158
Wald test (p)	0.000	0.000
Hausmann test (p)	0.000	0.000

*Notes: ***/**/* denotes significance at the 1%/5%/10% level; robust standard errors in parentheses; All regressions run with time dummies as controls; reported Wald test tests the H_0 that the coefficients on all determinants are 0; (p) denotes p-value*

4.5.4 Constant Adjustment Speed Estimates

Table 6 reports the dynamic panel estimation results assuming a constant adjustment speed. To achieve the best results, we follow Drobetz and Wanzenried (2006), and include in our regressions, purely for statistical reasons, the second lag of leverage (coefficients not reported).

Furthermore, we include the lags of all the explanatory variables, justified by the fact that managers in NPOs are likely to be backward looking. We also attempted many specifications of the instrument matrix. The reported results use all lags of the dependent variable and the third lags of the endogenous variables to instrument the equation in first difference and the lagged first difference of dependent variable and the first and second lags of the first difference of endogenous variables as instruments for the equation in levels. This instrument specification is robust to minor changes.

We can clearly see that hypothesis H_1 holds as evidenced by a low λ coefficient of 0.368 on leverage and 0.363 on financial leverage. These values are surprisingly higher than those estimated for POs (Huang and Ritter (2007) cite, despite mixed evidence, high adjustment speeds at around these values).

Hypotheses regarding the target variables are partially supported by the data. High cash flows (H_{2b}), both current and previous period, implying a low equity cost, are found to have a negative effect on leverage, with a more pronounced effect on financial leverage. Furthermore, contemporaneous financial deficit has a positive effect on both types of leverage (H_{2h}), while lagged financial deficit has a negative effect. The latter explained by noting that high financing gaps in the past were probably filled by securing other financing that requires less borrowing in the current period. We find in favour of our agency hypothesis with higher salaries leading to higher target leverage ratios. However, this borrowing does not necessarily take the form of financial contracts. Finally, endowment assets are found to have a negative effect on leverage.

4.5.5 What determines Adjustment Speed

Table 7 presents results of estimating equation (8) using sys-GMM. Our main focus lies in estimating parameter α_1, the coefficient on the interaction term Q_t and $L_{i,t-1}$. Hence, we report this coefficient together with estimates of the parameter α_0. Regressions for total leverage include its second lag and use the same instruments as described above. Regressions

Table 6: Constant Adjustment Speed

	Lev		**Flev**	
	Coefficient	λ/β_j	Coefficient	λ/β_j
Lev_{t-1}	0.632***	0.368	0.637***	0.363
	(0.097)		(0.109)	
Sal	0.092*	0.250	-0.004	0.012
	(0.052)		(0.064)	
Sal_{t-1}	-0.078	0.212	-0.017	0.047
	(0.049)		(0.043)	
CF	−0.183*	0.497	−0.215***	0.592
	(0.102)		(0.064)	
CF_{t-1}	-0.143	0.389	−0.353**	0.972
	(0.102)		(0.162)	
$Endow$	−0.111*	0.302	0.074	0.204
	(0.064)		(0.148)	
$Endow_{t-1}$	0.033	0.090	-0.106	0.292
	(0.052)		(0.122)	
$Arbrate$	0.004	0.011	0.006	0.017
	(0.004)		(0.004)	
Fix	0.128	0.348	0.142	0.391
	(0.114)		(0.155)	
Fix_{t-1}	-0.106	0.288	-0.187	0.515
	(0.089)		(0.122)	
Don	-0.010	0.027	0.002	0.006
	(0.013)		(0.036)	
Don_{t-1}	-0.008	0.022	-0.033	0.090
	(0.010)		(0.032)	
$Findef$	0.060***	0.163	0.0266**	0.072
	(0.011)		(0.012)	
$Findef_{t-1}$	−0.037***	0.101	−0.020**	0.055
	(0.008)		(0.009)	
$Size$	0.037	0.000	0.101	-0.023
	(0.031)		(0.071)	
$Size_{t-1}$	-0.027	0.073	0.012	0.033
	(0.031)		(0.065)	
RD	0.001	0.003	0.003	0.008
	(0.002)		(0.003)	
Number of instruments	442		269	
Number of groups	8380		6182	
Wald 1 (p-value)	0.000		0.138	
Wald 2 (p-value)	0.000		0.000	
Sargan (p-value)	0.172		0.924	
AB AR(2) (p-value)	0.414		0.072	

*Notes: ***/**/* denotes significance at the 1%/5%/10% level; Windmeijer (2005) corrected standard errors in parentheses; AB AR(2) is the Arellano and Bond(1991) test for second order autocorrelation in the differenced residual; All regressions include a constant and state and time dummies; Wald 1 tests the joint significance of time dummies; Wald 2 tests the joint significance of target variables*

for financial leverage do not include this variable but use the same instruments.

