Financing Nonprofits *

Egor Matveyev
MIT

Stefan Zeume
UIUC

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Abstract

Nonprofits in the United States finance over $3 trillion in annual program spending with no access to equity and only narrow access to debt markets. This paper develops and tests a dynamic theory of nonprofit finance in which liquidity, fundraising, and governance jointly substitute for capital market instruments. Managers choose spending, fundraising effort, and borrowing to maximize the present value of mission services, while donors adjust giving in response to observed liquidity reserves and board oversight. Donors restrict or redirect gifts when liquidity is high and increase unrestricted support when it is low. Fundraising generates liquidity after shocks, but its effectiveness depends on governance. We test the model on a panel of 450,000 nonprofits from 2010 to 2023 and document a cash-rich paradox: organizations entering an adverse shock with large liquidity reserves attract less donor relief, cut mission spending by about a third, and exit at three times the rate of comparable organizations. Strong governance allows organizations to deploy restricted reserves and sustain mission spending.

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1 Introduction

The nonprofit sector in the United States delivers more than $3 trillion annually in program and service expenditures and holds unusually large liquid reserves. The average nonprofit holds cash and short-term investments equal to about 45% of total assets, and the upper quartile holds more than 85%. Relative to for-profit firms of the same size, nonprofits hold more liquidity throughout the distribution: 32% of assets at the median, compared with 25% for firms, and 81% at the 75th percentile, compared with 62% for firms.[1]

These balances appear precautionary. Nonprofits routinely face funding shortfalls: expenses average 102% of revenue, roughly 38–42% of organizations report a deficit in a typical year, and about one-third are in chronic deficit. At the same time, nonprofits cannot issue equity and have limited access to debt, with fewer than one-quarter of organization-years reporting any interest-bearing borrowing. An organization that cannot easily raise outside capital and often spends more than it earns has a clear reason to self-insure with cash.[2]

This paper asks whether these reserves in fact insure nonprofits against funding shocks. The answer is not the one implied by the precautionary-reserve view. We document a cash-rich paradox: when nonprofits suffer sharp losses of external funding, higher pre-shock liquidity predicts larger cuts to mission spending and a higher probability of exit. The same reserves that appear to insure the organization internally can reduce the external relief it receives when the shock arrives.

We establish this pattern with two independent research designs. The first exploits large organization-specific collapses in government grant funding, using a stacked difference-in-differences design that compares treated organizations to not-yet-treated peers in the same sector, size group, and year. The second exploits cross-sectional exposure to the donor-side effects of the 2017 Tax Cuts and Jobs Act, which raised the standard deduction and reduced the share of taxpayers who itemize charitable gifts; we measure exposure with a ZIP-code shift-share instrument based on pre-reform income distributions and national changes in itemization. The two shocks are very different. One is idiosyncratic and originates in public budgets; the other is an aggregate tax-policy change that operates through private donors. They deliver the same conclusion. Following government-grant collapses, exit rises by 4.8 percentage points among organizations in the top pre-shock liquidity tercile, compared with 1.7 percentage points in the bottom tercile, against an unconditional exit rate near 2.6%. Mission spending contracts by about one-third among cash-

[1] See Table 1 for full-sample summary statistics; the median and 75th-percentile comparisons are drawn from the size-matched sample in Appendix B.

[2] See Table 1 and Figure 1 for the deficit statistics and Table 1 for the incidence of interest-bearing debt.

rich organizations and far less among cash-poor ones. The donor-side design reproduces the asymmetry: in the most exposed local markets, exit and spending respond significantly only among organizations that entered the shock with high liquidity.

Why can reserves hurt the organizations that hold them? The answer lies in a key difference between nonprofit and corporate finance. A nonprofit cannot issue equity or distribute residual profits, so its main source of flexible external finance is donor support, which donors allocate partly on perceived need. Because reported liquidity is observable, a visible cushion signals that the organization is less constrained and diverts flexible gifts toward peers that appear more urgent. This cost is largest in downturns, when flexible donor dollars are most valuable, so the reserves accumulated for precaution can repel the very relief that would otherwise arrive.

We formalize this logic in a dynamic model of nonprofit finance. In the model, a nonprofit finances mission spending with earned revenue, routine support, and donations raised through costly fundraising. Because it cannot issue equity and can reach debt markets only narrowly, the organization holds liquid reserves to insure program spending against funding shocks it cannot otherwise smooth. It may also hold restricted, board-designated, or endowment assets, some of which are deployable for current use and some of which are not. The central departure from standard corporate liquidity models is that cash does double duty. It protects future program spending, but because donors observe it, it also affects the supply and form of donations. Organizations with high visible reserves attract less flexible donor support because donors infer that their marginal gifts are less pivotal, or because they redirect giving toward restricted purposes.

This signaling role changes the economics of liquidity. In a standard precautionary model, the cost of cash is a carry cost and the benefit is insurance against future financing shortfalls. In our setting, the marginal cost of cash also includes a donor-signal wedge: a visible dollar of reserves lowers the flexible donor support the organization can raise. The optimal cash target equates this carry-and-signal cost to the expected marginal value of cash in high-shortfall states. The model therefore predicts that nonprofits hold more liquidity when residual funding shortfalls are more volatile or more discretionary, and less liquidity when revenues are more predictable or when alternative financing sources substitute for internal cash. These substitutes include deployable restricted assets, endowments, governance-enabled draws, and usable debt capacity.

The model's key object is how the donor-signal wedge varies with need. Flexible donor support falls with reported liquidity, and this negative gradient steepens in high-shortfall states. That interaction generates the paradox. When need is low, looking liquid has little cost. When need is high, looking liquid can forfeit donor relief precisely when flexible dollars are most valuable.

The model therefore delivers a sharp conditional prediction: after a funding shock, high-liquidity organizations contract program spending more and face higher exit risk whenever the donor relief they lose exceeds the deployable liquidity they can mobilize internally. The tradeoff is familiar from corporate liquidity models, but the price of external finance is distinctive: it is set by donors' inference about need.

Before turning to shocks, we show that nonprofit liquidity policy is consistent with the model's two building blocks: a precautionary motive and a donor-signal cost. On the precautionary side, organizations build cash as funding becomes more volatile and discretionary, and draw it down as they gain access to substitutes. Liquidity rises with reliance on contributions and with contribution volatility, and falls with reliance on the more forecastable program-service stream and with its persistence; organizations that hold endowments or have tax-exempt, secured, or unsecured debt access hold materially less cash, with the four substitution margins surviving jointly. These patterns mirror the precautionary and financing-substitution forces familiar from corporate cash holdings (Opler, Pinkowitz, Stulz and Williamson, 1999; Almeida, Campello and Weisbach, 2004; Bates, Kahle and Stulz, 2009).

On the donor side, we show that visible reserves predict the financing response the model implies. As liquidity rises, fundraising effort and solicited giving fall, consistent with fundraising operating as an endogenous financing margin (Andreoni and Payne, 2003). More tellingly, the composition of support shifts: higher liquidity predicts larger subsequent inflows of restricted net assets and endowment contributions, the most constrained forms of giving. This compositional shift is the clean signature of donor triage, because it is the one response that the organization's own effort choice cannot mechanically generate. Soliciting less yields fewer dollars, but it cannot by itself raise the restricted share of the dollars that arrive. The fact that the restricted share rises with visible reserves points to donor behavior rather than organizational effort.

Governance shapes how forcefully the paradox operates, in the direction predicted by the model. Nonprofit governance differs from for-profit governance in several important respects. Donors provide funds but receive no residual claim and typically no formal control rights. Formal authority rests with the board, which often includes major donors who monitor the use of funds and provide access to networks, information, and new resources. In a crisis, these connections can help the organization mobilize support. Governance can also affect the deployability of reported assets. Better-governed organizations may be more able to work with donors, renegotiate restrictions where possible, draw on board-designated funds, or otherwise convert accounting liquidity into resources that can support current mission spending.

The evidence is consistent with this role of governance. Larger boards attenuate both the donor-triage gradient and the post-shock contraction. Among organizations hit by a government-grant collapse, exit rises by 5.7 percentage points for high-liquidity organizations with small boards, compared with 1.4 percentage points for otherwise similar high-liquidity organizations with large boards. Larger boards do not eliminate the paradox: cash-rich organizations with large boards still generally fare worse after a shock than comparable cash-poor organizations. But governance reduces its force. The evidence suggests that stronger boards improve the organization's ability to use reserves and mobilize resources in bad states, even though they cannot fully offset the reduction in external support induced by visible liquidity.

Together, the results identify a cost of liquidity that requires neither shareholders nor debt markets nor managerial agency conflicts: a signaling cost, paid to the external financiers an organization depends on, that turns precautionary reserves into a liability exactly when they are needed most.

Our paper contributes to the dynamic corporate finance literature on how firms jointly choose financing, investment, payout, and liquidity (see, among many others, Leland, 1994; Hennessy and Whited, 2005; Strebulaev, 2007; Riddick and Whited, 2009; Bolton, Chen and Wang, 2011). In this literature, firms finance themselves with debt and equity, and creditors and shareholders provide discipline. Nonprofits face a different problem. Debt is available only to a narrow set of organizations: tax-exempt bonds are costly and restricted, and ordinary borrowing is difficult without collateral or predictable revenues. Nonprofits also lack the credit lines that allow firms to draw liquidity when shocks arrive rather than hold cash in advance (Sufi, 2009). Equity is unavailable because nonprofit status rules out private ownership and distributions of surplus. The relevant financing margins are fundraising effort and endowment draws, and the relevant discipline comes from donors rather than residual claimants. In our model, the value of liquidity is not pinned down by issuance costs. It is pinned down by a donor-signal wedge: visible reserves reduce the support donors are willing to provide.

Our paper also contributes to the literature on corporate liquidity management. One strand shows that firms hold more liquidity when external finance is costly, volatile, or uncertain (Opler, Pinkowitz, Stulz and Williamson, 1999; Almeida, Campello and Weisbach, 2004; Almeida and Campello, 2007; Bates, Kahle and Stulz, 2009). Another shows that large cash balances create agency costs and are disciplined by governance and shareholders (Jensen, 1986; Faulkender and Wang, 2006; Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008). Nonprofits face analogues of both forces, but the mechanism is different. Hansmann (1990) provides the

foundational account of why nonprofits accumulate reserves, and Fisman and Hubbard (2005) formalize the precautionary motive in a static model of nonprofit saving with managerial diversion. Our dynamic framework keeps the precautionary motive but changes the friction. In their model, the cost of reserves is internal: managers can divert them for private benefit. In our model, the cost is external: reserves are visible to donors and signal low need. Cash is costly because it signals that additional gifts are less needed. The nonprofit's liquidity choice trades off insurance against future funding shocks with the loss of donor support today, a tradeoff absent from corporate liquidity models and from nonprofit models in which the main cost of cash is managerial diversion.

A separate literature treats financing as shaped by the supply of capital rather than the demand for it (Stein, 1996; Shleifer and Vishny, 1997; Baker and Wurgler, 2002). In our setting the suppliers are donors. Existing work shows that their giving tracks a nonprofit's financial condition (Andreoni and Payne, 2003, 2011; O'Regan and Oster, 2005; Harris, Petrovits and Yetman, 2015) and that they shape its conduct directly, through the restrictions they place on gifts (Yermack, 2017) and the conservatism that tiered recognition induces (Ellis, Luo and Esson, 2026). Our model connects the two: the cash a nonprofit holds against future need is also the measure of need that donors read, so a visible dollar of reserves carries a price in donor support. It lowers the unrestricted giving the organization can raise, and it tilts the giving that remains toward restricted forms. The data carry the signature of this mechanism. Higher liquidity predicts less subsequent fundraising and fewer donations and, more tellingly, a larger restricted share of the gifts that arrive, a shift in composition that solicitation alone cannot produce, since cutting effort lowers the dollars raised but cannot by itself restrict them. This reallocation of flexible support away from organizations that appear well reserved is what we call donor triage.

Governance enters our setting differently than it enters corporate finance. There, large cash balances invite agency costs that boards and the market for control are meant to curb. In nonprofits these disciplines are weak. Lewellen, Phillips and Sertsios (2026) show that the market for corporate control barely operates: poorly performing nonprofits are about half as likely as comparable for-profits to be acquired, so the takeover threat that disciplines managers elsewhere is largely absent. Babenko, Bennett and Sen (2026) show that nonprofit executives can shape their own pay, and that legislation curbing this influence lowered compensation while raising effort and performance; relatedly, Core, Guay and Verdi (2006) link ample reserves to persistent hoarding and higher officer compensation. But the governance question that binds for a nonprofit is not whether reserves are forced out; it is whether they can be spent at all, since much of what an organization reports as liquidity is locked by donor restrictions or board designations. In our model governance

acts on exactly this margin. It raises the share of reported reserves an organization can deploy, through board-designated draws and the renegotiation or reclassification of restricted funds, and it lowers the weight donors place on the reserve ratio when they gauge need. Consistent with this, larger boards attenuate both the donor-triage gradient and the post-shock contraction, though we treat board size as a summary proxy that cannot by itself separate deployability from donor reach.

Our paper finally connects to work on nonprofit capital structure, which has largely framed nonprofit financing around debt. Early studies test trade-off theories of leverage in hospitals (Wedig, Hassan and Morrisey, 1996; Wedig, Sloan, Hassan and Morrisey, 1988), and Binfarè and Zimmerschied (2026) document the sharp rise in university borrowing and its consequences for the cost of higher education. This work studies sectors where debt is a live margin. For most of the nonprofit population it is not: the organizations we study cannot issue equity and reach debt markets only narrowly, so the financing decision that binds is not how much to borrow but how much cash to hold against the risk that outside support contracts. We move the question from capital structure to liquidity, and we show that this liquidity can fail just when it is needed. The closest antecedent to our central result is Brown, Dimmock, Kang and Weisbenner (2014), who find that university endowments meet negative shocks by cutting payouts rather than drawing on the corpus. We bring two independent shocks to bear: organization-specific collapses in government grants, and the donor-side effect of the 2017 Tax Cuts and Jobs Act, which raised the after-tax price of giving and reduced donations across exposed local markets (Meer and Priday, 2020; Han, Hungerman and Ottoni-Wilhelm, 2024). Under both, the organizations that entered most liquid cut spending most and exit at the highest rates. In the model, this cash-rich paradox follows directly: the visibility that lets reserves insure mission spending also leads donors to withhold relief in the states where flexible support is most valuable, so a nonprofit's own reserves and its outside support fall away together precisely when it needs both. Establishing this across the sector, under two distinct shocks and within one dynamic framework, is the central contribution of the paper.

The rest of the paper proceeds as follows. Section 2 develops the model and derives its main comparative statics. Section 3 describes the data, variable construction, and summary statistics. Section 4 tests the model's predictions for liquidity policy and donor responses. Section 5 turns to the cash-rich paradox, using government-grant collapses and the donor-side shock from the 2017 Tax Cuts and Jobs Act. Section 6 concludes.

2 A Model of Nonprofit Finance

To motivate our empirical work, we consider a discrete-time, infinite-horizon model of a nonprofit organization that chooses program spending, fundraising, restricted-asset draws, and debt. A nonprofit organization cannot issue equity and cannot distribute a surplus. It begins period t with unrestricted liquidity K_t, which it can spend on any mission purpose; restricted or board-designated wealth E_t, which donor or board limits tie to particular uses; and debt b_t, which must be repaid.

Each period the organization chooses program spending $m_t \geq 0$, fundraising effort $f_t \geq 0$, a draw χ_t that moves resources from restricted wealth into unrestricted liquidity, and next period's debt b_{t+1}. Its objective is the present value of mission output, $\mathbb{E}_0 \sum_{t \geq 0} \beta^t u(m_t)$, with u increasing and concave and $\beta \in (0,1)$, so it values a smooth path of spending.

