Nonprofit Death Spirals: Balance Sheet Insolvency and Contribution Revenue in Nonprofit Organizations

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Abstract

Using Form 990 data reported by public charities, we document significant bunching of nonprofit organizations at near-zero net assets and use this result to examine the financial dynamics of organizations as they approach insolvency. Bunching occurs across organizations of various ages and sizes, despite the fact that creditors cannot force nonprofit organizations into involuntary bankruptcy in the same manner as for-profits. The extent of bunching appears related to the revenue models of the organizations; donation-dependent organizations are much more likely to bunch than organizations that rely on program revenue or governmental grants. We show that when nonprofits report low levels of net assets relative to their size, contributions from donors decline, exacerbating ongoing financial distress. Although nonprofits can continue to operate while balance sheet insolvent, managers and donors appear to regard the zero net assets threshold as a salient reference point in their assessment of an organization’s viability.

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1 Introduction

A for-profit business is balance sheet insolvent if its total liabilities exceed its total assets, a condition that typically results in bankruptcy or restructuring. While many nonprofit organizations similarly experience balance sheet insolvency, the options available to them differ from their for-profit counterparts, in part because creditors cannot force non-profits into involuntary bankruptcy; instead, the decision to liquidate or re-structure lies with the organization’s board of directors. Nevertheless, insolvent organizations face considerable financial challenges, including a skeptical donor base and higher debt costs.

Using a panel of nearly half a million public charities spanning 2005 to 2015, we document significant bunching at zero net assets. Bunching occurs among organizations of various ages and sizes. The extent of bunching among different types of non-profits appears related to the revenue models of the organizations; non-profits that rely heavily on contribution revenue are much more likely to bunch than organizations that rely primarily on program revenue or governmental grants. In this paper, we explore the underlying causes of these patterns. We show that the greater degree of bunching among donation-dependent organizations relates to the fact that contribution revenue begins to decline as non-profits approach insolvency and drops precipitously across the insolvency threshold.

These findings are consistent with previous work in the nonprofit literature showing that donors are sensitive to the financial health of the organizations to which they contribute. For the average public charity, donor contributions are the primary source of revenue – in our data, the median nonprofit receives 53% of its revenue from contributions – and consequently, how donors decide to allocate their charitable contributions has been a focus of much of the nonprofit finance literature. Prior research shows donors factor in the amount of net assets of the organizations to which they contribute (Calabrese, 2011), the amount of cash on hand (Calabrese, 2011), the degree of leverage (Calabrese and Grizzle, 2012), and the amount of program revenue (Okten and Weisbrod, 2000). Moreover, there is also clear evidence that non-profits shift their behavior in response to these donor preferences (Calabrese, 2013;
While the existing literature recognizes the importance of nonprofit financial position on donor contributions, it fails to identify specific benchmarks that may represent pivotal thresholds in the minds of external parties. We demonstrate that zero net assets represents an important focal point. Donors to nonprofits, who must decide how to allocate their giving among various organizations, recognize organizations at or below zero net assets as financially distressed and consequently withhold donations. Meanwhile, nonprofit managers, who must decide whether to unwind an organization or continue operations, often choose to discontinue operations once an organization becomes balance sheet insolvent.

Besides contributing to the literature on nonprofit finance, this paper also relates to the study of bunching in the public economics literature. In recent years, bunching designs have become an increasingly popular method for studying behavioral responses to policy discontinuities. While the early bunching papers focused on the earnings responses of individuals to kinks in the income tax schedule (Saez, 2010), the literature has since expanded to examine behavioral responses in a variety of contexts. A number of recent papers have specifically documented bunching among nonprofit organizations at various accounting metrics. Omer and Yetman (2003) document a spike in the frequency distribution of nonprofits at near-zero taxable income. St.Clair (2016) demonstrates how nonprofits manipulate their revenues to avoid audit requirements, while Marx (2015) shows bunching in gross receipts at the Form 990 filing threshold.

While this paper also studies bunching in response to an accounting threshold, it differs from the St.Clair and Marx papers in that the observed bunching appears to be driven by a “reference point” (Kleven, 2016) rather than a specific statutory threshold based on regulatory requirements. In this sense, the behavior we observe is consistent with prospect theory, as set out by Kahneman and Tversky (1979), that has since formed the basis for much of behavioral economics and finance. Donors use balance sheet solvency as a heuristic for financial health, which simplifies decision-making on how to best allocate scarce donative
This paper proceeds as follows. Section 2 reviews the relevant literature on insolvency and nonprofit finance. Section 3 describes the dataset. Section 4 presents graphical evidence of bunching at zero net assets. Section 5 explains the pattern of results we observe by examining the relationship between net assets and various metrics of financial growth. Section 5 discusses the theoretical implications, and section 6 concludes.

2 Background on Nonprofit Finance

Like for-profit companies, nonprofit organizations face two different kinds of insolvency: cash-flow insolvency and balance-sheet insolvency. Cash-flow insolvency refers to the inability of an organization to meet its near-term debts because of liquidity issues. Balance-sheet insolvency occurs when an organization does not have enough assets to cover its debts in liquidation, i.e. total liabilities exceed total assets. In court proceedings, judges sometimes incorporate contingent liabilities when determining whether an organization remains solvent, but we focus solely on accounting insolvency, which only considers whether the organization is “insolvent on the books.”

Bowman (2011) draws a distinction between for-profit and nonprofit balance-sheet insolvency, arguing that nonprofits are balance sheet insolvent when their unrestricted net assets drop below zero, rather than total net assets, since organizations with negative unrestricted net assets will be unable to discharge their obligations to their creditors.