Table 7: Endogenous Adjustment

	Lev	**Flev**
$Lev_{i,t-1}$	0.183***	0.140***
	(0.030)	(0.052)
$Lev_{i,t-1} \times Term$	-0.007	-0.007
	(0.013)	(0.007)
Wald (p-value)	0.000	0.001
Sargan (p-value)	0.185	0.945
AB AR(2) (p-value)	0.450	0.152
$Lev_{i,t-1}$	0.253***	0.146***
	(0.057)	(0.042)
$Lev_{i,t-1} \times STrate$	0.012	-0.002
	(0.008)	(0.003)
Wald (p-value)	0.000	0.000
Sargan (p-value)	0.052	0.858
AB AR(2) (p-value)	0.534	0.303
Number of instruments	699	438
Number of groups	8380	6174
Number of Obervations	100,042	44,707

*Notes: ***/**/* denotes significance at the 1%/5%/10% level; Windmeijer (2005) corrected standard errors in parentheses; AB AR(2) is the Arellano and Bond(1991) test for second order autocorrelation in the differenced residual; Wald tests the joint significance of target determinants; All regressions include state but not time dummies*

It is evident from Table 7 that neither of our macroeconomic variables have an effect on the adjustment speed. In other words, the data suggests that it is correct to model leverage process using a constant adjustment speed.

4.6 Extension - The decision to borrow

Since of 34% of NPOs in our sample report no financial liabilities we use a panel conditional fixed effects logit model to investigate equation (1) i.e. the decision to borrow. Note, such a regression necessarily drops all NPOs for which we have all positive outcomes. Table 8 presents the results of this investigation.

Table 8: Fixed Effects Logit model of Financial Leverage

Sal	0.088
	(0.063)
CF	-0.133
	(0.085)
Findef	0.213***
	(0.018)
Size	1.652***
	(0.059)
Fix	2.778***
	(0.159)
Don	0.069
	(0.054)
Endow	-0.162
	(0.138)
Arbrate	0.012
	(0.081)
RD	0.197***
	(0.055)
Number of groups	2354
Number of observations	25,339
Log(likelihood)	-9,461
Wald 1 (p)	0.000
Wald 2 (p)	0.000

*Notes: ***/**/* denotes significance at the 1%/5%/10% level; Regression includes time dummies as controls; Wald 1 tests significance of year dummies and Wald 2 the joint significance of all variables*

We can clearly see that large well connected NPOs with high financing deficits and high ratios of fixed assets to total assets are the most likely to borrow through formal financial instruments. These results support our hypotheses and make intuitive sense as mostly hospitals and large educational institutions participate in tax-exempt markets.

5 Conclusion

In trying to understand the capital structure of nonprofit organisations this paper takes a novel approach by framing such decisions in a dynamic model. We find strong support for this method in our sample where NPOs exhibit a sluggish adjustment process. In this framework we also establish and explore several hypotheses regarding the determinants of a time varying NPO specific target. Instrumental among these are the positive effect of financial deficit, negative effect of cash flow over total assets as a measure equity constraints and a positive effect of total salaries over total assets as a proxy for agency costs. We find that the relative importance of these variables depends on whether total leverage or financial leverage is being studied. Endogenizing speed of adjustment to account for macroeconomic factors leads us to conclude that speed of adjustment is better modeled as a constant. As an extension we note that many NPOs in our sample do not report any financial liabilities. To account for this we employ a fixed effects logit specification to explain financial borrowing. The significant effects include size, fixed assets, relation dummy and financial deficit.

Perhaps the most important goal of this paper is to draw attention to this fledgling field. Within the framework proposed here, which has recently become popular in PO research, we can identify a host of topics that lend themselves to further research. For example we could consider disaggregating by NTEE groups to account for the heterogeneity of the sector. Other NPO specific determinants of speed of adjustment could be tested e.g. distance to target to account for asymmetric adjustment. Leverage ratios can be further dissected to investigate determinants and processes of tax-exempt borrowing as well as non-market debt. In the context of the latter stewardship theory ideas could be tested. Finally, given the serious persistence of leverage, Huang and Ritter (2007) suggest the long differencing estimator developed by Hahn et al (2007) is more appropriate.

Fundamentally much can be gained from cross-applying ideas from PO research to understand this third sector.