A. Revenue, commitments, and liquidity

Two exogenous forces drive the budget: the organization's earned revenue and the broader funding environment. Program-service revenue follows a stationary process,

$$Y_{t+1} = \bar{Y} + \rho\,(Y_t - \bar{Y}) + \varepsilon_{Y,t+1}, \qquad |\rho| < 1, \tag{1}$$

with innovations $\varepsilon_{Y,t+1} \sim (0, \sigma_Y^2)$. The funding environment z_t is a stationary Markov state with transition $\Pi(z_{t+1} \mid z_t)$. It determines government and other non-donor support $H(z_t)$, routine donor support $U^0(z_t)$ that does not depend on solicitation, common operating costs $o(z_t)$, and a pre-decision service commitment $\bar{X}(z_t)$.

The commitment $\bar{X}(z_t)$ is the level of mission activity the organization is expected to deliver given its programs, contracts, and constituents. It is a cash need that stakeholders and donors can assess before the organization adjusts actual program spending m_t. The organization's need for additional flexible finance is therefore the part of this commitment that earned revenue, grants, and routine giving leave uncovered,

$$n_t = \max\bigl\{\bar{X}(z_t) - Y_t - H(z_t) - U^0(z_t),\, 0\bigr\}. \tag{2}$$

A grant loss, a contraction in routine giving, or a cost shock raises perceived need. Because n_t is built from exogenous revenue and environmental objects, it does not move mechanically with current program spending; m_t determines how much of the commitment is actually met.

Donors do not observe the organization's books in real time. They read the most recent public disclosure, such as a filing or audit, which reflects a prior balance sheet. Let A_t denote total assets

on that disclosure. The Online Appendix gives the formal timing assumption; for the current-period policy problem, A_t is predetermined.

Reported liquidity combines unrestricted cash with the liquid part of restricted wealth $L_t = K_t + \varpi E_t$ with $0 \leq \varpi \leq 1$, where ϖ is the share of restricted wealth held in liquid form. Donors observe L, but it is not the same as deployable liquidity: restrictions, board designations, approval lags, and eligible-cost rules can keep a reported balance from financing the program that is short. Donors judge liquidity relative to circumstances, forming the signal

$$S_t = \frac{L_t}{A_t} - \bar{c}\left(\frac{E_t}{A_t}, Y_t, z_t, G_i\right), \tag{3}$$

where G_i is governance and $\bar{c}(\cdot)$ is the liquidity ratio donors regard as normal for an organization with these restrictions, revenue, environment, and governance. A higher S_t means the organization appears more liquid than its circumstances would predict. Since A_t is predetermined, the partial derivative of the current signal with respect to current unrestricted cash is $S_{K,t} \equiv \partial S_t / \partial K_t = 1/A_t > 0$. Thus a marginal dollar of cash raises the reported-liquidity signal by one dollar scaled by total assets.

B. Donor finance and fundraising

Donors translate the signal into a judgment about impact. The perceived impact of an unrestricted dollar is

$$a_t = I(n_t) - \phi(G_i) S_t, \qquad I'(n) > 0, \quad \phi(G_i) > 0. \tag{4}$$

Need raises perceived impact: a flexible dollar matters more when the organization is short. Apparent liquidity lowers perceived impact: a dollar is less likely to change current service when the recipient already appears buffered. Better governance lowers the signal loading $\phi(G_i)$ because credible reporting and communication make donors rely less on the coarse liquidity ratio.

Fundraising effort creates donor contacts, $\theta(G_i) f_t^{\alpha}$ with $0 < \alpha < 1$. Each contacted donor can give nothing, give unrestricted, or restrict the gift to a program. Let $p_U(a)$ denote expected unrestricted dollars per contact and $p_R(a)$ expected restricted dollars per contact. The Online Appendix derives these functions from a simple donor choice problem. On the interior donor region used for the comparative statics,

$$p_U'(a) > 0, \qquad p_R'(a) < 0, \qquad [p_U(a) + p_R(a)]' > 0. \tag{5}$$

Higher perceived impact raises unrestricted and total giving per contact. It also reduces the

restricted share, because when an unrestricted dollar is perceived to be highly productive, donors have less reason to impose restrictions.

Expected gifts are

$$U_t = U^0(z_t) + \theta(G_i) f_t^{\alpha} p_U(a_t), \tag{6}$$

$$Z_t = \theta(G_i) f_t^{\alpha} p_R(a_t), \tag{7}$$

where unrestricted gifts U_t enter cash and restricted gifts Z_t enter restricted wealth. Fundraising costs are

$$c_f(f_t) = \frac{\gamma}{1+\nu} f_t^{1+\nu}, \qquad \gamma > 0, \quad \nu > 0. \tag{8}$$

The fundraising margin is therefore endogenous: when donors perceive flexible gifts as more impactful, the organization both receives more per contact and chooses more fundraising effort.

C. Restricted assets, debt, and the flow of funds

Restricted wealth earns a return, receives restricted gifts, pays a regular payout, and supplies any permissible draw,

$$E_{t+1} = (1 + r_E)E_t + Z_t - \pi E_t - \chi_t, \qquad 0 \le \chi_t \le \bar{\chi}(G_i)E_t, \qquad E_{t+1} \ge 0. \tag{9}$$

The regular payout πE_t and any draw χ_t flow into unrestricted liquidity. Governance does not make legally unavailable dollars available, but it improves the organization's ability to identify eligible spending, document compliance, and obtain approvals. Thus restricted wealth can be a close substitute for cash for one purpose and not a substitute at all for another.

An organization's access to debt markets is determined by its institutional quality and the availability of pledgeable assets. We summarize that access by an indicator $\iota_i \in \{0, 1\}$, a borrowing limit $\bar{b}_i$, an interest rate r_i, and a fixed cost $F_{b,i}$ paid only when the organization raises incremental net new borrowing. The debt constraint is

$$0 \le b_{t+1} \le \iota_i \bar{b}_i, \tag{10}$$

and the fixed cost is incurred when $b_{t+1} > (1 + r_i)b_t$. This formulation makes debt a state-contingent substitute for cash: borrowing reduces the need for internal liquidity only when, after debt service and the fixed cost, it supplies positive net resources in the states where the cash constraint binds. If the organization is too small relative to the fixed cost, already carries large

debt service, or lacks collateral for the relevant instrument, the debt variable need not relax the shortfall even when borrowing is observed in other states or years.

Holding cash is costly in reduced form. Let $h_K(K)$ be the per-period carrying cost of idle balances, with $h_K(0) = 0$, $h'_K(K) \geq 0$, and $h''_K(K) \geq 0$. The cost stands in for low cash returns relative to mission uses, inflation, compliance and internal-control costs. The target-liquidity condition below uses h_K only through the marginal carrying cost $h'_K(K_t)$: a higher $h'_K(K_t)$ raises the cost of holding one more dollar as cash.

Unrestricted liquidity evolves according to

$$\begin{aligned} K_{t+1} = K_t + Y_t + H(z_t) + U_t + \pi E_t + \chi_t - m_t - o(z_t) - c_f(f_t) - h_K(K_t) \\ + b_{t+1} - (1+r_i)b_t - F_{b,i}\mathbf{1}\{b_{t+1} > (1+r_i)b_t\}. \end{aligned} \tag{11}$$

Continuation requires $K_{t+1} \geq \underline{K}_i$ and $K_{t+1} \geq 0$. If no feasible policy meets the operating floor, the organization exits as an independent operating entity. Exit does not destroy charitable assets; remaining restricted wealth keeps its charitable purpose, and the exit value is denoted by V_i^X.

D. Optimal policy and the cost of visible liquidity

Let $\mathscr{C}_i$ be the feasible set implied by the flow equations, the draw and debt limits, nonnegativity, and the operating floor. The continuation value is

$$V_i^C = \sup_{(m_t, f_t, \chi_t, b_{t+1}) \in \mathscr{C}_i} \{u(m_t) + \beta \mathbb{E}_t[V_i(\cdot)]\}, \qquad V_i = \max\{V_i^X, V_i^C\}. \tag{12}$$

The argument of $V_i(\cdot)$ is next period's state. Standard boundedness and transversality conditions rule out value from accumulating assets without bound. To develop the intuition, consider a differentiable continuation region with interior donor probabilities.

Let λ_t be the value of a dollar delivered to next period's unrestricted balance and μ_t the value of a dollar delivered to next period's restricted balance. The standard optimality conditions are intuitive. Spending satisfies

$$u'(m_t) = \lambda_t. \tag{13}$$

Fundraising equates the cash cost of effort to the shadow value of the gifts it generates,

$$\lambda_t c'_f(f_t) = \lambda_t U_{f,t} + \mu_t Z_{f,t}, \tag{14}$$

where $U_{f,t} \equiv \partial U_t / \partial f_t$ and $Z_{f,t} \equiv \partial Z_t / \partial f_t$. A draw converts restricted wealth into cash and is most

valuable when $\lambda_t > \mu_t$. Define

$$\eta_t \equiv \frac{\mu_t}{\lambda_t} \tag{15}$$

for the cash-equivalent value of a restricted dollar. The propositions below evaluate local shortfall states in which cash is weakly more valuable for the binding current use, so $0 \leq \eta_t \leq 1$ is maintained locally. For debt, away from borrowing limits and the fixed-cost kink, the Euler condition is

$$\lambda_t = \beta(1+r_i)\mathbb{E}_t[\lambda_{t+1}], \tag{16}$$

with the fixed cost determining whether it is worthwhile to move into the incremental net-borrowing region.

The envelope condition for cash contains the key nonprofit-specific term. A marginal beginning-of-period dollar is not only a dollar of insurance; because donors observe reported liquidity, it also changes current donor finance. Differentiating the value function with respect to beginning-of-period cash gives

$$V_K = \lambda_t \left[1 - h'_K(K_t) + U_{S,t} S_{K,t}\right] + \mu_t Z_{S,t} S_{K,t}, \tag{17}$$

where $U_{S,t} \equiv \partial U_t / \partial S_t$ and $Z_{S,t} \equiv \partial Z_t / \partial S_t$. The first term is the direct value of cash net of the marginal carrying cost. The other terms are the donor response to a visible dollar. Since $a_S = -\phi(G_i)$, visible cash reduces unrestricted gifts, $U_{S,t} < 0$, and increases restricted gifts, $Z_{S,t} > 0$, on the interior donor region. Restricted gifts do not fully replace unrestricted gifts when $\eta_t < 1$. In cash-equivalent units, the marginal cost of holding a visible dollar is therefore

$$g_K = h'_K(K_t) - \left[U_{S,t} + \eta_t Z_{S,t}\right] S_{K,t}. \tag{18}$$

The first component is the carrying cost. The second is the donor-signal wedge: the cash-equivalent donor finance lost when the organization looks more liquid. If donors did not condition on reported liquidity, this wedge would be zero and the model would reduce to a standard precautionary liquidity problem. With the wedge, liquidity is both insurance and a public signal about need.

E. Target liquidity and alternative financing

The Online Appendix derives the cash target from a first-order approximation to the optimality condition for carrying cash into the next short window. Let R_{t+1} be next period's residual cash shortfall after predictable funding, regular restricted payouts, deployable restricted resources, and net borrowing capacity have been accounted for, but before the unrestricted cash buffer. Let Λ_{t+1} be the cash-equivalent marginal value of a dollar in states where the shortfall is not covered.

Around a reference continuation policy, target cash solves

$$K^* \in \arg\min_{K \geq 0} \{ g_K K + \mathbb{E}_t[\Lambda_{t+1} \max\{R_{t+1} - K, 0\}] \}. \tag{19}$$

If the solution is interior and the residual-shortfall distribution is smooth at the target,

$$g_K = \mathbb{E}_t \left[\Lambda_{t+1} \mathbf{1}\{R_{t+1} > K^*\} \right]. \tag{20}$$

Cash is accumulated until its marginal carry-and-signal cost equals its weighted upper-tail insurance value. The right-hand side is the expected marginal value of an additional dollar of cash in the states in which residual shortfalls exceed the target.

Proposition 1 (Funding risk and target liquidity)**.** *Holding the marginal cost g_K fixed, target unrestricted liquidity rises with any change in the distribution of residual shortfalls that raises*

$$\Psi(K) \equiv \mathbb{E}_t[\Lambda_{t+1} \mathbf{1}\{R_{t+1} > K\}] \tag{21}$$

at the relevant target, and falls with predictable deployable funding that shifts R_{t+1} down. For (1)*, at fixed conditional mean and common long-run variance, higher persistence ρ lowers the innovation variance $\sigma_Y^2 = v_Y(1-\rho^2)$ and so lowers the target.*

Unrestricted cash insures the part of next period's need that predictable receipts, payouts, deployable restricted wealth, and usable borrowing cannot cover. Replacing a predictable dollar of revenue with a discretionary dollar of the same expected value raises cash only if it raises the weighted upper tail of uncovered shortfalls; a mean-preserving change that does not add weighted mass above the target leaves it unchanged. The donor wedge inside g_K attenuates the response, so a carried dollar insures less than one for one.

Proposition 2 (Restricted resources and governance)**.** *At an interior target, and holding the donor-signal cost, debt policy, and other dynamic channels fixed, the deployable part of restricted wealth substitutes for unrestricted cash one for one. Writing $\delta_E(G)$ for the deployable share, which governance raises, the cash target and reported liquidity respond as*

$$\frac{\partial K^*}{\partial E} = -\delta_E(G), \qquad \frac{\partial L^*}{\partial E} = \varpi - \delta_E(G), \tag{22}$$

so reported liquidity can rise, fall, or stay flat even as the cash target falls.

What matters for precautionary saving is not the book value of restricted wealth but how much of it can lawfully and reliably meet the current shortfall. A permissible payout or draw does the same job as cash, so the cash target falls one for one with the deployable share, which governance raises by making eligible balances easier to mobilize. The two responses in (22) differ only because reported liquidity already counts the liquid part of restricted wealth through ϖE, the mechanical inclusion that offsets the substitution. A large restricted balance therefore need not mean a large buffer for the current shortfall.

Proposition 3 (Debt capacity and target liquidity)**.** *Usable debt capacity lowers the target unrestricted cash holding when it delivers positive net resources, after repayment, interest, and the fixed cost of new borrowing, in states where cash would otherwise be short. The reduction is larger the higher the borrowing limit, the lower the interest rate, the lower inherited debt service, and the lower the fixed cost, and it vanishes when the instrument delivers no net resources in those states.*

Debt substitutes for cash through its net contribution in a shortfall, not its gross size, so an organization with a committed line need not pre-fund every shortfall with reserves. Because the draw is repaid with interest and carries a fixed cost when the stock rises, a line that is costly to tap or already heavily drawn displaces no precautionary cash even when it is available. Where the shortfall binds, the same capacity cushions the program-spending contraction, relaxing the constraint that cash would otherwise relax.

F. Donor triage and the cash-rich response

The same donor-signal wedge that enters the cash target also shapes fundraising. On an interior effort margin, fundraising satisfies (14). Holding η_t fixed locally, the effort choice can be written as an increasing function of $d(a_t, \eta_t) = p_U(a_t) + \eta_t p_R(a_t)$, the cash-equivalent value of a donor contact. Since a_t falls with S_t and rises with n_t, reported liquidity and need have opposite effects on donor finance.

Proposition 4 (Fundraising and donor triage)**.** *On the interior donor region, holding $\eta_t = \mu_t/\lambda_t$ fixed locally, a higher visible-liquidity signal S_t lowers optimal fundraising effort, unrestricted solicited gifts, and total solicited gifts, and it raises the restricted share of solicited giving. A higher shortfall n_t has the opposite effect on flexible donor support. If η_t varies with the state, the same signs hold when the direct donor-triage effect dominates the induced movement in η_t.*

The result has two margins. The organization solicits less because the return to effort is lower, and donors who are contacted see an unrestricted dollar as less pivotal. Some donors may still

give but restrict the gift, which is why the model predicts a decline in flexible donor finance and a higher restricted share rather than a uniform decline in all gift categories. This is the donor-side counterpart of the balance-sheet wedge in (18).