Similar to the for-profit sector, insolvent nonprofit organizations are able to fully liquidate under Chapter 7 of the United States Bankruptcy Code or reorganize under Chapter 11. Unlike for-profit companies, creditors cannot force nonprofit organizations into involuntary bankruptcy; the decision to pursue bankruptcy is determined by the nonprofit’s board.

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1FASB also recently required enhanced disclosures related to an entity’s ability to operate as a going concern (FASB, 2014). Financial statements are typically prepared under the assumption that the reporting entity will continue to operate as a going concern. If liquidation is imminent, financial statements should be prepared under the liquidation basis of accounting.

2Net assets are the nonprofit equivalent of shareholders’ equity. Unrestricted net assets are net assets whose use has not been restricted by donors.
of directors. Furthermore, courts have generally held that creditors of nonprofits are not entitled to the residual value of the enterprise in bankruptcy, which instead remain in the possession of the board.

The inability of creditors to force nonprofits into involuntary bankruptcy as they could with for-profit companies has implications for the management of these firms as they approach insolvency. A for-profit organization with near zero net assets may still be technically solvent, but is worthless to its owners, who may rationally favor liquidation of those assets to compensate its creditors. As a result, for-profits are more likely to enter bankruptcy (The Law Project, 2014). On the other hand, nonprofit organizations can operate with low or even negative net assets, so long as they are able to raise sufficient revenue to service outstanding debts and support operating costs. Nonetheless, nonprofits operating with low to zero net assets may be particularly vulnerable to a financial shock, such as a decline in donor contributions or unexpected increase in operating costs.

A nonprofit organization’s ability to withstand unexpected financial shocks depends to some extent on its financial model, and by extension the type of mission it espouses (Foster, Kim, & Christiansen, 2009). While most organizations accept donor contributions, there is considerable variation in their reliance on contributions, and how those revenues are used. For example, nonprofit hospitals and colleges raise program revenue by providing services, but also solicit donations to finance capital projects and build endowments. Other nonprofit organizations rely primarily on governmental grants to provide social services that may otherwise be supplied by governments, such as housing or education. Fischer, Wilsker, and Young (2011) show that nonprofits providing services that are collective goods have greater reliance on donation revenue, while organizations whose benefits are enjoyed privately are more dependent on program revenue.

The nonprofit sector’s reliance on contribution revenue also has significant implications for financial management. Calabrese (2013) shows that nonprofits do not maintain sufficient liquidity because donors may be reluctant to give to organizations with excessive
cash on hand. On the other hand, Calabrese (2011) shows that in general donors are more likely to give to organizations with greater wealth, which he measures as the sum of unrestricted and temporarily restricted net assets. Together, these papers suggest that while donors prefer charities not to maintain substantial idle cash, they also do not want to give to financially distressed organizations at risk of discontinuing operations.

We contribute to this line of research by examining revenue growth among organizations with relatively little net assets relative to their size. Focusing on this subset of nonprofits enables us to better understand not only what leads nonprofits to become insolvent but also what happens to them when they do cross over the insolvency threshold. In the following sections, we first document significant bunching near the threshold and examine the characteristics of charities with near-zero net assets. Next we examine the factors that lead charities to bunch, focusing in particular on the link between nonprofits’ balance sheet positions and their contribution revenue.

3 Data

Our data source is the National Center for Charitable Statistics’ (NCCS) 2005-2015 Core Financial Files for public charities, which are based on the IRS’ annual Return Transaction Files. The public charities core files contain approximately 50 financial variables for all 501c(3) public charities reporting at least $50,000 in gross receipts that filed either the Form 990 or the Form 990 EZ. The public charities files contain data only on 501c(3) public charities, and consequently our analysis does not include private foundations or exempt organizations that are not 501c(3)s.

Despite Bowman’s (2011) contention that nonprofit balance sheet insolvency should be defined by unrestricted net assets rather than total net assets, we focus on total net assets.

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3 The Form 990 is an information return required by the IRS of all tax-exempt organizations. Organizations with gross receipts of less than $200,000 and total assets of less than $500,000 can file the Form 990 EZ, a simpler version of the form. Organizations with gross receipts of less than $50,000 can file the Form 990-N (e-Postcard)
for two reasons. First, information on unrestricted net assets is not available in the regular Core Financial Files. Though we also possess data on unrestricted net assets from the Full Files for 2012-2015, there is some question as to the accuracy of the unrestricted net assets variable. Second, while Bowman is correct that nonprofits with negative unrestricted net assets are unable to meet their obligations to creditors in the near-term, this is a liquidity issue that pertains more to cash-flow insolvency than to balance-sheet insolvency, and our focus is on a metric that will be highly salient to users of financial statements. Hence, we confine our analysis to balance-sheet insolvency based on net assets.

To compare the behavior of organizations of disparate size, we scale net assets as a percentage of total assets. Because new organizations are also likely to have zero or near-zero net assets, we exclude organizations whose average total assets over the sample period are less than $100,000 in order to focus on the behavior of “mature” organizations near the threshold. While this threshold is somewhat arbitrary, in Table 1 of the Appendix we show that our bunching results do not change appreciably beyond thresholds of approximately $25,000. After excluding organizations with less than $100,000 in assets, the final sample consists of 261,825 organizations and 2,072,737 observations. Table 1 reports summary statistics for the main variables of interest.

4 Bunching at Zero Net Assets

4.1 Graphical Evidence

Figure 1 shows a density plot of public charities and provides the intuition for our analysis. The x-axis shows net assets scaled by total assets; the y-axis shows the number of nonprofits.

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4 The dataset incorrectly codes some organizations as having zero unrestricted net assets when they simply do not report the information. To clean the data, we removed observations in which unrestricted, temporarily restricted, and permanently restricted net assets do not sum to total net assets. Using this cleaned sample, Appendix Figure 1 depicts the bunching of organizations at near-zero unrestricted net assets. The figure is similar in shape to Figure 1 and likely includes substantial overlap since many organizations do not report temporarily or permanently restricted net assets.