6 Appendix

6.1 Form 990 Variables

Variable	Position on Form 990
Total Assets:	line 59
Total Liabilities:	line 66
Total Revenue:	line 12
Tax Exempt Bonds:	line 64a
Mortgages and notes payable:	line 64b
Compensation of officers, directors:	line 25, column (A)
Other salaries:	line 26, column (A)
Net income:	line 18
Depreciation:	line 42, column (A)
Related NPO:	line 80a
Investment in LBE:	line 55c
Investment in Securities:	line 54c
Other Investment:	line 56
Land Buildings and Equipment:	line 57c
Total Contributions:	line 1d
Fund Balance:	line 21
Program Service Expenses:	line 44, column (B)

Form 990 specimen at:

`http://nccs2.urban.org/nccsdataweb/SOIfields_990andA.pdf`

Notes

[1]This study primarily focuses on the 501(c)3 group of US public charities. These organisations receive the most generous tax treatment, being exempt from most state and local taxes

[2]There has been a steady improvement in the efficiency of such markets. Currently there exist countless orgnisations, guidestar.org being the prime example, set up to alleviate informational deficiencies. Donor capital has also become much more sophisticated with the rise of new philanthropy. For example the Nonprofit Finance Fund in the US has introduced an equity like financial instrument for NPOs and research into a social stock exchange is underway in the UK

[3]Bowman (2002) interestingly points out a similarity in POs, where almost three-quarters of publicly traded corporations in the US do not declare dividend and reinvest all profits.

[4]This source of internal equity is very important for the large NPOs studied here

[5]Investors in effect push down yields on such bonds to reflect their tax free nature. Over the period 1988 - 2005 the average annual interest rate differential off tax-exempt private activity bonds was 1.6%

[6]The majority of tax-exempt securities volume is issued for the purposes of education and health, i.e. primarily by hospitals and educational establishments

[7]Indeed the fact that tax-exempt entities have positive leverage is often used as indirect evidence against the basic static trade-off theory in POs

[8]For an excellent exposition of the necessary conditions see Duffie (1992)

[9]Modigliani and Miller actually recognised the tax-shield benefits of debt in their paper

[10]Indeed, investing endowments is profitable business, over the past decade many university endowments outpaced the S&P 500 and other institutional investors. According to NACUBO and TIAA-CREF, university endowments in 2007 made an average return of 10.7% net of fees and expenses, with some blockbuster endowments achieving 20% returns

[11]Evidence of this is presented in Graham and Harvey (2001) and Brounen et al. (2004)

[12]The approach is novel because some authors have used exogenously determined target ratios measured either using historical data or industry averages (Jalilvand and Harris (1984), Shyam-Sunder and Myers(1999))

[13]Over-adjustment can be thought of as arising from unanticipated shocks

[14]We draw heavily from ideas developed in Bowman(2002) and Jegers and Vershueren (2006), see Empirical Literature section

[15]readers are referred to the aforementioned paper

[16]See Estrella and Hardouvelis (1991)

[17]All NPOs with gross receipts of $25,000 or more, apart from religious organisations, are required to file

a Form 990 tax return annually

[18]The overall reliability of the database is shown to be acceptable, despite NPOs being aware of the use of Form 990s by donors to calculate important ratios and trying to manipulate them. Froelich, Knoepfle and Pollack (2000) compare audited financial statement data to Form 990 entries. They find that, although income statement and balance sheet entries are of lower quality, there is a reasonable consistency with the audited financial statements

[19]Notice that the bulk of the sector's revenues and assets are held by the top 5-10% of organisations

[20]This includes Arts, culture and humanities; Health (including Hospitals); Education (Including Higher Education); Public benefit; Human Services

[21]This included removing NPOs with no assets, negative values of variables that could not be negative e.g. liabilities and salaries

[22]This involved trimming the top and bottom 0.5% of variables that were not already censored

[23]This is provided by the Bureau of Economic Analysis in the US and transforms nominal variables to real values in 2000 dollars

[24]This includes accounts payable, accrued expenses, grants payable, deferred revenues, non market debt from officers, tax-exempt bonds, mortgages and other notes payable, other liabilities

[25]However using book values in POs is not unusual e.g. Rajan and Zingales (1995) or Dorbitz and Wanzenreid (2006)

[26]We could have used number of employees but this variable is only available from 1997 onwards and correlates, naturally, with salaries.

[27]A more direct measure of cash flow would be CF1 = net income + 2*depreciation - Δ net fixed assets - Δ working capital requirement. Where working capital requirement is defined as cash + accounts payable inventories - accounts payable and net fixed assets is defined as land buildings and equipment net of depreciation (hence why we add back depreciation twice). However, due to differencing this variable reduces the number of observations and its effects are insignificant in all regressions

[28]It is entirely possible to have negative revenue. To avoid negative donation ratios we use the absolute value of revenue

[29]If fund balance is 0 we set this variable to equal program service expenses. If fund balances are negative we add its value to expenses. Extremely large values of financial deficit are censored at 10

[30]OLS is clearly inconsistent while the within transformation also induces a strong correlation between the error and the transformed regressors

[31]Historically researchers use one-step robust estimates for inference because of the severe downward finite sample bias in the two step standard erros. However, the Windmeijer (2005) correction has greatly reduced

this problem

[32]All apart from the dummy RD which is taken as exogenous

[33]There are also two notable problems. Firstly, there is high correlation between *Endowment* and Fix. Exclusion of either variable does not significantly alter the results. Secondly, there is a natural correlation between the *Arbrate* and $STrate$, however specifications are robust to exclusion of the latter variable

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