The central implication is that cash can change the organization's response to a shock in a way that is absent from standard corporate liquidity models. In the usual precautionary model, more cash unambiguously buffers a firm against a financing shock. Here a high reported liquidity ratio also changes external finance: donors who observe the shock direct relief toward organizations that appear more constrained. A liquid organization therefore brings more internal resources to the shock but may receive less flexible relief precisely when marginal donor dollars are most valuable.

To formalize this tradeoff, consider two short-window states $j \in \{0,1\}$ with $n_1 > n_0$. Let

$$W_j(L,G) = \bar{W}_j + \kappa_j(G)L + D(L,n_j,G) \tag{23}$$

be cash-equivalent resources available for short-window spending. The term $\kappa_j(G)L$ is the deployable part of reported liquidity in state j. The term $D(L,n_j,G)$ is optimized donor finance, net of fundraising cost, valued in cash equivalent units. The Online Appendix shows that $D_L < 0$ and $D_{Ln} < 0$. Thus a higher reported-liquidity ratio lowers donor finance, and that negative liquidity gradient is steeper when need is higher. The second inequality is the source of the paradox: the donor penalty from looking liquid is most costly in the state in which donors perceive flexible dollars as most pivotal.

Proposition 5 (Cash-rich response and governance)**.** *Let the resource contraction from the high-need shock be $C(L,G) = W_0(L,G) - W_1(L,G)$. Holding η fixed locally, the resource contraction is increasing in reported liquidity if and only if*

$$D_L(L,n_0,G) - D_L(L,n_1,G) > \kappa_1(G) - \kappa_0(G). \tag{24}$$

If short-window spending has a locally common marginal response to cash-equivalent resources across the two states, the same condition characterizes when the spending contraction is increasing in reported liquidity. With different spending slopes, the condition is the corresponding slope-weighted inequality. Under a locally flat density of operating floors, or under the corresponding density-weighted condition, (24) also implies a larger shock-induced increase in exit. Governance attenuates the gradient under the sufficient condition

$$\frac{\partial}{\partial G}\left[D_L(L,n_0,G) - D_L(L,n_1,G)\right] \leq \kappa_{1G}(G) - \kappa_{0G}(G). \tag{25}$$

Condition (24) compares two forces. The right side is the extra deployable liquidity that a high-L organization can use in the bad state relative to the normal state. The left side is the extra donor relief it forgoes in the bad state because it appears liquid. When the left side dominates, the shock reduces resources more for organizations with higher reported liquidity. This does not mean cash is mechanically harmful. It means the observed liquidity ratio is both a buffer and a signal, and the signal can reduce the very relief that would otherwise arrive after an adverse shock.

The intensification $D_{Ln} < 0$ is economically natural. When need is low, a donor may view an additional unrestricted dollar as only mildly useful, so a high liquidity ratio has a limited effect on giving. When need is high, flexible dollars are more pivotal and fundraising effort responds more strongly. The same visible dollar of cash then puts more donor finance at risk. The Online Appendix derives this curvature from optimized fundraising and donor choice. The result is therefore a nonprofit analogue of the corporate finance tradeoff between liquidity and external finance, with an important nuance that the price of external finance is partly set by stakeholders' inference about need.

The governance inequality has the same interpretation. Stronger governance can make reported resources more deployable in the adverse state, lower donor reliance on a coarse cash ratio, or both. Either channel reduces the chance that high reported liquidity translates into a larger deterioration after a shock.

Together, the propositions organize the empirical analysis. The first three link liquidity to revenue risk, endowments, restricted resources, and available debt. Proposition 4 links liquidity to fundraising effort, donations, restricted giving, and endowment contributions. Proposition 5 explains why the response to large funding shocks can be stronger for organizations that looked cash-rich beforehand, especially when governance is weak and reported liquidity is a poor measure of deployable resources.

3 Data Sources and Summary Statistics

Our empirical analysis uses the universe of electronically filed IRS Form 990 returns submitted by organizations exempt under Section 501(c) of the Internal Revenue Code between 2010 and 2023. Most filers are charitable organizations exempt under Section 501(c)(3), but the sample also includes social welfare, labor, and agricultural organizations exempt under other Section 501(c) subsections. We retain these organizations because the financing frictions studied in the paper arise from the nonprofit organizational form rather than from charitable status alone.

Form 990 provides standardized information on assets, revenues, expenses, debt, fundraising, endowments, and governance. We exclude organizations filing Form 990-EZ or Form 990-N, which contain substantially less financial information, as well as observations with non-positive assets or missing revenue. Employer Identification Numbers (EINs) allow us to follow organizations over time. We classify organizations into 12 major mission categories using National Center for Charitable Statistics (NCCS) groupings and assign locations from registered mailing addresses. The final panel contains approximately 3.4 million organization-year observations on more than 450,000 distinct nonprofits. Appendix A lists every variable, its Form 990 source line, and its construction. Table 1 reports summary statistics.

Scale, funding structure, and operating outcomes. The sector is highly heterogeneous. Mean annual revenue is $10.7 million and mean assets are $23.5 million, but the median organization has only $0.5 million in revenue and $0.8 million in assets. Employment is similarly skewed: the median nonprofit reports 3 employees, and the 90th percentile reports 95.

To characterize funding structure, we separate earned revenue (program-service revenue, line 2g of Part VIII) from contributed support (private donations, government grants, federated campaigns, and membership dues; lines 1a–1f of Part VIII). Program-service revenue accounts for 39% of total revenue on average and contributions for 47%, but the two means conceal sharply different business models. Program-service revenue is zero at the 25th percentile and 86% of revenue at the 75th, while the contribution share ranges from 1% to 93% over the same interval. Some organizations rely almost entirely on earned income, while others are financed almost entirely by donors and grantors.[3] Government grants are received by fewer than one-third of organizations but supply more than half of revenue at the 90th percentile.

Operating outcomes are widely dispersed and frequently negative. Total expenses average 101.7% of revenue, while the median organization spends 96.3%. The expense-to-revenue ratio reaches 105.9% at the 75th percentile and 128.5% at the 90th. The median operating margin (surplus over total expense) is correspondingly positive but small, typically 2–5%. The 25th percentile is negative in every year of the panel, and the bottom decile sits in deep deficit, between roughly -22% and -26% in most years. These shortfalls are persistent as well as common: 38–42% of organizations run a deficit in pre-pandemic years, and about a third are chronically

[3]For example, hospitals, universities, nursing homes, and daycare centers generate the bulk of their revenue through patient fees, tuition, or contractual reimbursements. Religious congregations, advocacy and policy organizations, food banks, environmental groups, and disaster-relief charities operate primarily on private donations and grants. Many cultural institutions, including museums, theaters, and orchestras, fall in between, combining ticket revenue with substantial donor support.

in deficit, defined as negative operating margins in at least three of the preceding five years (Figure 1). Operating shortfalls are therefore a recurring feature of nonprofit finance rather than unusual distress events. Program-service expenses nevertheless average 72.0% of revenue and 71.1% of total expenses, with considerable dispersion that reflects capital campaigns, accumulation for future projects, and episodic activities such as disaster relief in which spending is inherently uneven.

Liquidity. The combination of unevenly timed inflows and recurring shortfalls creates a natural role for liquid reserves. We define two liquidity measures from Part X of Form 990: cash (line 1, non-interest-bearing balances only) and cash plus short-term investments (lines 1 and 2; STI includes savings and temporary cash investments such as interest-bearing accounts, money market funds, certificates of deposit, and other short-maturity instruments). Both are scaled by total assets (line 16). Cash alone averages 29% of assets and Cash+STI averages 45%. The two diverge because Form 990 reports interest-bearing balances on a separate line, so cash alone understates the resources organizations can readily deploy. We use Cash+STI as our preferred measure throughout the paper and report robustness to the narrower cash measure in the Online Appendix.[4] Liquidity holdings also vary widely across organizations. The median nonprofit holds Cash+STI equal to 34% of assets, the 75th percentile holds 85%, and the 25th percentile only 10%. Appendix B shows that these balances are high even relative to size-matched for-profit firms: in a matched sample, mean liquidity is 43.4% of assets for nonprofits and 35.9% for for-profit firms, with the gap especially large in the upper tail (81% vs 62% at the 75th percentile).

Debt. We measure three forms of interest-bearing debt from the Part X balance sheet: tax-exempt bond liabilities (line 20), secured mortgages and notes payable to unrelated third parties (line 23), and unsecured notes and loans payable to unrelated third parties (line 24). Debt use is concentrated. Only 2.5% of organization-years report tax-exempt bond liabilities and 6.4% report unsecured debt; secured debt is more common at 19.3%, reflecting facility financing in sectors such as housing, education, and healthcare. Combined, about a quarter of organization-years report some interest-bearing debt, and even where debt is used leverage is modest: secured debt averages 7.4% of assets and tax-exempt and unsecured borrowing each about 1%, consistent with the limited role of external capital markets for the sector. Tax-exempt bonds typically finance long-lived facilities and carry substantial fixed issuance costs; unsecured debt is more flexible and can absorb working-capital needs and temporary shortfalls; secured debt sits between the two.

[4] Cash+STI is the closest analogue to Compustat's *CHE* (cash and short-term investments) scaled by total assets, the standard measure of corporate liquidity.

Panel B of Table 1 characterizes which nonprofits use each form of debt and, conditional on borrowing, how much they hold and how it splits across forms, the participation and intensity margins the model distinguishes. Because the model treats debt access as an organization-specific primitive rather than predicting what drives it, we interpret these as describing the heterogeneity it takes as given. Scale, fixed assets, and endowment status are the strongest correlates of debt use, while donation-dependent organizations use less of every form. Endowment most cleanly separates the two margins: having an endowment raises the probability of borrowing, particularly through tax-exempt bonds, whereas greater endowment intensity is associated with less debt and lower leverage; the existence of the endowment marks institutional capacity to access markets, and its size provides internal funds that substitute for borrowing. Larger boards borrow less overall and carry substantially lower leverage, with the mix tilting toward tax-exempt financing, consistent with broader donor reach reducing the need for external finance. Prior-year operating deficits raise leverage sharply and tilt the marginal borrowing modestly toward unsecured debt.

Endowments. We construct endowment variables from Schedule D Part V of Form 990, which is filed by organizations that maintain a permanent or quasi-permanent fund. *HasEndowment* equals one if the organization reports a non-zero end-of-year endowment balance (line 1g), and *EndowShare* is that balance scaled by total assets. About 11% of organization-years report an endowment. Among endowment-holders, the average endowment balance is $31.1 million and the median $1.2 million. We decompose endowed assets into board-designated, permanent, and term-restricted components (Schedule D Part V lines 2a, 2b, and 2c) for use in the Online Appendix. Quasi-endowment is board-designated and therefore deployable subject to board approval. Permanent and term endowment is donor-restricted, with the corpus typically held in perpetuity or for a specified horizon.

Governance and external oversight. We measure four dimensions of governance and external oversight. The first is board size (Part VI line 1a). Nonprofit governance differs fundamentally from the corporate case: donors receive neither residual cash-flow rights nor formal control in exchange for their gifts, and because authority resides with the board, nonprofit boards often include major donors, for whom board service is the channel of influence over mission and the use of resources. Larger boards may also connect the organization to wider donor, professional, and community networks. We therefore interpret board size as a broad measure of governance capacity, donor reach, and institutional capital. The median nonprofit reports 9 voting members and the mean 12.4.

Board independence (Part VI line 1b over line 1a) is the fraction of voting directors classified

as independent under IRS rules, which require the director to be uncompensated, free of material outside transactions with the organization, and not engaged in joint ventures with insiders; donor status alone does not compromise independence. As with public-company boards, formal independence captures the absence of financial ties but not necessarily effective monitoring or expertise, so it is an imperfect measure of governance quality. The mean is 85%.

External accounting involvement equals one if the organization reports that its financial statements were reviewed or audited by an independent accountant, our proxy for external scrutiny of financial reporting, present in 44% of organization-years. Government-grant receipt, present in 29% of organization-years, is a coarse proxy for external public monitoring: granting agencies impose reporting and compliance requirements, though the variable also reflects sector and funding model.

Heterogeneity and identification. The summary statistics document substantial heterogeneity in nonprofit financing across organizations, sectors, and time. Liquidity, debt, endowment, and governance vary widely both across organizations and within the same organization over time. This motivates the fixed-effect structure used throughout. Organization fixed effects absorb time-invariant differences in funding model, mission, and management, and sector $\times$ revenue-percentile $\times$ year fixed effects condition each nonprofit on others of similar size in the same mission area and year. In the panel specifications, the coefficients are therefore identified from within-organization changes in financing variables relative to peers facing the same contemporaneous environment; the organization-level specifications instead exploit cross-sectional variation in funding risk and persistence.

4 Liquidity Policy and Donor Triage

Our empirical work is organized around the main propositions of the model. We first analyze how liquidity responds to revenue risk, endowments, restricted resources, and debt access, testing Propositions 1–3. We then turn to the donor side, where Proposition 4 links visible liquidity to fundraising effort, donations, restricted giving, and endowment contributions.

4.1 Funding Risk, Financing Access, and Liquidity

Proposition 1 characterizes the liquidity target through the condition $g_K = \Psi(K^*)$, where $\Psi(K) = \mathbb{E}_t[\Lambda_{t+1}\mathbf{1}\{R_{t+1} > K\}]$ is the value-weighted mass of states in which next period's residual funding

need exceeds deployable liquidity on hand. The target rises with any revenue characteristic that thickens this upper tail and falls with any characteristic that makes funding more predictable. In the model this works through two channels. First, because program-service revenue enters the funding need with a negative sign while contributions do not, reliance on the two streams enters with opposite signs. Second, at a fixed long-run revenue variance, a more persistent stream has smaller one-step-ahead innovation variance and therefore requires less precautionary liquidity.

We estimate, at the organization-year level, specifications of the form

$$\text{Liquidity}_{i,t} = \alpha_i + \alpha_{s(i),\,p_{t-1}(i),\,t} + \beta' X_{i,t-1} + \varepsilon_{i,t}, \tag{26}$$

where $\text{Liquidity}_{i,t}$ is either Cash/Assets or (Cash + Short-Term Investments)/Assets, and $X_{i,t-1}$ contains lagged drivers of liquidity. These specifications include organization fixed effects α_i and sector-by-revenue-percentile-by-year fixed effects $\alpha_{s(i),\,p_{t-1}(i),\,t}$, with revenue percentiles formed within sector from lagged revenue. The cell (s, p_{t-1}, t) conditions on the organization's current sector-scale environment, the empirical analogue of the model's contemporaneous state, so β is identified from residual within-cell, within-organization variation in $X_{i,t-1}$ and captures how the same nonprofit adjusts liquidity as its funding structure evolves. Because the design absorbs the cross-sectional level relationship, we read β as consistent with the comparative static $\partial L^*/\partial X$ rather than as its structural counterpart. Standard errors are clustered by organization.

We complement this within-organization design with cross-sectional specifications that exploit organization-level variation in funding risk and persistence. Because these measures are built from each organization's full time series, they are estimated with one observation per organization,

$$\overline{\text{Liquidity}}_i = \alpha_{s(i),\,p(i)} + \gamma R_i + u_i, \tag{27}$$

where $\overline{\text{Liquidity}}_i$ is the organization's average liquidity ratio and R_i is an organization-level risk measure: either the within-organization standard deviation of ln(Contributions), capturing the volatility of discretionary funding, or the AR(1) coefficient ρ_i from a regression of ln(PSR) on its own lag, capturing the persistence of earned income; $\alpha_{s(i),\,p(i)}$ denotes sector-by-revenue-percentile fixed effects with percentiles formed within sector from average lagged revenue, and standard errors are clustered by sector.