5 Harrison and Laincz (2008) demonstrate that there is a negative relationship between nonprofit exit and size or age.
There is significant bunching at one side of the zero net assets threshold. This bunching occurs despite the fact that there is no discontinuity in policy – such as the requirement for organizations above a certain threshold to be audited, as in other analyses of bunching in the nonprofit sector (St.Clair, 2016; Marx, 2015). Instead, zero appears to represent a reference point, i.e. a focal point that is highly salient for managers and donors (Kahneman & Tversky, 1979; Thaler, 1999; Kleven, 2016).

Figure 2 divides the sample into various types of nonprofits based on their IRS classifications and illustrates heterogeneity in the extent of bunching. While there is a spike in the density at zero net assets in each plot, the extent of bunching is greater for nonprofits focused on the environment or international issues. On the other hand, there is less bunching among human services organizations. One key distinction between these two groups is the share of revenues earned from program revenue rather than donations. Human services organizations tend to provide services directly to clients and are compensated by the clients directly or a government sponsor. Examples include the YMCA, a local Boys & Girls Club, or a youth sports association. In contrast, organizations focused on the environment or international issues, such as Greenpeace or Amnesty International, receive most of their revenue from donor contributions.

To investigate this further, Figure 3 plots the share of total revenue received from contributions against the organization’s scaled net assets. Each dot represents the mean value within “bins” of net assets. The percentage of revenue that organizations see from contributions increases linearly once organizations have positive net assets, consistent with Calabrese (2011). The figure also reveals a sharp discontinuity in the percentage of revenue that organizations receive from contributions. Organizations with near-zero but positive net assets receive a much higher percentage of their revenues from contributions than organizations on the other side of the zero-net-asset threshold. Notably, organizations bunching

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6For the remainder of the paper we use scaled ‘net assets’ as a shorthand for net assets as a share of total assets.

7We trim outliers in the top and bottom one percentage of the distribution, effectively eliminating organizations that report negative contributions or significantly more contributions than total revenue.
just above the threshold receive as much as 45 percent of their revenue from contributions, five percentage points higher than organizations with only slightly higher net assets. This is evident from the outlying observation in the figure falling right at zero net assets.

4.2 Measuring the Excess Mass

While the graphical results provide evidence of bunching at the zero net assets threshold, they do not provide quantitative measurements of the extent of bunching. In this section we outline the methodology for identifying the extent of bunching, and compare bunching behavior across different nonprofit sectors.

The bunching design was first introduced by Saez (2010) and further developed by Chetty, Olsen, and Pistaferri (2011) and Kleven and Waseem (2013) to identify tax-induced behavior distortions using kink points in tax schedules. These methods have since been extended to the nonprofit sector to study responses to audit requirements (St.Clair, 2016) and financial reporting requirements (Marx, 2015). Bunching designs are similar to regression discontinuity (RD) designs in that they measure the effect of a policy change at a threshold. However, while RD designs require the assumption that there is no manipulation of the assignment variable, bunching designs exploit such manipulation and use the extent of bunching to infer behavioral measures of interest. In this case, we use a bunching design to study behavior at a reference point that holds no explicit policy significance for nonprofits but instead serves as a salient indicator of an organization’s financial health.

The basic bunching design divides the running variable into bins and counts the number of observations within each bin. The number of excess bins on one side of the threshold is then compared to a counterfactual distribution in which no bunching occurs, with the identifying assumption being that the counterfactual distribution is smooth across the threshold. Borrowing the notation of Kleven (2016), we estimate bunching as follows:

\[ c_j = \sum_{i=0}^{p} \beta_i \cdot (z_j)^i + \sum_{i=z^-}^{z^+} \gamma_j \cdot 1[z_j = i] + v_j \] (1)
where \( c_j \) represents the number of organizations in bin \( j \) and \( z \) represents the level of scaled net assets (net assets / total assets) in bin \( j \). The left-hand side of the equation represents the counterfactual, estimated as a polynomial function that expresses the association between the organization count and net assets, with \( p \) as the degree of the polynomial. The right-hand side measures the extent of bunching by estimating the difference in the bin counts around the threshold (between \( z^- \) and \( z^+ \)) relative to the counterfactual, obtained using a series of dummy variables for bins \( z^- \) through \( z^+ \).

Like regression discontinuity designs, the estimation of bunching is sensitive to various specification choices, most notably the “exclusion window” (the distance between \( z^- \) and \( z^+ \)), the choice of bin size, the degree of the polynomial, and the choice of bandwidth (the range over which the counterfactual is estimated). However, the bunching region is simple to discern using density plots such as Figures 1-2, and as we demonstrate below, our results are largely insensitive to the choice of specification.\(^8\)

Table 2a reports the estimated excess mass based on the sample of organizations with at least $100,000 in assets. The estimates represent a ratio; the numerator represents the number of excess organizations, calculated as the difference between the observed number of organizations within the exclusion window and the estimated counterfactual. The denominator is the number of counterfactual organizations within the exclusion window. The four columns use slightly different specifications, varying the bin width, the polynomial, and the exclusion window. Varying these specification choices has little impact on the estimated excess mass, except for the size of the exclusion window. This is unsurprising given that adjusting the exclusion window alters the number of organizations in the denominator.

The number of excess organizations above the zero net assets threshold represents a little over a third of the number of organizations at the threshold; this figure represents

\(^8\)A potentially more problematic issue raised by Marx (2015) is that bunching estimates based on panel data may be biased if organizations’ response to a threshold in one year is based on their position relative to the threshold in a previous year, e.g. they repeatedly bunch at the notch. This does not appear to be an issue in this analysis; organizations bunching near zero net assets in one year are no more likely to remain in the same bin as those further from the threshold.
approximately 0.60 percent of all organizations. By comparison, Marx (2015) finds that the number of excess organizations above the filing threshold for the Form 990 (the main information return required of not-for-profit organizations by the IRS) is equal to 0.1 percent, only about 1/6th the magnitude of this estimate.

Table 2b considers the heterogeneity of bunching across sectors. These sectors (along with those in Figure 2) are based on the national taxonomy of exempt entities (NTEE) system used by the IRS and the NCCS to classify nonprofits. We use the NTEE (10) major groups, excluding certain groups (mutual benefit, public and societal benefit, religious, and unknown) in order to focus on more common classifications. Estimates in Table 2 use a bin width of 0.01, a bunching range of 0 to 0.1, and a third-degree polynomial. Consistent with Figure 2, Table 2 shows that there is considerably more bunching among international and environmental organizations than there is among human services organizations, with bunching organizations representing approximately 80% of the former and only about 20% of the latter near the threshold.

To better understand the degree of heterogeneity in the bunching estimates, we divide the sample into donation-dependent organizations and non-donation-dependent organizations. We define donation-dependent organizations as those that earn more than 50 percent of their total revenue from donor contributions on average over the sample period. As expected, we find that donation-dependent organizations are much more likely to bunch than non-donation-dependent organizations, with an excess mass almost four times as large.

Donation-dependent organizations appear to be more reluctant to report that they are balance sheet insolvent, perhaps because the consequences for them are more dire. If donors penalize charities that are balance sheet insolvent, organizations that rely on donation revenue may be unable to meet their operating expenses. On the other hand, for organizations that provide local public services on a fee-for-service model, their balance sheet position is less likely to have a bearing on future revenues. In the next section, we examine the financial changes in organizations just above and below the insolvency threshold and propose
a framework for understanding why bunching occurs.

5 Explaining the Pattern of Bunching

5.1 Death Spiral: the Relationship Between Net Assets and Net Asset Growth

In the previous section, we documented significant bunching of public charities at zero net assets, especially among organisations that rely heavily on donations. In this section, we seek to explain this pattern of results. To do so, we examine the relationship between the current level of net assets and the change in net assets, as well as organizational attrition.

Figure 4 plots the proportion of charities that experience an increase in their net assets against their current level of net assets. Organizations with low levels of net assets are more likely to experience a decline in net assets from the prior year, and the severity of the decline grows as organizations approach zero. Moreover, with the exception of a small window around the threshold, which includes organizations that are bunching, the relationship between the two variables is fairly smooth.

Figure 5 depicts a similar process occurring for attrition. We define attrition as the proportion of organizations that are no longer in the sample three years later. As organizations with positive net assets see a decline in their net assets and approach zero, they are more likely to attrite. The figure includes a sharp outlier at zero, indicating that organizations with zero net assets are the most likely to disappear of all. On the other hand, there is no obvious relationship between organizations with negative net assets and attrition; for these organizations, their viability is less tied to their financial position, perhaps because of an implicit government backstop.

Table 3 depicts this relationship in table form, showing the proportion of charities

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9An alternative approach would be to look at the mean percent change in net assets. While this approach yields similar results, we find that the graphical depictions are much more sensitive to outliers and measurement issues.
seeing an increase in net assets by the number of years prior to attrition. Attriting organizations experience positive net asset growth in the years prior to attrition, but at a declining rate. The proportion seeing net asset growth shrinks until it eventually dips below 50% in the year prior to failure.

We refer to this process of declining net assets as the “death spiral.” While organizations with large net asset positions relative to their total size may be able to weather a financial shock for a year or two without long-term consequences, it appears that financially vulnerable nonprofits with minimal net assets are sensitive to negative financial shocks that reduce net assets, and their poor balance sheet position makes it less likely that they will recover. As their balance sheet position deteriorates, they are more likely to experience additional declines and ultimately discontinue operations.

5.2 The Relationship Between Net Assets and Contribution Revenue

The results presented in the previous section document how net assets decline as a nonprofit’s balance sheet position deteriorates. In this section, we investigate the role of contribution revenue in driving this outcome. Descriptive evidence presented earlier indicates that organizations most likely to bunch at zero are those that receive a high percentage of their revenue in the form of contributions.

Figure 6a plots the level of log contributions by net assets. The figure depicts a clear discontinuity; organizations with positive net assets receive significantly more contributions than organizations with negative net assets. To provide a point of comparison, figure 6b plots log program service revenue. In figure 6b, there is no clear evidence of a discontinuity; while there is a positive relationship between an organization’s net assets and its level of program revenue, it does not appear to make a difference whether an organizations reports positive or negative net assets, suggesting that there is something unique about the role of contribution revenue.
Thus, contribution revenue appears to be the driving factor behind the death spiral documented in the previous section. To confirm, in Figure 7 we plot the proportion of charities with an increase in contributions. In addition, Table 4 provides descriptive statistics for charities by the years prior to attriting, as in Table 3, but this time looks at contribution revenue. The evidence suggests that a decline in contributions is indeed the reason why charities experience a decline in their net asset growth as they approach zero net assets. Contribution revenue declines at a faster rate as organizations approach the insolvency threshold, causing them to be more and more likely to discontinue operations. This is consistent with prior work showing that donors are sensitive to the financial position of their favored charities (Calabrese, 2011; Calabrese and Grizzle, 2013). After observing deteriorating financial condition, they are more likely to withhold contributions, in turn exacerbating financial distress and increasing the likelihood of the organization’s failure.