Table 2 reports the estimates. Panel A uses Cash/Assets and Panel B uses (Cash + Short-Term Investments)/Assets, our preferred and more complete measure of readily deployable liquidity. In the text we discuss the Panel B coefficients; the two panels are similar. Columns 1 and 2 examine

revenue composition. When the same organization becomes more reliant on contributions, its discretionary stream, subsequent liquidity rises; when it shifts toward program-service revenue, its contractual and more forecastable stream, liquidity falls. The opposite signs are consistent with the model: program-service revenue enters the funding need (2) with a negative sign and so shrinks the residual shortfall and thins Ψ, while a larger contribution share does the reverse. The within-organization magnitudes are modest: a one-standard-deviation increase in the lagged contribution share raises (Cash + STI)/Assets by 0.17 percentage points.[5] Column 3 shows that liquidity rises following periods of higher contribution volatility, measured as the five-year rolling standard deviation of total contributions scaled by assets, the most direct proxy in the table for a thicker shortfall tail.

Columns 4 and 5 use the organization-level design in equation (27). Organizations with more volatile contribution streams hold more precautionary liquidity, and organizations with more persistent program-service revenue hold substantially less. A one-standard-deviation increase in contribution-stream volatility raises (Cash + STI)/Assets by 0.85 percentage points, and an organization with fully persistent PSR ($\rho_i = 1$) holds 2.46 percentage points less than one with a non-persistent stream ($\rho_i = 0$); relative to the sample mean of roughly 46 percentage points, these are about 2% and 5%.[6]

Part of the contrast between these magnitudes and the modest within-organization effects in Columns 1–3 reflects the variation each design exploits: equation (26) is identified from year-to-year changes in revenue mix, whose within-organization standard deviation is roughly a third of its cross-sectional counterpart, whereas equation (27) exploits the larger cross-sectional dispersion in risk and persistence. Taken together, the results support the precautionary channel of Proposition 1.

Table 3 examines whether financing access substitutes for internal liquidity, as predicted by Propositions 2 and 3. The three debt indicators test Proposition 3, and the endowment indicator tests the deployability channel of Proposition 2. The evidence supports both. Organizations hold less liquidity once they have tax-exempt debt, secured debt, unsecured borrowing, or endowment assets, on both liquidity measures, and the effects survive with all four included together, indicating distinct substitution margins.

[5]The within-FE standard deviation is 0.135 for Contributions/Revenue, computed as the standard deviation of the residual after absorbing EIN and Sector $\times$ RevPct $\times$ Year fixed effects. The pooled standard deviation is roughly three times larger, reflecting the persistence of nonprofit revenue mix within organizations year to year.

[6]We use program-service revenue for the persistence test because it is the contractual stream the organization plans against, so its one-step forecastability is what governs the operating shortfall; the AR(1) of contributions is noisier and less tied to a planning horizon. The reading assumes organizations with more persistent PSR do not also have systematically higher long-run revenue variance.

Relative to organizations without each source, those reporting secured debt hold about 5.4 percentage points less liquidity, tax-exempt debt 2.8, an endowment 2.7, and unsecured borrowing 1.7. All four are consistent with Proposition 3: usable financing lowers the cash target through its net contribution in a shortfall. The model does not predict the ranking of magnitudes across instruments, which depends on their institutional features, usable capacity, interest cost, issuance costs, and access. Secured debt displaces the most cash, consistent with its broad access, low issuance cost, and collateral that makes it reliably drawable in a shortfall. Tax-exempt debt carries the lowest interest rate but the highest issuance cost and the most restrictive access, so fewer organizations are on the marginal-borrowing margin and its average displacement is smaller. Unsecured borrowing, whose capacity rests on the reliability of residual revenue rather than collateral, supplies the least dependable resources in a shortfall and displaces the least.

Table 4 turns to governance, using (Cash+STI)/Assets, with the Cash/Assets analogues in the Online Appendix. Liquidity declines with board size: the smallest boards (four or fewer members) hold about 1.2 percentage points more than the 9–10 member baseline and the largest (fifteen or more) about 0.8 points less, monotonically across buckets and in the continuous specification. A larger board may monitor reserve accumulation more closely, but it may equally bring wider fundraising reach, donor connections, and access to in-kind and emergency support, any of which lets an organization self-insure with less cash. The regression cannot separate these channels, and the model does not sign the level relation in any case. Audited organizations hold about 1.4 percentage points less, and those receiving government grants about 0.3 points less; both bring external oversight through reporting and compliance requirements. Board independence is unrelated to liquidity once the other characteristics are controlled for. We test governance's signed predictions where the model delivers them, in its interaction with the donor-triage slope (Section 4.2) and the cash-rich gradient (Section 5).

Overall, Tables 2–4 support the model's view of liquidity as a precautionary asset that substitutes for the capital-market instruments nonprofits lack. Organizations build liquidity as funding becomes more volatile and discretionary and draw it down as they gain deployable financing capacity or more predictable revenue. Liquidity is also lower for organizations with larger boards, audited statements, and government grants, patterns the model does not sign but that are consistent with broader access to non-cash adjustment, whether through oversight or fundraising reach.

4.2 Fundraising and Donor Triage

Proposition 4 turns from the liquidity target to its consequences for external finance. On the interior donor region, a higher visible-liquidity signal lowers fundraising effort, unrestricted solicited gifts, and total solicited gifts, and it raises the restricted share of the support that arrives. The mechanism has two margins. The organization solicits less because the return to effort is lower, and contacted donors, inferring that an unrestricted dollar is less pivotal, give less or restrict the gift. The model therefore predicts a decline in flexible donor finance together with a shift in composition toward restricted forms, rather than a uniform fall across all categories of giving. The composition shift is the part of the prediction the organization's own effort cannot reproduce: soliciting less lowers the dollars raised but cannot by itself raise the restricted share of the dollars that arrive.

We test these predictions with organization-year regressions that place lagged liquidity on the right-hand side,

$$Y_{i,t} = \alpha_i + \alpha_{s(i),\,p_{t-1}(i),\,t} + \beta\,\text{Liquidity}_{i,t-1} + \delta' Z_{i,t-1} + \varepsilon_{i,t}, \tag{28}$$

where $\text{Liquidity}_{i,t-1}$ is lagged (Cash + Short-Term Investments)/Assets and $Z_{i,t-1}$ collects the contribution ratio, the endowment and three debt indicators, and an indicator for audited or reviewed statements. The fixed effects are those in equation (26), so β is identified from within-organization variation in liquidity relative to sector-scale peers in the same year, and standard errors are clustered by organization. As in Section 4.1, we interpret β as consistent with the model's comparative static rather than as a structural object. Because liquidity is predetermined, the association is not mechanically generated by contemporaneous fundraising, and its sign runs opposite to the accumulation channel in which successful solicitation builds reserves, which would induce a positive relation.

Table 5 reports the estimates. Panel A separates the organization's fundraising effort, measured by fundraising spending in columns 1 and 2, from realized donor support, measured by fundraising-event revenue and total donations in columns 3 through 5. On the effort side, a higher lagged liquidity ratio lowers both the probability that an organization reports any fundraising spending (column 1) and the level of that spending: a 10 percentage point increase in lagged liquidity is associated with about 1.9% lower fundraising expenditures (column 2). The organization solicits less when internal reserves are abundant. Realized donor support falls with it. Fundraising-event revenue declines on both the extensive and intensive margins (columns 3 and 4; about 1.0% lower for a 10 percentage point increase in liquidity), reflecting both the lower effort and weaker donor

willingness to give. Because fundraising-event revenue captures only gifts raised through formal campaigns, column 5 examines total donations, which test whether the decline extends beyond organized fundraising. It does: a 10 percentage point increase in lagged liquidity is associated with about 0.8% lower total donations, significant at the 1% level. Visible reserves predict less fundraising effort and less flexible donor support, the flexible-finance margin of Proposition 4.

Panel B turns to the composition of support, and the signs reverse. The same higher liquidity ratio predicts larger subsequent inflows into the most constrained forms of giving: the change in donor-restricted net assets, scaled by average assets (column 1), and endowment contributions, scaled by average assets and by average endowment value (columns 2 and 3, among endowment holders). A 10 percentage point increase in lagged liquidity raises the restricted-asset inflow by about 0.30 percentage points of assets and endowment contributions by about 1.6 percentage points of endowment value. Flexible giving falls while restricted and endowment giving rises, so the mix of support shifts toward restricted forms exactly as the donor-triage prediction implies. The composition of gifts is therefore the sharper evidence of donor triage. Lower fundraising effort can explain fewer dollars raised, but it cannot mechanically explain why the dollars that arrive become more restricted. The rise in restricted giving with visible reserves points to donors reallocating support toward constrained uses when unrestricted dollars appear less pivotal.

Table 6 sharpens this distinction by interacting liquidity with board size, splitting each effect across terciles of board size formed within sector-by-revenue-percentile-by-year cells. The two panels behave differently. In Panel A, the liquidity sensitivity of fundraising and flexible giving is strongest for the smallest boards and weakens monotonically with board size. For the largest boards the fundraising-event and total-donation margins are economically small and statistically indistinguishable from zero, and the test that the small-board and large-board interactions are equal is rejected at the 1% level in every column. In Panel B, by contrast, the shift toward restricted and endowment giving is essentially uniform across board sizes. The point estimates are close in magnitude across terciles, and the small-versus-large equality cannot be rejected for either endowment-contribution margin; for restricted net assets the difference is statistically detectable but economically small, with small- and large-board coefficients of 0.029 and 0.032. Board size moves the effort and flexible-giving margin but leaves the composition margin nearly unchanged.

The contrast localizes the role of board size. The model attributes governance's effect to a lower signal loading, which would damp both margins, yet the data place the board-size effect on solicitation and flexible support alone. We interpret board size primarily as fundraising reach and donor networks rather than monitoring strength: larger boards sustain solicitation and flexible

giving when reserves are high, rather than changing the per-contact inference that leads a donor to restrict a gift. To the extent donors also treat a larger board as reassurance that reserves will not be misused, the same gradient is consistent with the model's signal-loading channel, which board size cannot separate from reach. The donor's restriction decision, conditional on giving, shifts with visible liquidity regardless of the recipient's board. Its invariance to board size is the cleanest evidence that the composition shift reflects donor allocation rather than organizational effort, since the effort margin moves Panel A while leaving Panel B intact. This is the donor-triage pattern on which the cash-rich response in Section 5 builds: the same visible liquidity that redirects giving in normal times can redirect relief when an adverse shock arrives.

5 The Cash-Rich Response to Funding Shocks

Sections 4 and 4.2 establish the two halves of the model's logic in normal times: nonprofits hold precautionary liquidity that substitutes for the financing instruments they lack, and visible reserves reduce flexible donor support while tilting the support that arrives toward restricted forms. We now bring the model to its central prediction, the cash-rich response to an adverse funding shock.

Proposition 5 states the prediction precisely. Let $C(L,G)$ be the resource contraction a high-need shock imposes on an organization with reported liquidity L and governance G. The contraction is increasing in reported liquidity if and only if condition (24) holds: the extra donor relief a high-liquidity organization forgoes in the bad state, because it appears liquid, exceeds the extra deployable liquidity it can mobilize from its own balance sheet. The condition rests on the two properties of donor finance derived in the model, $D_L < 0$ and $D_{Ln} < 0$: donor support falls with reported liquidity, and that negative gradient steepens when need is high. When need is low, looking liquid costs little; when need is high, looking liquid forfeits donor relief precisely when flexible dollars are most pivotal. The same proposition predicts that governance attenuates the gradient, under condition (25), by making reported resources more deployable in the bad state, by lowering donor reliance on the coarse liquidity ratio, or both.

We test this prediction with two complementary shocks. The first is a set of large organization-specific collapses in government grant funding, an idiosyncratic shock that originates in public budgets. The second is the donor-side effect of the 2017 Tax Cuts and Jobs Act (TCJA), an aggregate tax-policy change that operates through private donors and varies across organizations only through local exposure. One shock removes resources directly; the other works purely through giving. If high pre-shock liquidity predicts a deeper contraction under both, the pattern is unlikely

to reflect a feature peculiar to either setting. In each design we also interact pre-shock liquidity with board size, the empirical counterpart to the governance margin in the model.

5.1 Government Funding Shocks

Government grants are a major revenue source for many nonprofits, and unlike private donations they are often set by budget cycles, contract renewals, and policy decisions outside any single organization's control. Sharp collapses in this funding therefore offer a clean setting in which to ask whether pre-shock liquidity makes an organization more resilient to an adverse funding shock.

We define a funding shock at the organization-year level as a lagged government-grant share of revenue above a threshold, 25%, 50%, or 75%, that falls below 1% in the current year. The first such event for each organization defines its cohort. We estimate a stacked difference-in-differences specification (Cengiz, Dube, Lindner and Zipperer, 2019; Baker, Larcker and Wang, 2022) in which each cohort enters as a separate event window $\tau \in [-3,3]$, with $\tau = 0$ the shock year, and the treated organizations in each window are compared to not-yet-treated peers in the same cohort, sector, pre-shock revenue percentile, and year. Stacking the clean cohort comparisons in this way yields treatment effects robust to heterogeneous timing and avoids the negative-weighting problem that arises when conventional two-way fixed effects estimators combine cohorts treated at different times (Goodman-Bacon, 2021; Sun and Abraham, 2021; de Chaisemartin and D'Haultfœuille, 2020). The treatment indicator $T \times \text{Post}$, equal to one for treated organizations in $\tau \in \{0,1,2,3\}$, is interacted with the organization's pre-shock liquidity tercile, defined on (Cash + STI)/Assets within cohort-by-sector-by-pre-shock-revenue-percentile cells. The outcomes are an indicator for organizational exit and the log of program-service expenses. Each specification includes cohort-by-organization fixed effects and cohort-by-sector-by-revenue-percentile-by-year fixed effects, and we cluster standard errors by organization.

The design isolates the comparison the model speaks to. All treated organizations lose the same kind of funding, so selection into grant loss does not drive the contrast across pre-shock liquidity terciles; the question is why organizations that looked cash-rich before an identical shock fare worse afterward. The not-yet-treated comparison group and the cohort-by-organization fixed effects absorb the level differences across cohorts and organizations, and Figure 2 shows that the high-cash and low-cash groups move in parallel before the shock, so the post-shock divergence is not a continuation of a pre-existing trend.

Table 7 reports the results. The pattern is the cash-rich paradox. At the broadest threshold, organizations in the top pre-shock liquidity tercile exit at a rate 4.8 percentage points higher after the

shock, against 1.7 points for the bottom tercile, a contrast that is large relative to the unconditional exit rate of 2.6% and is rejected as equal at the 1% level. The response is concentrated at the top of the liquidity distribution: the bottom and middle terciles are nearly identical (1.7 and 1.8 points), and the jump comes only in the top tercile, the shape that the steepening in D_{Ln} predicts. Program spending moves the same way. High-liquidity organizations cut program-service expenses by about a third, while low-liquidity organizations cut them by about 8% at the broadest threshold and not at all at the stricter ones. The contrast sharpens with severity: when the lost grant exceeded three-quarters of revenue, top-tercile exit rises by 6.3 percentage points and program spending falls by more than 0.4 log points, while the bottom tercile shows no program-spending response at all. That the contrast scales with the size of the lost grant is consistent with the design capturing genuine funding disruptions. The organizations that entered the shock looking most liquid are the ones that retrench and disappear.