5.2.1 The Effect of Crossing the Zero Net Assets Threshold on Contributions

Based on figures 6 and 7, it appears that governments bunch at near-zero net assets in order to prevent any further deterioration in their financial condition. However, one difficulty in establishing whether crossing the zero net assets threshold has a causal effect on contributions is that organizations that operate with negative net assets tend to be different than organizations that attrite from the panel after reaching insolvency. In other words, Figures 6-7 primarily depict cross-sectional variation: differences across organizations rather than within organizations over time. In order to determine whether there is a causal effect to crossing the threshold, we estimate a model with organizational fixed effects. This allows us to uncover estimates based on variation within organizations over time.

In order to estimate the effect of crossing the threshold on the level of contributions, we couple the fixed effect model with a regression discontinuity (RD) design. Because RD designs are invalid when agents can manipulate the running variable – as is the case here

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10We observe a similar relationship when we plot the mean change in contributions, but outliers in the tail of the distribution cause the relationship to be less smooth.
– we use a “donut-hole” approach. This strategy involves excluding observations adjacent to the threshold where manipulation of the running variable occurs. While this approach is less than ideal as it requires extrapolation of the running variable to points further away from the cut-off, it allows us to overcome potential confounding that otherwise occurs due to bunching at the threshold. We exclude observations with scaled net assets between 0 and 0.10 and estimate an RD regression of the form:

\[ Y_{it} = \beta_0 + \beta_1 [NA_i \geq 0] + f(NA_{it}) + \gamma_i + \epsilon_{it} \]  

(2)

where NA represents scaled net assets, f(NA) represents a flexible specification of the running variable, and \( \gamma_i \) represents organizational fixed effects.

We treat log contribution revenue three years in the future as the dependent variable in this analysis. We focus on contributions three years in the future because financial statements are not released immediately, and it may be some time before donors become cognizant of an organization’s financial position. Organizations that track and report on nonprofits’ efficacy, such as Charity Navigator, also will not report on an organization’s metrics until some time has passed following the release of an organization’s financial statements. Nevertheless, our results hold in years \( t+2 \) and \( t+1 \) in addition to year \( t+3 \), although the coefficients are slightly smaller when shorter time frames are considered.

Because the distribution of contributions is heavily right skewed, with a mass at zero and a very long right tail, we use the log transformed measure of contributions as the dependent variable. This results in a loss of 14 percent of the sample with zero contribution revenue. However, as we are concerned with the effect of financial health on contribution revenue, we are primarily interested in organization that solicit donations; consequently, organizations that do not report contribution revenue do not form part of the population of interest.\(^\text{11}\)

\(^{11}\)Many states impose additional regulatory requirements on tax-exempt organizations that solicit donations, and in fact “charitable solicitation registration” is a separate process in most states from registering as a tax-exempt organization.
The four columns of Table 5 show the estimation results from different specifications of equation 2. Columns 1 and 3 use a linear polynomial, while columns 2 and 4 use a quadratic polynomial. The four columns vary the bandwidth between 0.20 (organizations with net assets between -0.2-0 and 0.1-0.3) and 0.40 (organizations with net assets between -0.4-0 and 0.1 – 0.5). Organizations just above the zero net assets threshold in year t receive between 0.049 and 0.061 more in log contributions in year t+3 than organizations just below. In other words, an organization that moves from negative to positive net assets will experience a 5 to 6 percent increase in contributions three years later, confirming that there is a discontinuous increase across the threshold despite its lack of legal or policy relevance.

5.2.2 The Effect of Bunching on Contributions and Attrition

Given that balance sheet insolvent organizations receive less contribution revenue in subsequent years, do organizations seek to maintain positive net assets to preserve contribution revenue? As noted above, the graphical figures presented in the previous sections do not necessarily provide answers, as they are based almost entirely on cross-sectional variation. Hence, we examine contribution revenue and attrition among those organizations that remain above the threshold by somehow manipulating their net assets. As in the previous section, we use fixed effects to examine within-organization variation when examining contribution revenue. However, we rely on cross-sectional variation when measuring attrition since survivor’s bias confounds any attempt to look at attrition over time.

Diamond and Persson (2017) propose an estimator for determining the effects of manipulation in a setting with bunching. It involves first estimating a “reduced form effect” which represents the effect of falling in the exclusion window. This involves estimating an equation of the form:

\[ Y_{it} = \beta_0 + \beta_1[0 < NA_i < z+] + f(NA_i) + \gamma_i + \epsilon_{it} \]  \hspace{1cm} (3)

where \( z+ \) represents the upper end of the bunching range, as in Equation 1. This
analysis results in a “intent-to-treat” estimate because it captures the effect of falling in the manipulation region for all organizations, including those that would fall in the region even in the absence of a reference point. Diamond and Persson’s estimator then scales this reduced form effect by the first stage effect, which captures the share of organizations whose net assets are manipulated. The ratio of the reduced form effect to the first stage effect identifies the local average treatment effect (LATE) for bunching organizations.

Tables 6a and 6b display the “intent-to-treat” estimation results for a range of $z+$ values. Column 1 corresponds to organization reporting 0 to 0.01 in scaled net assets, while columns 2 and 3 correspond to organizations in the 0 to 0.02 and 0 to 0.04 ranges, respectively. First we consider the effect on contributions. The results show that the effects of bunching vary considerably depending on the size of the exclusion window. Organizations remaining just above zero ($0 < NA < 0.01$) have 2 percent higher contributions than otherwise predicted by a counterfactual. The estimated effect rises to 3.0 log points when evaluated as a LATE in Table 4c. On the other hand, the estimated effect shrinks when the exclusion window is broadened, with the coefficients in columns 2 and 3 in Table 6a smaller than the estimate in the first column. This is consistent with Figure 3, which demonstrates that organizations at the zero net asset threshold earn a significantly larger share of their total revenue from contributions than organizations with slightly more scaled net assets.

We next consider the effect of bunching on attrition from the NCCS panel, which we view as a proxy for nonprofit failure. We again measure attrition on the basis of whether an organization remains in the sample three years later. Figure 5 demonstrates that attrition rises as organizations’ balance sheet position deteriorates, with a considerable jump in attrition at zero. Table 6c shows that the LATE estimate is 0.05, implying that organizations just above the zero net assets threshold (scaled net assets between 0 and 0.01) are 5 percentage

\[12\] One possible drawback to this strategy is that organizations with annual gross receipts less than $25,000 are not required to file a Form 990 in that tax year. However, this concern is mitigated by the fact we restrict the sample to organizations with more than $100,000 in total assets. Another possible drawback is that we are also unable to observe mergers of nonprofits in the NCCS panel, as one of two merging organizations no longer file the Form 990 using their IRS Employer Identification Number (EIN) following the merger.
points more likely to attrite than other organizations. As with contributions, table 6b shows that the magnitude of the effect declines as the exclusion window is widened.

To summarize, in the previous section we showed that crossing from positive to negative net assets causes a significant decline in contribution revenue, suggesting that donors view nonprofits with negative net asset positions as poor investments for their scarce donative resources. In this section, we examined the effect of bunching; nonprofits cluster at zero to maintain the confidence of their donors, which enables them for a time to stave off a decline in contributions that would otherwise raise the likelihood of organizational failure.

6 Theoretical Implications

The empirical results suggest that the zero net assets threshold is a critical indicator of organizations’ financial wellbeing and ability to continue operating as a going-concern. However, since net assets are a continuous measure, it is not obvious why this behavior should vary discontinuously across a binary threshold. Put differently, what is so different about an organization with near-zero but positive net assets and one with near-zero but negative net assets?

In this regard, our findings are consistent with the behavioral finance literature and prospect theory (Kahneman and Tversky, 1979), which describes how people use heuristics to simplify their decision-making and receive utility according to how they frame a transaction in their minds. In much the same way that investors prefer avoiding losses to acquiring gains (loss aversion), our results suggest that donors may not wish to give to insolvent organizations, even though there may be very little difference between a charity that is just barely solvent and one that is just barely insolvent.

In other words, instead of viewing the financial health of organization according to a continuous measure of net assets, denoted by Y, donors – and perhaps also nonprofit boards – view the viability of nonprofits according to the decision rule:
\[ V = \begin{cases} 
1 & \text{if } Y \geq 0 \\
0 & \text{if } Y < 0 
\end{cases} \] (4)

where \( V \) reflects whether an organization is viable or not.

This framing – viable or non-viable – in turn influences whether donors are willing to give. Their willingness to donate, \( D \), is given by:

\[ D = \begin{cases} 
f(Y) & \text{if } V = 1 \\
g(Y) & \text{if } V = 0 
\end{cases} \] (5)

where \( f(Y) \) and \( g(Y) \) are functions representing the relationship between donations and nets assets for solvent and insolvent organizations respectively. Our empirical findings depicted in figure 6a lead us to theorize that the functional forms for the two types of organizations differ, and further suggest that \( f'(Y) > g'(Y) \approx 0 \).

Although we do not explore it in detail in this paper, the heterogeneity in our bunching results also leads us to speculate that contribution revenue depends to some extent on the nature of the charity (i.e., \( f(Y,N) \), \( g(Y,N) \)). Charities whose mission is closely aligned with local government and who provides services that are supplemental rather than complementary to local government services may see contribution revenue that is insensitive to their financial position; in this regard, they may be seen by donors as quasi-governments that will continue on as going-concerns regardless of the state of their balance sheet. On the other hand, charities that provide public goods that are more difficult to value may receive contribution revenue that is more elastic to donor preferences.

7 Conclusion

In this paper, we document significant bunching of nonprofit organizations at near zero net assets despite the fact that nonprofit organizations cannot be forced into bankruptcy. We use
this result to show that as charities approach insolvency, their contribution revenue declines, which further exacerbates ongoing financial distress. Moreover, charities with no net assets are more likely to attrite, perhaps anticipating that they will not be able to remain viable once they are balance sheet insolvent.

While our graphical results capture much of this cross-sectional variation, we also use fixed effect regression models to show that there appear to be causal effects of crossing the zero net assets threshold. In particular, organizations receive fewer contributions in the future after reporting that they are balance sheet insolvent, which explains why so many organizations bunch near zero.

This paper contributes not only to the literature on nonprofit financial management but also behavioral finance. Our findings are consistent with a large literature showing that donors are sensitive to the financial condition of the organizations to which they donate. Our specific contribution here is to show how solvency serves as a salient reference point; in this regard, our paper aligns with prior behavioral finance literature that documents people using heuristics to inform their decision-making, even when the underlying measure of interest (in this case, the financial condition of public charities) is non-binary.