The baseline dynamics, reported in the Online Appendix, confirm that the shocks are economically meaningful and durable. Exit rises sharply in the shock year and remains elevated thereafter, while program-service spending falls steeply at the shock and then recovers only partially, with the recovery least complete under the most severe definitions. Figure 2 plots the high-minus-low-cash differential at each event time. The differential is flat and indistinguishable from zero in the three pre-shock years, jumps at the shock year, and persists for both outcomes, so the cash-rich gap reflects post-shock adjustment rather than a pre-existing divergence between high- and low-cash organizations.

Table 8 adds the board-size margin, splitting the treated organizations by pre-shock cash at the median and, within each cash group, by board-size tercile. Among high-cash organizations, the exit response is steeply decreasing in board size: small-board organizations exit at a rate 5.7 percentage points higher after the shock, against 1.4 points for large-board organizations, and the difference is rejected at the 1% level. Program spending shows the same attenuation, and the board-size gradient appears within both cash groups: in each, larger boards are associated with smaller post-shock increases in exit and smaller spending cuts. We read board size here as in Section 4.2, primarily as fundraising reach and donor networks, and possibly as lower donor reliance on the liquidity ratio, channels board size cannot separate. Either way, the attenuation matches the qualitative prediction of condition (25), that a smaller cash-rich gradient appears where reserves are more deployable or the liquidity signal carries less weight. It does not eliminate the paradox: even high-cash organizations with large boards exit at a significantly higher rate and cut spending after the shock, so wider reach, and any added oversight, blunt the cash-rich response without undoing it.

5.2 The TCJA Donor-Side Shock

The government-grant design removes resources directly. To isolate the donor channel at the center of the model, we turn to a shock that operates only through giving. The 2017 Tax Cuts and Jobs Act roughly doubled the standard deduction, which sharply reduced the share of taxpayers who itemize and therefore the tax incentive to give. The reform lowered the price of giving differently across communities, depending on the local income distribution, without touching any individual organization's grants or operations.

We measure each organization's exposure with a shift-share (Bartik) instrument (Bartik, 1991; Card, 2001). For ZIP code z, exposure is $\text{Exposure}_z = \sum_k s_{z,k} \Delta\text{itemize}_k$, where $s_{z,k}$ is the 2017 share of local filers in adjusted-gross-income bracket k and $\Delta\text{itemize}_k$ is the national decline in the itemization rate of bracket k from 2017 to 2019. The variation comes from how a ZIP's pre-reform income mix loads onto brackets whose itemization fell most.[7] Table 9 reports the instrument's construction and first stage. Panel A shows that the identifying variation comes mainly from higher-income taxpayers, whose itemization fell most after the reform and who account for a disproportionate share of giving and are the most tax-price sensitive (Auten, Sieg and Clotfelter, 2002; Bakija and Heim, 2011; Han, Hungerman and Ottoni-Wilhelm, 2024). Panel B reports the first stage. A one-standard-deviation increase in exposure lowers total contributions by about 2.5%, and organizations in the most exposed ZIP-code tercile see contributions fall by about 5.6%, magnitudes in line with prior estimates of the TCJA's effect on giving (Meer and Priday, 2020; Han, Hungerman and Ottoni-Wilhelm, 2024). Both are estimated on the panel of organizations with positive contributions in each pre-period year. Figure 3 shows the dynamic first stage: the exposure loading on contributions is flat before 2018 and turns sharply negative afterward, confirming that the instrument captures a post-reform decline in giving rather than a pre-existing difference across exposed and unexposed areas.

Table 10 reports how organizational outcomes respond to local exposure, interacted with pre-shock liquidity. The asymmetry of the government-grant design reappears in a setting with an entirely different source of variation. In the most exposed ZIP-code tercile, exit and program spending respond significantly only among organizations that entered the period with high liquidity. Top-tercile-cash organizations in the most exposed areas exit at a rate 0.41 percentage points higher and cut program-service spending by about 9.5%, while low-liquidity organizations show no significant response on either outcome, and the equality of the high- and low-cash coefficients

[7] For recent econometric treatments of shift-share designs, see Goldsmith-Pinkham, Sorkin and Swift (2020), Borusyak, Hull and Jaravel (2022), and Borusyak and Hull (2023).

is rejected at conventional levels. The continuous-exposure specifications deliver the same conclusion. Because the design includes sector-by-year-by-revenue-percentile fixed effects, the aggregate giving environment over this period, including the pandemic years, is absorbed, and identification comes from the differential response of high- versus low-liquidity organizations to local exposure.

Table 11 adds board size, which again moves outcomes within both cash groups, though the precise pattern differs from the government-grant design. Among high-cash organizations the response is largest for small boards and smaller, often insignificant, for large boards, but the difference between small and large boards is only marginally significant here. Among low-cash organizations the board gradient is sharper: small-board organizations experience higher exit rates and cut spending while large-board organizations do neither, so the muted average low-cash response in Table 10 masks offsetting effects across board sizes. Consistent with the reach reading of Section 4.2, board size shapes how a given exposure translates into outcomes, while high pre-shock liquidity remains the margin that turns exposure into a deeper contraction. On that central margin the two designs agree: high pre-shock liquidity deepens the contraction under both an idiosyncratic collapse of public grants and an aggregate change in the tax treatment of private giving.

5.3 Interpretation and External Validity

The two designs together identify the cash-rich paradox and tie it to the donor channel. An idiosyncratic loss of public grants and an aggregate change in the tax treatment of private giving produce the same response: the organizations that looked most liquid before the shock cut mission spending most and exit at the highest rates. In the language of Proposition 5, condition (24) holds in the data, so the extra donor relief a cash-rich organization forgoes in the bad state exceeds the extra liquidity it can deploy from its own balance sheet. The concentration of the effect in the top liquidity tercile, and its sharpening with shock severity, are the empirical counterpart of the steepening gradient $D_{Ln} < 0$ that makes looking liquid most costly exactly when need is greatest.

The result does not say that cash is harmful. It draws the distinction between the level of resources and the change a shock induces. A liquid organization holds more resources and may face lower exit risk in normal times; the paradox concerns what happens when an adverse shock raises need and visible reserves redirect the donor relief that would otherwise arrive. Board size shapes the magnitude of this redirection. In both designs board size moves post-shock outcomes, and larger boards generally dampen the cash-rich response, consistent with the reach reading of Section 4.2: wider fundraising reach and donor relationships help cash-rich organizations mobilize

support in the bad state, and possibly lower donor reliance on the liquidity ratio. The attenuation is partial and cleaner in the grant design than in the donor-side design, and it never overturns the central pattern: even well-connected cash-rich organizations fare worse after a shock than comparable cash-poor ones.

More broadly, the evidence echoes the long-standing tension between precautionary and disciplinary motives for corporate cash holdings (Jensen, 1986; Opler, Pinkowitz, Stulz and Williamson, 1999; Almeida, Campello and Weisbach, 2004; Dittmar and Mahrt-Smith, 2007; Bates, Kahle and Stulz, 2009), with the distinctive feature that in the nonprofit setting the disciplining agent is the donor rather than the shareholder, and the discipline operates ex ante through the price of external finance. Nonprofits accumulate cash in response to funding risk and limited capital-market access, yet when large shocks arrive the organizations with the largest reserves do not prove more resilient. They retrench and exit more, consistent with the donor-triage mechanism in which visible reserves reduce access to external relief.

Several considerations bound the interpretation. The government-grant design identifies responses among organizations with meaningful exposure to public funding. This limits the population for which treatment effects are directly identified, but these are precisely the organizations for which large and clearly measured funding disruptions can be observed. The estimates should therefore be read as evidence on organizational responses to major funding losses, not as treatment effects for the nonprofit sector as a whole.

The TCJA design faces a different set of considerations. Some donors offset the reduction in itemization incentives through donor-advised funds, charitable bunching, and other tax-planning vehicles, and part of the post-reform window overlaps with the COVID-19 pandemic, which moved both giving and nonprofit operations. These factors add noise to the link between local exposure and realized giving and so attenuate the estimated effects toward zero. That the first stage remains strong and the second-stage results mirror the government-grant evidence therefore strengthens, rather than weakens, the interpretation that the donor channel is economically important, and the first-stage magnitudes line up with prior work on donor responses to the TCJA (Meer and Priday, 2020; Han, Hungerman and Ottoni-Wilhelm, 2024).

Taken together, liquidity in the nonprofit sector serves both an insurance function and a signaling role. Reserves help organizations absorb shocks, but they also shape donor behavior and the allocation of external support. Whether reserves ultimately enhance resilience depends not only on their size but also on an organization's reach and donor relationships and on how donors respond when an adverse shock raises need. The observed liquidity ratio is both insurance and a signal, and

in a downturn the signal can reduce the very relief the reserves were accumulated to provide.

6 Conclusion

This paper documents a cash-rich paradox in the nonprofit sector. Nonprofit liquidity follows the precautionary motive: higher where funding is volatile and donor-dependent, lower with endowments, debt, or larger boards. Yet when a large funding shock arrives, the organizations that held the most liquidity beforehand contract the most and are the most likely to disappear.

We establish this pattern with two shocks sharing no common source of variation: an idiosyncratic collapse in government grants, and the 2017 Tax Cuts and Jobs Act, an aggregate tax shock reaching nonprofits only through the price of private giving. Following grant collapses, exit rises 4.8 percentage points for top-tercile pre-shock liquidity organizations, against 1.7 points for the bottom tercile and a 2.6% unconditional rate. Mission spending contracts by about a third for cash-rich organizations, against far smaller cuts (none at all under the strictest definition) for cash-poor ones. The tax shock reproduces the same asymmetry: in the most exposed markets, only high-liquidity organizations are significantly more likely to exit, cutting spending by about 9.5%; low-liquidity organizations show no response on either margin.

The mechanism is donor behavior. A nonprofit's only flexible outside capital comes from donors, who give partly on how pivotal a gift appears, an assessment shaped by the organization's own balance sheet. We formalize this in a model where donors read reported liquidity as a signal of need, so the marginal cost of cash includes not just a carrying cost but a donor-signal wedge: a loss of flexible support that steepens as need rises. The data confirm both halves. Higher liquidity predicts less fundraising effort, fewer unrestricted donations, and larger inflows of restricted and endowment gifts, the most constrained forms of giving. The second pattern helps separate the mechanisms: lower fundraising effort can explain why fewer dollars arrive, but it cannot explain why the dollars that do arrive are more restricted. That requires a shift in donor behavior.

Governance softens the paradox without closing it. Larger boards attenuate both the donor-triage gradient and the post-shock contraction: among organizations hit by a grant collapse, high-liquidity, small-board organizations see exit rise 5.7 percentage points, against 1.4 points for large-board ones. The relief is partial. Even well-governed, cash-rich organizations fare worse than comparable cash-poor ones, and the shift toward restricted giving is nearly uniform across board sizes. Board size widens fundraising reach; it does not change how donors read a balance sheet. Unlike the market for corporate control, which disciplines nonprofits only weakly (Lewellen,

Phillips and Sertsios, 2026), donor triage needs no change of control: it operates every time a donor decides whether, and how, to give.

These results extend the corporate cash-holdings literature to a setting without shareholders, debt markets, or managers holding residual claims. The canonical view treats cash cost as a carrying cost against insurance value (Opler, Pinkowitz, Stulz and Williamson, 1999; Almeida, Campello and Weisbach, 2004; Bates, Kahle and Stulz, 2009), with agency frictions layered on once reserves invite diversion (Jensen, 1986). Fisman and Hubbard (2005) bring the precautionary motive to nonprofits but keep the cost internal, where managers are the threat. We identify a third cost requiring neither a market price for cash nor an entrenched manager: a signaling cost paid to the external financiers who, in a sector without shareholders or creditors, supply the only real discipline a nonprofit faces.

This force need not be unique to nonprofits: wherever discretionary capital is allocated on perceived need rather than priced in a market, in foreign aid, sovereign lending, or the internal capital markets of a diversified firm, visible reserves plausibly carry some version of the same wedge. The nonprofit sector, where the channel is large and free of the agency confounds complicating its for-profit analogue, offers a clean place to identify it.

Appendix A: Variable Construction and Definitions

Variable	Form 990 Source	Construction and Definition
Revenue ($000s)	Part VIII, line 12, Col. A	Total revenue, in thousands.
Assets ($000s)	Part X, line 16, Col. B	Total assets at end of tax year, in thousands.
Employees	Part V, line 2a (or Part I, line 5)	Total number of W-2 employees reported by the organization.
Cash / Assets	Part X, line 1 / line 16	Non-interest-bearing cash over total assets. Winsorized 1/99.
(Cash+STI) / Assets	Part X, (line 1 + line 2) / line 16	Non-interest-bearing cash plus savings and temporary cash investments over total assets. Winsorized 1/99.
Tax-Exempt Debt	Part X, line 20 $>$ 0	Indicator: tax-exempt bond liabilities $>$ 0 (Schedule K, Part I is filed when this exceeds $100k).
Secured Debt	Part X, line 23 $>$ 0	Indicator: secured mortgages and notes payable to unrelated third parties $>$ 0.
Unsecured Debt	Part X, line 24 $>$ 0	Indicator: unsecured notes and loans payable to unrelated third parties $>$ 0.
Endowment	Schedule D, Part V	Indicator: Schedule D, Part V filed with end-of-year balance (line 1g) $>$ 0.
Program-Service Revenue Share	Part VIII, line 2g / line 12	Program-service revenue over total revenue.
Contributions Share	Part VIII, line 1h / line 12	Total contributions (sum of lines 1a–1f) over total revenue. Also referred to as the "Contribution Ratio."
Donations Share	Part VIII, line 1f / line 12	All contributions, gifts, grants, and similar amounts not included on lines 1a-1e, i.e., contributions not classified as federated campaigns, membership dues, fundraising events, contributions from related organizations, or government grants.
Government Grants Share	Part VIII, line 1e / line 12	Government grants reported as contributions over total revenue.
Fundraising Revenue Share	Part VIII, line 1c / line 12	Contribution-side fundraising-event revenue (reported on Schedule G, Part II if $>$$15k) over total revenue.
Total Expenses / Revenue	Part IX, line 25, Col. A / Part VIII, line 12	Total functional expenses over total revenue.
Program-Service Expenses / Revenue	Part IX, line 25, Col. B / Part VIII, line 12	Program-service expenses over total revenue.

Variable	Form 990 Source	Construction and Definition
Program-Service Expenses / Expenses	Part IX, line 25, Col. B / Col. A	Program-service share of total expenses.
Fundraising Expenses / Expenses	Part IX, line 25, Col. D / Col. A	Fundraising share of total expenses.
Board Size	Part VI, line 1a	Number of voting members of the governing body at year-end.
Board Independence	Part VI, line 1b / line 1a	Independent voting members divided by total voting members.
Audited Financial Statements	Part XII, line 2b	Indicator: financial statements audited by an independent accountant.
5y SD Contributions / Revenue	Constructed	Five-year rolling within-EIN standard deviation of Contributions / Revenue (Part VIII, line 1h / line 12).
AR(1) $\ln(\text{PSR})$	Constructed	EIN-by-EIN OLS slope of $\ln(1+\text{PSR})_t$ on $\ln(1+\text{PSR})_{t-1}$; PSR = Part VIII, line 2g; restricted to EINs with ≥ 5 year pairs; cross-section winsorized 1/99.
ΔRestricted / Avg Total Assets	Part X, line 16	Year-over-year change in donor-restricted net assets divided by the average of beginning-of-year (BOY) and end-of-year (EOY) total assets. Winsorized 1/99.
Endowment Contributions / Avg Total Assets	Schedule D, Part V, line 1b / Part X, line 16	Endowment contributions in the year divided by the average of BOY and EOY total assets. Winsorized 1/99. Endowment holders only.
Endowment Contributions / Avg Endowment Value	Schedule D, Part V, line 1b / (line 1a + line 1g)/2	Endowment contributions divided by the average endowment balance (average of BOY and EOY balances). Winsorized 1/99. Endowment holders only.
Nonprofit Exit	Constructed	Indicator equal to one in the EIN's last observed Form 990 year, only for EINs with ≥ 2 observed years. Set to missing for year ≤ 2011 and year > 2022 (boundary censoring).

All Form 990 line numbers refer to the post-2008 Form 990 (Federal redesign), which is the prevailing format throughout 2010–2023. For details on schema changes and how they are handled for consistency, see Lo, Matveyev and Zeume (2025).

Appendix B: Comparison with For-Profit Firms

This appendix compares the liquid asset holdings of nonprofit organizations with those of for-profit firms of similar size. Panel A reports summary statistics, while Panels B and C present the time-series evolution of liquidity in the two samples. For nonprofits, liquidity is measured as cash plus short-term investments divided by total assets. The for-profit sample is drawn from Compustat, where liquidity is measured as *CHE* (cash and short-term investments) divided by *AT* (total assets).

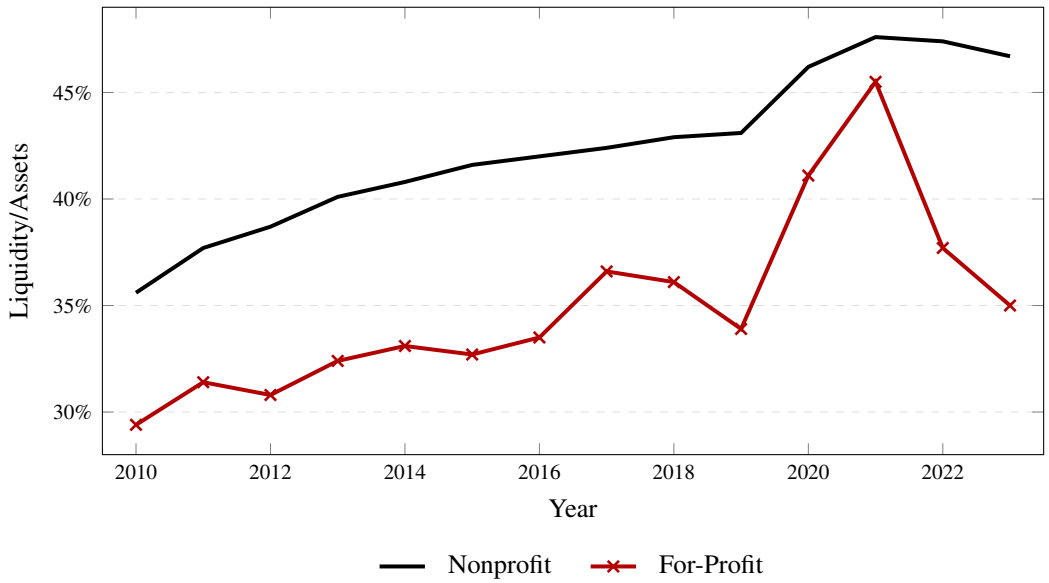
We match each nonprofit-year to the Compustat firm-year in the same year with the closest level of total assets. Matching is conducted with replacement, so a given Compustat firm may serve as the match for more than one nonprofit. We exclude matched pairs for which the absolute difference in log total assets exceeds 1%. Liquidity ratios are winsorized at the 1st and 99th percentiles.

Panel A compares the distribution of liquidity across the two matched samples. Panels B and C present the corresponding time-series evidence. Panel B plots annual mean liquidity ratios for nonprofits and for-profit firms. Panel C plots annual medians using solid lines and the 25th and 75th percentiles using dashed lines. Throughout the appendix, ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

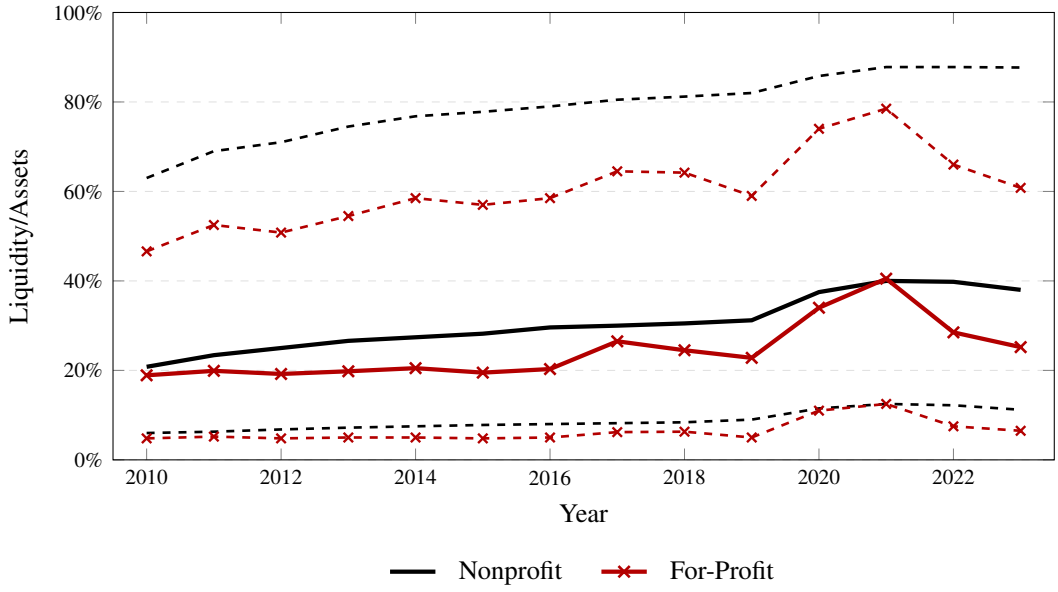
Panel A. Liquidity of Matched Nonprofits and For-Profit Firms

Variable	Nonprofit	For-profit	Difference
ln(Total assets)	13.81	13.81	0.00
Mean	43.40%	35.91%	7.49%***
25th percentile	9.41%	6.78%	2.63%***
Median	32.48%	25.66%	6.81%***
75th percentile	81.10%	62.43%	18.67%***

Panel B. Mean Liquidity Ratios of Nonprofits and For-Profit Firms



Panel C. Median and Interquartile Range of Liquidity for Nonprofits and For-Profit Firms



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Table 1: Summary Statistics and Correlates of Nonprofit Debt Use

This table presents summary statistics and the correlates of nonprofit debt use, leverage, and debt type. Panel A reports summary statistics for all nonprofit organizations required to file Form 990 with the IRS over the 2010–2023 period. Number of Organizations is the number of distinct EINs with at least one non-missing observation for the variable. STI is short-term investments. Further details of variable definitions are in the Appendix.

Panel A: Summary Statistics

Variable	Number of Organizations	Number of Observations	Mean	SD	P10	P25	P50	P75	P90
Revenue ($000s)	453,910	3,345,066	10,687	180,419	71.4	200.1	487.8	1,860	8,517
Total Assets ($000s)	454,397	3,360,728	23,465	434,209	60.6	226.8	798.5	3,313	15,690
Employees	454,397	3,360,728	82.5	1,775	0	0	3	19	95
Program-Service Revenue Share	450,274	3,316,341	39.0%	40.9%	0.0%	0.0%	20.5%	85.8%	99.1%
Total Contributions Share	450,295	3,317,610	46.8%	41.0%	0.0%	1.2%	43.0%	92.6%	100.0%
Donations Share	450,291	3,317,309	27.6%	35.9%	0.0%	0.0%	5.8%	52.8%	95.1%
Receives Government Grants	450,295	3,317,509	28.75%	45.26%	0%	0%	0%	100%	100%
Government Grants Share	450,295	3,317,509	10.9%	24.8%	0.0%	0.0%	0.0%	2.8%	50.5%
Fundraising Revenue Share	450,295	3,317,610	2.1%	8.8%	0.0%	0.0%	0.0%	0.0%	2.4%
Total Expenses / Revenue	450,283	3,317,251	101.7%	63.2%	58.6%	82.5%	96.3%	105.9%	128.5%
Wages / Revenue	450,283	3,317,251	29.50%	28.07%	0%	0%	25.72%	51.97%	68.99%
Program-Service Expenses / Revenue	450,295	3,317,610	72.0%	53.9%	0.0%	45.1%	76.3%	92.5%	109.0%
Program-Service Expenses / Expenses	449,971	3,331,373	71.1%	33.2%	0.0%	65.5%	83.8%	94.3%	100.0%
Fundraising Expense / Expenses	449,971	3,331,373	2.2%	5.2%	0.0%	0.0%	0.0%	1.3%	7.7%
Cash / Total Assets	446,744	3,298,355	29.4%	34.9%	0.0%	1.5%	12.1%	49.8%	98.1%
(Cash+STI) / Total Assets	446,744	3,298,355	44.9%	37.2%	2.4%	9.5%	34.3%	85.4%	100.0%
Board Size	454,397	3,360,728	12.4	16.7	3	5	9	14	21
Board Independence	446,585	3,311,036	85.0%	31.9%	0.0%	91.7%	100.0%	100.0%	100.0%
Audited Financial Statements	454,397	3,360,728	43.7%	49.6%	0.0%	0.0%	0.0%	100.0%	100.0%
Tax-exempt Debt	454,397	3,360,728	2.5%	15.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Secured Debt	454,397	3,360,728	19.3%	39.5%	0.0%	0.0%	0.0%	0.0%	100.0%
Unsecured Debt	454,397	3,360,728	6.4%	24.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Has Endowment	454,397	3,360,728	11.1%	31.5%	0.0%	0.0%	0.0%	0.0%	100.0%
Nonprofit Exit	434,896	3,015,516	2.6%	16.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 1 Continued: Summary Statistics and Correlates of Nonprofit Debt Use

Panel B reports regressions of nonprofit debt outcomes on lagged organization characteristics. Columns (1)–(4) are linear probability models on the full sample; tax-exempt, secured, and unsecured debt are liabilities from Form 990 Part X, lines 20, 23, and 24, and Any debt indicates positive debt of any of the three types. Columns (5) and (6) are OLS estimated conditional on positive debt: Leverage is total debt over assets, and the tax-exempt share is tax-exempt debt over total debt. Lagged surplus/assets is the prior-year surplus scaled by prior-year assets, and the lagged deficit indicator equals one when that surplus is negative. Continuous regressors are winsorized at the 1st and 99th percentiles within year and standardized; their coefficients are percentage-point changes for a one-standard-deviation increase, while indicators are kept on 0/1. Coefficients and standard errors are multiplied by 100. All specifications include Sector × Year and State × Year fixed effects, with standard errors clustered by EIN in parentheses. Sectors are defined based on National Center for Charitable Statistics (NCCS) 12 major mission categories. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel B: Correlates of Nonprofit Debt Use, Leverage, and Debt Type

	Debt outstanding				Conditional on debt	
	(1) Tax-exempt debt	(2) Secured debt	(3) Unsecured debt	(4) Any debt	(5) Leverage	(6) Tax-exempt share
ln(Revenue)	3.1899***	7.9173***	1.9710***	10.4614***	-7.1823***	7.4486***
	(0.0431)	(0.0668)	(0.0380)	(0.0691)	(0.1511)	(0.1174)
Program-Service Revenue Share	0.6688***	0.8900***	-0.1034***	1.2098***	4.4351***	1.6092***
	(0.0278)	(0.0665)	(0.0375)	(0.0691)	(0.1572)	(0.0872)
Donation Share	-0.4004***	-2.3118***	0.1801***	-2.2939***	-3.5902***	-0.9050***
	(0.0178)	(0.0524)	(0.0336)	(0.0571)	(0.1686)	(0.0728)
Fixed-Asset/Assets	1.2413***	15.9152***	2.3874***	17.5961***	3.9000***	1.6854***
	(0.0233)	(0.0637)	(0.0377)	(0.0636)	(0.1210)	(0.0569)
Has Endowment	6.9606***	5.4334***	0.2036	8.2462***	-6.0178***	7.8453***
	(0.2213)	(0.2870)	(0.1569)	(0.2783)	(0.2821)	(0.4142)
Endowment/Assets	-0.9944***	-1.6433***	-0.3464***	-2.2005***	-0.6805***	0.5271***
	(0.0558)	(0.0731)	(0.0422)	(0.0740)	(0.1236)	(0.1806)
Log Board Size	0.1528***	-0.8082***	-0.2135***	-0.9672***	-7.4741***	0.2305***
	(0.0229)	(0.0525)	(0.0316)	(0.0557)	(0.1483)	(0.0836)
Board Independence	-0.0301*	1.6626***	0.4070***	1.9124***	0.0823	-0.7386***
	(0.0175)	(0.0466)	(0.0273)	(0.0502)	(0.1566)	(0.0729)
Lagged Surplus/Assets					-9.7656***	-0.5728***
					(0.2213)	(0.0372)
Lagged Deficit Indicator					6.4780***	0.0301
					(0.2069)	(0.1145)
Sample	Full	Full	Full	Full	Debt>0	Debt>0
Outcome mean	2.75%	20.60%	6.67%	26.99%	38.79%	8.97%
Sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,693,423	2,693,423	2,693,423	2,693,423	726,823	726,823
Unique EINs	386,115	386,115	386,115	386,115	134,157	134,157
Adjusted R^2	0.192	0.235	0.030	0.266	0.183	0.278

Table 2: Revenue Composition, Volatility, Persistence, and Internal Liquidity

This table reports regressions of internal liquidity on revenue composition, volatility, and persistence. In Panel A the dependent variable is Cash / Total Assets; in Panel B it is (Cash + Short-Term Investments) / Total Assets. Both are expressed in percentage points. Columns (1)–(3) are estimated at the organization-year level. In Column (1) the independent variable is the lagged share of total contributions (gifts and donations) in total revenue; in Column (2) it is the lagged share of program service revenue (PSR) in total revenue; and in Column (3) it is the five-year rolling standard deviation of total contributions, normalized by assets. Columns (4)–(5) are estimated at the organization level. In Column (4) the independent variable is the standard deviation of logarithm of total contributions, computed for organizations with more than five annual observations; in Column (5) it is the AR(1) coefficient from a regression of PSR on lagged PSR, estimated for organizations with more than five annual observations. The organization-year specifications (Columns (1)–(3)) include organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The organization-level specifications (Columns (4)–(5)) include Sector × Revenue-Percentile fixed effects. The revenue percentile is based on 100 bins ranked across all organizations each year. In the organization-year specifications it is lagged one year; in the organization-level specifications, each organization is assigned to a Sector × Revenue-Percentile cell using its average percentile across the years it is observed. Standard errors are clustered by EIN in the organization-year specifications and by sector in the organization-level specifications. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Dependent variable = Cash / Assets

	Org-Year Level			Org Level	
	(1)	(2)	(3)	(4)	(5)
	Contr/Rev	PSR/Rev	SD Contr/Assets	SD ln(Contr)	AR(1) ln(PSR)
	1.2462***	-0.6225***	0.5325***	0.8469***	-1.9794***
	(0.1049)	(0.1222)	(0.1007)	(0.1011)	(0.1224)
EIN FE	Yes	Yes	Yes	No	No
Sec×RevPct×Yr FE	Yes	Yes	Yes	No	No
Sec×RevPct FE	No	No	No	Yes	Yes
Observations	2,694,517	2,693,446	1,843,358	286,970	186,556
Adj. R^2	0.814	0.814	0.830	0.120	0.139

Panel B: Dependent variable = (Cash + STI) / Assets

	Org-Year Level			Org Level	
	(1)	(2)	(3)	(4)	(5)
	Contr/Rev	PSR/Rev	SD Contr/Assets	SD ln(Contr)	AR(1) ln(PSR)
	1.2807***	-0.4945***	0.2907***	0.4835***	-2.4626***
	(0.1027)	(0.1207)	(0.1056)	(0.1101)	(0.1471)
EIN FE	Yes	Yes	Yes	No	No
Sec×RevPct×Yr FE	Yes	Yes	Yes	No	No
Sec×RevPct FE	No	No	No	Yes	Yes
Observations	2,693,461	2,692,391	1,842,622	286,970	186,549
Adj. R^2	0.853	0.853	0.869	0.136	0.161