Future work will help to delineate more precisely the way that the relationship between financial health and contribution revenue is heterogeneous across different types of nonprofit organizations. It may also help to identify other metrics – in addition to balance sheet solvency – that serve as salient reference points in the minds of donors and the public.
8 References


Figure 1: Bunching at Near-Zero Net Assets

Note: The figure illustrates bunching at near-zero net assets among public charities, 2005-2015. We restrict the sample to organizations with more than $100,000 in total assets (averaged over the sample period) so as to exclude new organizations with few assets or liabilities.
Figure 2: Bunching by Selected Types of Public Charities

Note: The figure illustrates bunching among selected types of public charities. 2005-2015. As with Figure 1, the sample is limited to organizations with more than $100,000 in total assets.
Note: The figure illustrates the percentage of revenue that charities received from contributions. Each observation represents the mean percentage within scaled net assets bins of size 0.01 (x-axis) after removing outliers in the top and bottom 1 percent of the distribution. The organizations bunching at zero net assets stand apart, with a much higher percentage of revenue coming from contributions.
Figure 4: Proportion of Charities with an Increase in Net Assets

Note: The figure illustrates the death spiral; nonprofits with negative net asset positions are less likely to improve their position in the subsequent year. Each observation represents the mean percentage for a bin of size 0.03 (units along the x-axis).
Note: Attrition increases as nonprofits approach zero net assets. Each observation represents the mean percentage for a bin of size 0.05 (units along the x-axis).
Note: Figure 6a illustrates that nonprofits with positive net assets receive far more in contribution revenue than nonprofits that are balance sheet insolvent. Figure 6b illustrates that, unlike contribution revenue, there is no discontinuity in program service revenue at the zero net assets threshold. There is a slick uptick at zero, representing the bunching organizations, but otherwise the trend line is continuous. In both figures, each observation represents the mean for each bin of size 0.03 (units along the x-axis) after removing outliers in the top/bottom one percent of the distribution.
Figure 7: Proportion of Charities with an Increase in Contributions

Note: The figure plots the proportion of charities that see an increase in their contributions in the following year. As organizations see their net assets decline toward zero, the proportion that sees an increase declines. Each observation represents the mean for a bin of size 0.03.
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>mean</td>
<td>median</td>
<td>SD</td>
</tr>
<tr>
<td>Contributions</td>
<td>2,072,737</td>
<td>1,743,494</td>
<td>125,774</td>
<td>23,709,054</td>
</tr>
<tr>
<td>Log Contributions</td>
<td>1,779,959</td>
<td>12.1</td>
<td>12.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Program Revenue</td>
<td>2,072,737</td>
<td>5,698,940</td>
<td>32,322</td>
<td>113,808,793</td>
</tr>
<tr>
<td>Log Program Revenue</td>
<td>1,279,610</td>
<td>12.4</td>
<td>12.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Assets</td>
<td>2,072,737</td>
<td>14,767,039</td>
<td>680,848</td>
<td>250,359,535</td>
</tr>
<tr>
<td>Liabilities</td>
<td>2,072,737</td>
<td>5,776,920</td>
<td>47,706</td>
<td>107,125,139</td>
</tr>
<tr>
<td>Net Assets</td>
<td>2,072,737</td>
<td>8,990,119</td>
<td>438,084</td>
<td>169,011,668</td>
</tr>
<tr>
<td>Net Assets / Assets</td>
<td>2,067,918</td>
<td>-184</td>
<td>0.93</td>
<td>78,892</td>
</tr>
</tbody>
</table>

The data come from the National Center of Charitable Statistics’ (NCCCS) 2005-2015 core files for public charities. The sample is restricted to organizations with more than $100,000 in total assets on average over the sample period.
Table 2a: Measures of Bunching - All Organizations

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Mass</td>
<td>0.391**</td>
<td>0.393**</td>
<td>0.353**</td>
<td>0.264**</td>
</tr>
<tr>
<td>Bin Width</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Polynomial Degree</td>
<td>Three</td>
<td>Three</td>
<td>Four</td>
<td>Three</td>
</tr>
<tr>
<td>Exclusion Window</td>
<td>0 - 0.10</td>
<td>0 - 0.10</td>
<td>0 - 0.10</td>
<td>0- 0.15</td>
</tr>
<tr>
<td>N</td>
<td>2,072,737</td>
<td>2,072,737</td>
<td>2,072,737</td>
<td>2,072,737</td>
</tr>
</tbody>
</table>

Table 2b: Measures of Bunching - by Sector

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts &amp; Humanities</td>
<td>Excess Mass</td>
<td>0.423**</td>
<td>0.630**</td>
<td>0.811**</td>
<td>0.459**</td>
<td>0.199**</td>
</tr>
<tr>
<td>N</td>
<td>200,121</td>
<td>317,775</td>
<td>90,165</td>
<td>321,511</td>
<td>735,575</td>
<td>37,527</td>
</tr>
</tbody>
</table>

Table 2c: Measures of Bunching - Donation-Dependent Orgs vs. Other

<table>
<thead>
<tr>
<th>Contributions &gt; 50% of Revenues</th>
<th>Contributions &lt;= 50% of Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Mass</td>
<td>Excess Mass</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>0.777**</td>
<td>0.230**</td>
</tr>
<tr>
<td>1,050,347</td>
<td>1,022,390</td>
</tr>
</tbody>
</table>

Notes: ** p < 0.01. The excess mass represents the ratio of the number of excess organizations (calculated as the difference between the observed number and the estimated counterfactual) relative to the number of counterfactual organizations within the exclusion window. Table 2a shows the extent of bunching across all organizations. The estimates are extremely consistent across various specification choices. Table 2a shows the extent of bunching for various nonprofit sectors. All of the specifications in Table 2b use a bin width of 0.01, a bunching range of 0-0.10, and a third degree polynomial. Table 2c compares bunching among donation dependent organizations – those for whom contributions constitute more than 50% of revenues – and all other organizations. There is approximately three times as much bunching in donation-dependent organizations as there is in other organizations. The counterfactual in all three tables is estimated over the range -0.4 - 0.5 scaled net assets.
Table 3: Proportion of Charities with Increase in Net Assets by Years Prior to Attrition

<table>
<thead>
<tr>
<th>Number of Years Until Attrition</th>
<th>Proportion of Charities with Increase in Net Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td>2</td>
<td>0.52</td>
</tr>
<tr>
<td>3</td>
<td>0.52</td>
</tr>
<tr>
<td>4</td>
<td>0.53</td>
</tr>
<tr>
<td>N</td>
<td>110,139</td>
</tr>
</tbody>
</table>