Table 3: Access to Finance and Internal Liquidity

This table reports regressions of liquidity measures on measures of access to finance. In Panel A the dependent variable is Cash / Total Assets; in Panel B it is (Cash + Short-Term Investments) / Total Assets. Both are expressed in percentage points. The independent variables are lagged indicators for whether an organization has tax-exempt debt outstanding, has secured debt outstanding, has unsecured debt outstanding, or has an endowment. Columns (1)–(4) include each access indicator alone; Column (5) includes all four together. Every column controls for the lagged share of contributions in total revenue. All right-hand-side variables are lagged one year. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The revenue percentile is lagged one year and based on 100 bins ranked across all organizations each year. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Dependent variable = Cash / Assets

	(1)	(2)	(3)	(4)	(5)
Tax-Exempt Debt	-1.4288***				-1.9175***
	(0.1400)				(0.1402)
Secured Debt		-2.9954***			-3.0753***
		(0.0656)			(0.0660)
Unsecured Debt			-0.6635***		-0.8956***
			(0.0744)		(0.0745)
Endowment				-2.0599***	-2.0416***
				(0.1132)	(0.1130)
Contribution Ratio	1.2551***	1.2490***	1.2624***	1.2596***	1.2497***
	(0.1057)	(0.1055)	(0.1057)	(0.1057)	(0.1054)
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,677,538	2,677,538	2,677,538	2,677,538	2,677,538
Adj. R^2	0.815	0.815	0.815	0.815	0.815

Panel B: Dependent variable = (Cash + STI) / Assets

	(1)	(2)	(3)	(4)	(5)
Tax-Exempt Debt	-1.9186***				-2.7866***
	(0.1859)				(0.1860)
Secured Debt		-5.2888***			-5.4312***
		(0.0759)			(0.0762)
Unsecured Debt			-1.3316***		-1.7405***
			(0.0773)		(0.0771)
Endowment				-2.7299***	-2.6987***
				(0.1390)	(0.1382)
Contribution Ratio	1.2797***	1.2673***	1.2920***	1.2858***	1.2706***
	(0.1032)	(0.1026)	(0.1032)	(0.1032)	(0.1025)
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,676,488	2,676,488	2,676,488	2,676,488	2,676,488
Adj. R^2	0.854	0.855	0.854	0.854	0.855

Table 4: Governance and Internal Liquidity

This table reports regressions of internal liquidity on governance characteristics. The dependent variable is (Cash + Short-Term Investments) / Total Assets, expressed in percentage points; for robustness, the Online Appendix reports analogous regressions for Cash / Total Assets. Regressions are estimated at the organization-year level. The governance variables are the natural logarithm of board size; indicators for board size buckets ($\leq$4, 5–6, 7–8, 11–14, and $\geq$15, with 9–10 omitted); board independence, defined following IRS guidelines for qualifying independent board members; *Audited or Reviewed*, an indicator equal to one if the organization reports on Form 990, Part XII that its financial statements for the tax year were compiled or reviewed (Line 2a) or audited (Line 2b) by an independent accountant, and zero otherwise; and *Receives Government Grants*, an indicator equal to one if the organization receives government grants, defined from Form 990, Part VIII, Line 1e. All specifications control for the contribution ratio and indicators for whether the organization has tax-exempt debt outstanding, has secured debt outstanding, has unsecured debt outstanding, or has an endowment. All right-hand-side variables are lagged one year. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The revenue percentile is lagged one year and based on 100 bins ranked across all organizations each year. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ln(Board Size)	-0.7571***					
	(0.0627)					
Board Size $\leq$4		1.1920***				1.1851***
		(0.1155)				(0.1212)
Board Size 5-6		0.5773***				0.5628***
		(0.0879)				(0.0888)
Board Size 7-8		0.2411***				0.2289***
		(0.0660)				(0.0662)
Board Size 11-14		-0.4415***				-0.4367***
		(0.0632)				(0.0633)
Board Size $\geq$15		-0.7585***				-0.7570***
		(0.0875)				(0.0878)
Board Independence			-0.2245**			-0.1220
			(0.1145)			(0.1144)
Audited or Reviewed				-1.3625***		-1.3436***
				(0.0698)		(0.0700)
Receives Govmt Grant					-0.3042***	-0.2806***
					(0.0537)	(0.0537)
Contribution Ratio	1.2670***	1.2655***	1.2790***	1.2668***	1.3543***	1.3475***
	(0.1025)	(0.1025)	(0.1031)	(0.1025)	(0.1035)	(0.1040)
Tax-exempt Debt	-2.7694***	-2.7680***	-2.7634***	-2.7721***	-2.7831***	-2.7293***
	(0.1860)	(0.1860)	(0.1858)	(0.1859)	(0.1861)	(0.1858)
Secured Debt	-5.4248***	-5.4228***	-5.3927***	-5.4079***	-5.4266***	-5.3575***
	(0.0762)	(0.0762)	(0.0762)	(0.0762)	(0.0762)	(0.0761)
Unsecured Debt	-1.7394***	-1.7378***	-1.7300***	-1.7443***	-1.7398***	-1.7309***
	(0.0771)	(0.0771)	(0.0773)	(0.0771)	(0.0771)	(0.0772)
Endowment	-2.6823***	-2.6771***	-2.6811***	-2.6464***	-2.6941***	-2.6070***
	(0.1381)	(0.1381)	(0.1380)	(0.1380)	(0.1381)	(0.1378)
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,676,488	2,676,488	2,644,631	2,676,488	2,676,413	2,644,556
Adj. R^2	0.855	0.855	0.855	0.855	0.855	0.855

Table 5: Determinants of Fundraising, Restricted Asset Donations, and Endowment Contributions

This table reports regressions of fundraising and donation outcomes on internal liquidity, measured as lagged cash plus short-term investments scaled by total assets. In Panel A, the dependent variables are fundraising and donation outcomes: 1[FRexp>0] and 1[FRrev>0] are indicators equal to one if an organization incurs fundraising expenses or earns revenue from fundraising events, respectively; ln(1+FRexp), ln(1+FRrev), and ln(1+Don) are the natural logarithms of one plus fundraising expenses, fundraising revenue, and total donations, respectively; one is added so that organization-years with zero values are retained. In Panel B, the dependent variables capture the composition of contributions: Column (1) is the change in restricted assets scaled by average total assets, and Columns (2) and (3) are endowment contributions scaled by average total assets and average endowment assets, respectively. All specifications control for the lagged contribution ratio; indicators for whether the organization has an endowment, tax-exempt debt, secured debt, or unsecured debt; and whether its financial statements are audited or reviewed. All right-hand-side variables are lagged one year. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The revenue percentile is lagged one year and based on 100 bins ranked across all organizations each year. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Fundraising and Donations

	(1) 1[FRexp>0]	(2) ln(1+FRexp)	(3) 1[FRrev>0]	(4) ln(1+FRrev)	(5) ln(1+Don)
(Cash + STI) / Assets	-0.0163***	-0.1874***	-0.0093***	-0.1026***	-0.0849***
	(0.0016)	(0.0150)	(0.0015)	(0.0153)	(0.0157)
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,673,494	2,673,494	2,680,681	2,680,681	2,680,649
Adj. R^2	0.818	0.862	0.661	0.701	0.846

Panel B: Restricted Asset Donations and Endowment Contributions

	(1) ΔRestricted/ Avg Total Assets	(2) Endowment Contr./ Avg Total Assets	(3) Endowment Contr./ Avg Endowment
(Cash + STI) / Assets	0.0298***	0.0432***	0.1569***
	(0.0012)	(0.0020)	(0.0078)
Other lagged governance controls	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes
Observations	1,134,059	326,946	326,881
Adj. R^2	0.026	0.433	0.428

Table 6: Board Size and the Liquidity Sensitivity of Fundraising and Contributions

This table reports regressions of fundraising, donation, and contribution outcomes on internal liquidity interacted with board size. Liquidity is measured as lagged cash plus short-term investments scaled by total assets. Small, Medium, and Large Board are indicators for terciles of board size, defined within Sector × Revenue-Percentile × Year cells; each reported coefficient is the interaction of Liquidity with the corresponding tercile. p(Small = Large) is the p-value of the within-regression Wald test that the Small-Board and Large-Board interaction coefficients are equal. In Panel A, the dependent variables are fundraising and donation outcomes: 1[FRexp>0] and 1[FRrev>0] are indicators equal to one if an organization incurs fundraising expenses or earns revenue from fundraising events, respectively; ln(1+FRexp), ln(1+FRrev), and ln(1+Don) are the natural logarithms of one plus fundraising expenses, fundraising revenue, and total donations, respectively; one is added so that organization-years with zero values are retained. In Panel B, the dependent variables capture the composition of contributions: Column (1) is the change in restricted assets scaled by average total assets, and Columns (2) and (3) are endowment contributions scaled by average total assets and average endowment assets, respectively. All specifications control for the lagged contribution ratio; indicators for whether the organization has an endowment, tax-exempt debt, secured debt, or unsecured debt; and whether its financial statements are audited or reviewed. All right-hand-side variables are lagged one year. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The revenue percentile is lagged one year and based on 100 bins ranked across all organizations each year. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Fundraising and Donations

	(1) 1[FRexp>0]	(2) ln(1+FRexp)	(3) 1[FRrev>0]	(4) ln(1+FRrev)	(5) ln(1+Don)
Liquidity × Small Board	-0.0239***	-0.2823***	-0.0151***	-0.1701***	-0.1653***
	(0.0017)	(0.0166)	(0.0016)	(0.0162)	(0.0179)
Liquidity × Medium Board	-0.0129***	-0.1513***	-0.0084***	-0.0934***	-0.0489***
	(0.0017)	(0.0166)	(0.0017)	(0.0172)	(0.0171)
Liquidity × Large Board	-0.0080***	-0.0772***	-0.0010	-0.0052	0.0026
	(0.0019)	(0.0184)	(0.0019)	(0.0202)	(0.0190)
p(Small = Large)	<0.001	<0.001	<0.001	<0.001	<0.001
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,673,494	2,673,494	2,680,681	2,680,681	2,680,649
Adj. R^2	0.818	0.862	0.661	0.701	0.846

Table 6 Continued: Board Size and the Liquidity Sensitivity of Fundraising and Contributions

Panel B: Restricted Asset Donations and Endowment Contributions

	(1) ΔRestricted/ Avg Total Assets	(2) Endowment Contr./ Avg Total Assets	(3) Endowment Contr./ Avg Endowment
Liquidity × Small Board	0.0286***	0.0447***	0.1574***
	(0.0015)	(0.0032)	(0.0132)
Liquidity × Medium Board	0.0288***	0.0448***	0.1621***
	(0.0013)	(0.0023)	(0.0091)
Liquidity × Large Board	0.0319***	0.0416***	0.1531***
	(0.0014)	(0.0021)	(0.0083)
p(Small = Large)	0.025	0.314	0.734
Other lagged governance controls	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes
Observations	1,134,059	326,946	326,881
Adj. R^2	0.026	0.433	0.428

Table 7: Effects of Government-Grant Collapses on Exit and Program Spending

This table reports stacked difference-in-differences regressions of organizational outcomes on the interaction of pre-shock cash with the post-shock indicator. The outcomes are an indicator for organizational exit (Columns 1–3) and the natural logarithm of program-service expenses (Columns 4–6). A shock is defined at the organization-year level as the lagged government-grant share of revenue exceeding a threshold (25%, 50%, or 75%) and falling below 1% in the current year; the first such shock for each organization defines its cohort. Each cohort enters the panel as a separate event window $\tau \in [-3,3]$, with $\tau = 0$ the shock year. $T \times$ Post equals one for treated organizations in $\tau \in \{0,1,2,3\}$ and is interacted with the organization's pre-shock cash tercile, defined as Low, Medium, or High of (Cash + STI) / Assets within Cohort × Sector × Pre-shock-Revenue-Percentile cells. Revenue percentiles use 100 bins computed on three-year pre-shock mean revenue and ranked across all organizations within each cohort. p(Low Cash = High Cash) is the p-value of the within-regression Wald test that the Low Cash and High Cash coefficients are equal. Each specification includes Cohort × Organization (EIN) fixed effects and Cohort × Sector × Pre-shock-Revenue-Percentile × Year fixed effects. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Exit			**Program Service Expenses**		
	(1) G>25%	(2) G>50%	(3) G>75%	(4) G>25%	(5) G>50%	(6) G>75%
T × Post × Low Cash	0.0172***	0.0222***	0.0399***	-0.0848**	-0.0214	0.0388
	(0.0023)	(0.0032)	(0.0053)	(0.0341)	(0.0478)	(0.0843)
T × Post × Medium Cash	0.0179***	0.0246***	0.0300***	-0.1114***	-0.1419***	-0.2186***
	(0.0025)	(0.0036)	(0.0049)	(0.0292)	(0.0426)	(0.0620)
T × Post × High Cash	0.0476***	0.0585***	0.0626***	-0.3353***	-0.4508***	-0.4276***
	(0.0032)	(0.0044)	(0.0055)	(0.0366)	(0.0521)	(0.0690)
p(Low Cash = High Cash)	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Cohort × EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,797,039	13,127,577	13,302,384	13,766,069	14,118,985	14,305,662
Adj. R^2	0.115	0.115	0.114	0.892	0.891	0.890

Table 8: Government-Grant Collapses, Pre-Shock Cash, and Board Size

This table reports stacked difference-in-differences regressions of organizational outcomes on the interaction of pre-shock cash with pre-shock board size. The dependent variable is an indicator for organizational exit in Panel A and the natural logarithm of program-service expenses in Panel B. The sample is split by pre-shock cash into Low Cash and High Cash groups at the median of (Cash + STI) / Assets within Cohort × Sector × Pre-shock-Revenue-Percentile cells. Within each cash group, $T \times$ Post is interacted with indicators for Small, Medium, and Large board, defined as terciles of pre-shock log board size within Cohort × Sector × Pre-shock-Revenue-Percentile cells. The bare $T \times$ Post coefficient is omitted. p(Low Cash = High Cash | Board Size) is the p-value of the cross-sample test that the Board Size coefficient is equal across the Low Cash and High Cash columns, and p(Small Board = Large Board) is the p-value of the within-sample test that the Small-board and Large-board coefficients are equal. Each cohort enters the panel as an event window $\tau \in [-3,3]$, and Post equals one for treated organizations in $\tau \in \{0,1,2,3\}$. Revenue percentiles use 100 bins computed on three-year pre-shock mean revenue and ranked across all organizations within each cohort. Each specification includes Cohort × Organization (EIN) fixed effects and Cohort × Sector × Pre-shock-Revenue-Percentile × Year fixed effects. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Exit

	G>25%		G>50%		G>75%	
	Low Cash	High Cash	Low Cash	High Cash	Low Cash	High Cash
T × Post × Cash Group × Small Board	0.0350***	0.0569***	0.0410***	0.0711***	0.0540***	0.0737***
	(0.0034)	(0.0041)	(0.0044)	(0.0055)	(0.0064)	(0.0065)
T × Post × Cash Group × Medium Board	0.0079***	0.0312***	0.0120***	0.0359***	0.0305***	0.0417***
	(0.0031)	(0.0042)	(0.0044)	(0.0058)	(0.0078)	(0.0077)
T × Post × Cash Group × Large Board	-0.0027	0.0141***	-0.0093**	0.0206***	-0.0114*	0.0163**
	(0.0032)	(0.0041)	(0.0043)	(0.0059)	(0.0066)	(0.0078)
p(Low Cash = High Cash | Small Board)	<0.001		<0.001		0.031	
p(Low Cash = High Cash | Medium Board)	<0.001		0.001		0.307	
p(Low Cash = High Cash | Large Board)	0.001		<0.001		0.007	
p(Small Board = Large Board)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cohort × EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,797,039		13,127,577		13,302,384	
Adj. R^2	0.115		0.115		0.114	