Table 4: Proportion of Charities with Increase in Contribution Revenue by Years Prior to Attrition

<table>
<thead>
<tr>
<th>Number of Years Until Attrition</th>
<th>Proportion of Charities with Increase in Contribution Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.31</td>
</tr>
<tr>
<td>2</td>
<td>0.35</td>
</tr>
<tr>
<td>3</td>
<td>0.40</td>
</tr>
<tr>
<td>4</td>
<td>0.42</td>
</tr>
<tr>
<td>N</td>
<td>110,139</td>
</tr>
</tbody>
</table>
Table 5: The Effect of Crossing the Zero Net Assets Threshold on Log Contributions - a Donut-Hole RD Approach

<table>
<thead>
<tr>
<th>Polynomial</th>
<th>Bandwidth</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>0.20</td>
<td>67,751</td>
</tr>
<tr>
<td>Quadratic</td>
<td>0.30</td>
<td>107,500</td>
</tr>
<tr>
<td>Linear</td>
<td>0.15</td>
<td>107,500</td>
</tr>
<tr>
<td>Quadratic</td>
<td>0.15</td>
<td>154,356</td>
</tr>
</tbody>
</table>

Notes: ** p < 0.01, * p < 0.05. Table reports regression discontinuity results corresponding to the effect of crossing the zero net asset threshold on log contributions three years in the future (year t+3). The model employs the “donut-hole” approach, excluding observations with net assets / assets between 0 and 0.1, because the RD estimator is invalid when there is manipulation of the running variable. All specifications include organization-level fixed effects.
Table 6a: The Effect of Falling in the Exclusion Window on Log Contributions

<table>
<thead>
<tr>
<th></th>
<th>0 &lt; NA &lt; 0.01</th>
<th>0 &lt; NA &lt; 0.02</th>
<th>0 &lt; NA &lt; 0.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Contributions</td>
<td>0.022</td>
<td>0.007</td>
<td>0.020</td>
</tr>
<tr>
<td>Year t+3</td>
<td>(0.024)</td>
<td>(0.016)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>N</td>
<td>175,436</td>
<td>175,436</td>
<td>175,436</td>
</tr>
</tbody>
</table>

Table 6b: The Effect of Falling in the Exclusion Window on Attrition

<table>
<thead>
<tr>
<th></th>
<th>0 &lt; NA &lt; 0.01</th>
<th>0 &lt; NA &lt; 0.02</th>
<th>0 &lt; NA &lt; 0.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing from Sample</td>
<td>0.037**</td>
<td>0.023</td>
<td>0.017</td>
</tr>
<tr>
<td>The Following Year</td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>N</td>
<td>316,998</td>
<td>316,998</td>
<td>316,998</td>
</tr>
</tbody>
</table>

Table 6c: The Effect of Bunching on Contributions and Attrition (LATE)

<table>
<thead>
<tr>
<th></th>
<th>Log Contributions</th>
<th>Attrition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>N</td>
<td>175,436</td>
<td>316,998</td>
</tr>
</tbody>
</table>

Notes: ** p < 0.01, * p < 0.05. Tables 4a and 4b report the effect of falling into the “manipulated” region (the exclusion window) on contributions and attrition. Table 4c reports the causal effect of manipulation on log contributions (year t+3) and attrition. The differences in the estimands stems from the fact that some of the organizations in the “manipulated region” would have the same net assets even in a counterfactual world in which the zero net asset threshold had no meaning. Hence, Table 4c presents the results only for the “manipulated” organizations that actively bunched at the threshold. These estimates come from scaling the “intent-to-treat estimates” in the first columns of Tables 4a and 4b by the probability of being manipulated. In tables 4a and 4b, the first column focuses on organizations with scaled net assets between 0 and 0.01 - those organizations just above the zero net asset threshold. The second and third columns includes organizations with scaled net assets of 0 - 0.02 and 0-0.04. All estimates are block-bootstrapped at the organization level. Table 4a includes organization level fixed effects. Table 4b does not include fixed effects in order to avoid survivor bias, i.e. it is impossible to measure attrition for organizations that have already left the sample. Table 4c uses an exclusion window of 0 - 0.01.
Appendix Table 1: Measures of Bunching Using Different Cut-Offs for “Mature” Organizations

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Mass</td>
<td>0.391</td>
<td>0.359</td>
<td>0.424</td>
<td>0.454</td>
</tr>
<tr>
<td>N</td>
<td>2,072,737</td>
<td>1,690,341</td>
<td>2,471,378</td>
<td>2,844,535</td>
</tr>
</tbody>
</table>

Notes: ** p < 0.01. The main results focus on nonprofit organizations with more than $100,000 in total assets on average over the sample period. This table shows how the estimates of the excess mass differ based on different definitions of “mature” organizations. While the estimates do not change appreciably, they do increase slightly when the cut-off point is lowered toward zero since newer organizations have fewer net assets. The excess mass represents the ratio of the number of excess organizations (calculated as the difference between the observed number and the estimated counterfactual) relative to the number of counterfactual organizations within the exclusion window. All specifications use a bin width of 0.01, a bunching range of 0-0.10, a third degree polynomial, and estimate the counterfactual over the range -0.4 - 0.5 scaled net assets.
Appendix Figure 1: Bunching at Near Zero Unrestricted Net Assets

Note: The figure depicts bunching at near-zero unrestricted net assets among public charities, 2012-2015. As with Figure 1, the sample is limited to organizations with more than $100,000 in total assets. We clean the data before creating the histogram so as to eliminate organization who incorrectly report zero unrestricted net assets.