Table 8 Continued: Government-Grant Collapses, Pre-Shock Cash, and Board Size

Panel B: Program Service Expenses

	G>25%		G>50%		G>75%	
	Low Cash	High Cash	Low Cash	High Cash	Low Cash	High Cash
T × Post × Cash Group × Small Board	-0.1507***	-0.3647***	-0.0994	-0.4522***	-0.0753	-0.4650***
	(0.0465)	(0.0463)	(0.0607)	(0.0643)	(0.0966)	(0.0825)
T × Post × Cash Group × Medium Board	-0.0594	-0.1933***	-0.0437	-0.2515***	-0.0877	-0.2914***
	(0.0422)	(0.0462)	(0.0591)	(0.0677)	(0.0943)	(0.0888)
T × Post × Cash Group × Large Board	0.0014	-0.1932***	0.0331	-0.2597***	0.1183	-0.2010*
	(0.0467)	(0.0511)	(0.0755)	(0.0761)	(0.1503)	(0.1079)
p(Low Cash = High Cash | Small Board)	0.001		<0.001		0.002	
p(Low Cash = High Cash | Medium Board)	0.032		0.021		0.116	
p(Low Cash = High Cash | Large Board)	0.005		0.006		0.084	
p(Small Board = Large Board)	0.021	0.013	0.171	0.053	0.278	0.052
Cohort × EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,766,069		14,118,985		14,305,662	
Adj. R^2	0.892		0.891		0.890	

Table 9: The TCJA Donor-Side Shock: Instrument and First Stage

This table describes the TCJA shift-share (Bartik) instrument and reports its first stage. Panel A, constructed from the IRS Statistics of Income, reports the national 2017 distribution of tax filers across the six AGI brackets used to construct the instrument: the number and share of filers, average AGI, and the bracket shares of total AGI and of total charitable contributions. The final column, Shift (pp), is the bracket-specific itemization-rate decline from 2017 to 2019, $\Delta\text{itemize}_k$, which is the shift component of the instrument. The Bartik exposure for ZIP z is $\text{Exposure}_z = \sum_{k=1}^{6} s_{z,k} \cdot \Delta\text{itemize}_k$, where $s_{z,k}$ is the ZIP-level 2017 share of filers in bracket k. Panel B reports the first-stage regression of log total contributions on Post × Exposure, estimated on the nonzero-contributions sample of organizations with positive contributions in each of 2015, 2016, and 2017. In Column (1), Exposure is the continuous standardized exposure; in Column (2), it is an indicator for ZIP codes in the top tercile of the exposure distribution. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects, where the percentile is based on 100 bins of 2015–2017 average total revenue ranked across all organizations. Reported coefficients are multiplied by 100. Standard errors, clustered by EIN, are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Tax Filers Across AGI Brackets

AGI bracket	# filers (M)	Filer share	Avg AGI ($k)	AGI share	Charit. share	Shift (pp)
<$25k	51.1	34.7%	12.5	5.9%	1.8%	4.0
$25–50k	35.3	24.0%	36.3	11.8%	6.0%	13.7
$50–75k	20.4	13.9%	61.5	11.6%	8.4%	26.0
$75–100k	13.2	9.0%	86.7	10.5%	8.8%	31.3
$100–200k	19.6	13.3%	136.5	24.6%	24.6%	47.6
≥$200k	7.5	5.1%	518.6	35.6%	50.4%	52.9
All	147.1	100%	73.9	100%	100%	–

Panel B: First-Stage Regression

	(1) Continuous exposure Log of contributions	(2) Top-tercile exposure Log of contributions
Post × Exposure	-2.5422***	-5.5762***
	(0.6534)	(1.3784)
EIN FE	Yes	Yes
Sector × Year × RevPct FE	Yes	Yes
Observations	1,386,352	1,386,352
Adjusted R^2	0.859	0.859

Table 10: The TCJA Donor-Side Shock, Pre-Shock Cash, and Organizational Outcomes

This table reports the second-stage regression of organizational outcomes on the interaction of pre-shock cash with the post-TCJA donor-side shock, instrumented by the Bartik exposure measure. The outcomes are an indicator for organizational exit (Columns 1–2) and the natural logarithm of program-service expenses (Columns 3–4). Cash terciles, Low, Medium, and High, are pre-shock and based on (Cash + STI) / Total Assets. In Columns (1) and (3), Exposure is the continuous standardized Bartik exposure; in Columns (2) and (4), it is an indicator for ZIP areas in the top tercile of the exposure distribution. The sample is the nonzero-contributions panel of organizations with positive contributions in each of 2015, 2016, and 2017. p(Low Cash = High Cash) is the p-value of the within-regression Wald test that the Low Cash and High Cash coefficients are equal. Each specification includes organization (EIN) fixed effects and Sector × Revenue-Percentile × Year fixed effects. The revenue percentile is lagged one year and based on 100 bins ranked across all organizations each year. Reported coefficients are multiplied by 100. Standard errors, clustered by EIN, are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Exit		**Program Service Expenses**	
	(1) Continuous Exposure	(2) Top tercile Exposure	(3) Continuous Exposure	(4) Top tercile Exposure
Post × Exposure × Low Cash	-0.0603	0.0266	0.5605	-0.5119
	(0.0501)	(0.1055)	(1.0315)	(2.1626)
Post × Exposure × Medium Cash	0.0725	0.3137***	-1.0235	-3.6139
	(0.0477)	(0.1009)	(1.0169)	(2.2022)
Post × Exposure × High Cash	0.1512**	0.4120***	-3.7704***	-9.4673***
	(0.0630)	(0.1306)	(1.1999)	(2.4926)
p(Low Cash = High Cash)	0.007	0.019	0.005	0.005
EIN FE	Yes	Yes	Yes	Yes
Sec × RevPct × Yr FE	Yes	Yes	Yes	Yes
Observations	1,041,855	1,041,855	1,041,855	1,041,855
Adjusted R^2	0.864	0.864	0.835	0.835

Table 11: The TCJA Donor-Side Shock, Pre-Shock Cash, and Board Size

This table reports regressions of organizational outcomes on the interaction of pre-shock cash and board size with the post-TCJA donor-side shock, instrumented by the Bartik exposure measure. The dependent variable is an indicator for organizational exit in Panel A and the natural logarithm of program-service expenses in Panel B. The sample is split by pre-shock cash into Low Cash and High Cash groups at the median of (Cash + STI) / Total Assets. Within each cash group, the Post × Exposure interaction is further interacted with indicators for Small, Medium, and Large board, defined as terciles of pre-shock board size. In Columns (1) and (2), Exposure is the continuous standardized Bartik exposure; in Columns (3) and (4), it is an indicator for ZIP areas in the top tercile of the exposure distribution. p(Low Cash = High Cash | Board Size) is the p-value of the cross-sample test that the Board Size coefficient is equal across the Low Cash and High Cash columns, and p(Small Board = Large Board) is the p-value of the within-sample test that the Small Board and Large Board coefficients are equal. Each specification includes organization (EIN) fixed effects and Sector × Year × Revenue-Percentile fixed effects, where the percentile is based on 100 bins. Reported coefficients are multiplied by 100. Standard errors, clustered by EIN, are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Exit

	Continuous Exposure		Top Tercile Exposure	
	(1) Low Cash	(2) High Cash	(3) Low Cash	(4) High Cash
Post × Exposure × Small Board	0.2087**	0.2307**	0.4270**	0.5556***
	(0.0948)	(0.0930)	(0.1914)	(0.1918)
Post × Exposure × Medium Board	-0.0464	0.2320***	-0.0107	0.6907***
	(0.0759)	(0.0821)	(0.1529)	(0.1741)
Post × Exposure × Large Board	-0.1889***	0.0348	-0.2563**	0.1915
	(0.0536)	(0.0692)	(0.1155)	(0.1508)
p(Low Cash = High Cash | Small Board)	0.895		< 0.001	
p(Low Cash = High Cash | Medium Board)	0.009		0.005	
p(Low Cash = High Cash | Large Board)	0.062		0.164	
p(Small Board = Large Board)	< 0.001	0.083	0.002	0.126
EIN FE	Yes	Yes	Yes	Yes
Sector × Year × RevPct FE	Yes	Yes	Yes	Yes
Observations	522,486	519,369	522,486	519,369
Adjusted R^2	0.889	0.839	0.889	0.839

Table 11 Continued: The TCJA Donor-Side Shock, Pre-Shock Cash, and Board Size

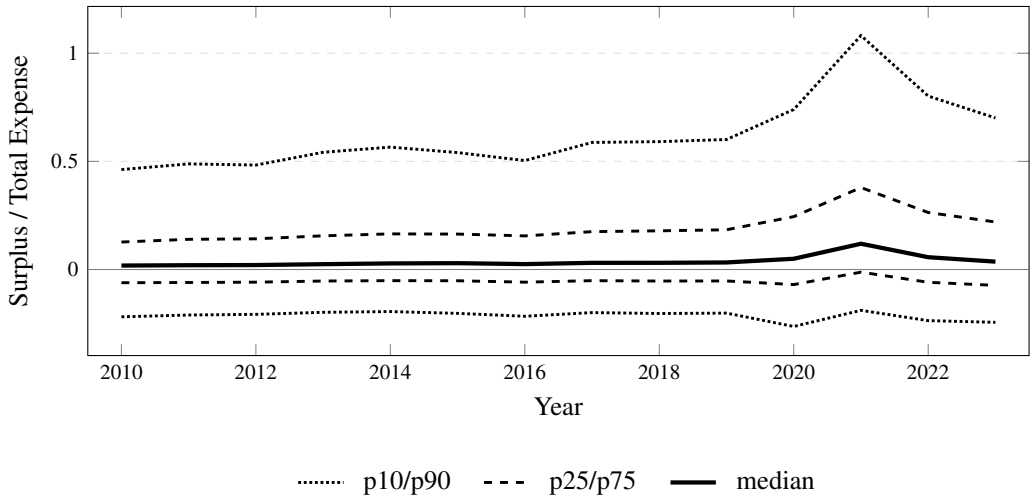
Panel B: Program Service Expenses

	Continuous Exposure		Top Tercile Exposure	
	(1) Low Cash	(2) High Cash	(3) Low Cash	(4) High Cash
Post × Exposure × Small Board	-1.9259	-6.0202***	-4.3098	-14.0770***
	(1.8848)	(1.6842)	(3.8076)	(3.4605)
Post × Exposure × Medium Board	-1.3268	-4.6006***	-0.7669	-12.1656***
	(1.5836)	(1.5707)	(3.3000)	(3.3339)
Post × Exposure × Large Board	4.0050***	-1.7912	5.1210*	-5.1329
	(1.2160)	(1.5528)	(2.6320)	(3.4841)
p(Low Cash = High Cash | Small Board)	0.188		< 0.001	
p(Low Cash = High Cash | Medium Board)	0.283		0.042	
p(Low Cash = High Cash | Large Board)	0.025		0.098	
p(Small Board = Large Board)	0.007	0.057	0.038	0.061
EIN FE	Yes	Yes	Yes	Yes
Sector × Year × RevPct FE	Yes	Yes	Yes	Yes
Observations	522,486	519,369	522,486	519,369
Adjusted R^2	0.852	0.818	0.852	0.818

Figure 1: Operating Deficits in U.S. Nonprofits

This figure plots the prevalence of operating deficits in the nonprofit sector over 2010–2023. Panel A plots the yearly cross-sectional distribution of the operating margin, defined as Surplus / Total Expense, where Surplus is total revenue minus total expense. The solid line is the median, the dashed lines are the 25th and 75th percentiles, and the dotted lines are the 10th and 90th percentiles. The horizontal reference line is zero. Panel B plots the yearly share of organizations in deficit, defined as Surplus < 0, and the yearly share with a chronic deficit, defined as Surplus < 0 in at least 3 of the preceding 5 years and requiring at least 4 valid observations in the 5-year window. The chronic-deficit series begins in 2013, the first year with sufficient prior-window coverage. The sample is the 2010–2023 Form 990 panel with total revenue greater than zero, total expenses greater than zero, and either total assets of at least $100k or total expenses of at least $50k.

Panel A: Cross-sectional Distribution of Operating Margin



Panel B: Share of Organizations in Deficit and Chronic Deficit

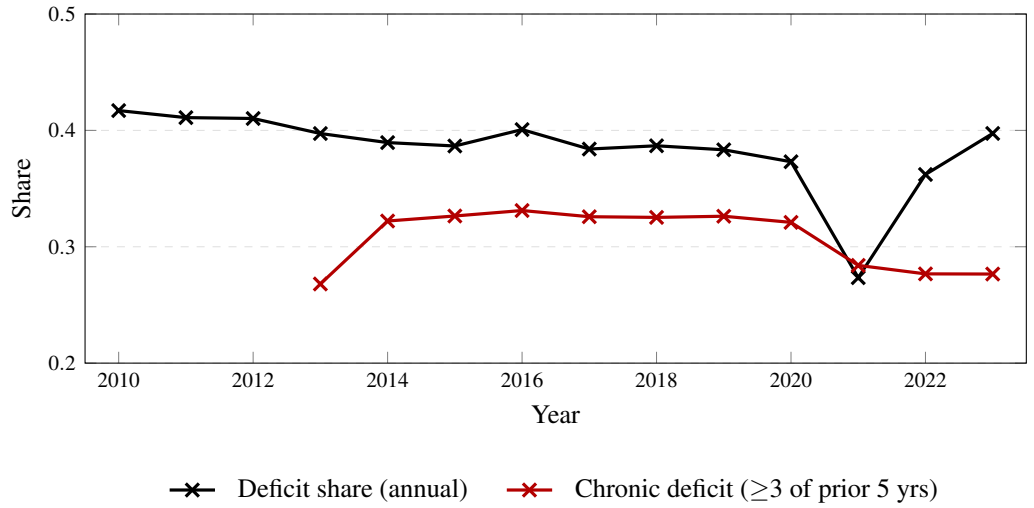


Figure 2: Dynamic Effects of Government-Grant Collapses on Exit and Program Spending

This figure plots dynamic event-study coefficients from the stacked difference-in-differences specification underlying Table 7. The outcomes are an indicator for organizational exit (Panel A) and the natural logarithm of program-service expenses (Panel B). A shock is defined at the organization-year level as the lagged government-grant share of revenue exceeding a threshold (25%, 50%, or 75%) and falling below 1% in the current year. The first such shock for each organization defines its cohort. Each cohort enters the panel as a separate event window $\tau \in [-3, 3]$, with $\tau = 0$ the shock year and $\tau = -1$ the omitted reference. Each panel plots the high-cash differential $\beta_{\tau,\text{Hi}} - \beta_{\tau,\text{Lo}}$, where High and Low are the top and bottom terciles of pre-shock (Cash + STI) / Assets within Cohort $\times$ Sector $\times$ Pre-shock-Revenue-Percentile cells. Revenue percentiles use 100 bins computed on three-year pre-shock mean revenue and ranked globally within cohort. "X" markers are point estimates and vertical caps are 95% confidence intervals. For exit, the sample is restricted to organizations alive throughout the pre-shock window $\tau \in [-3, -1]$ so the pre-period exit indicator is zero for all retained units. Each specification includes Cohort $\times$ Organization (EIN) fixed effects and Cohort $\times$ Sector $\times$ Pre-shock-Revenue-Percentile $\times$ Year fixed effects. Standard errors are clustered by EIN.

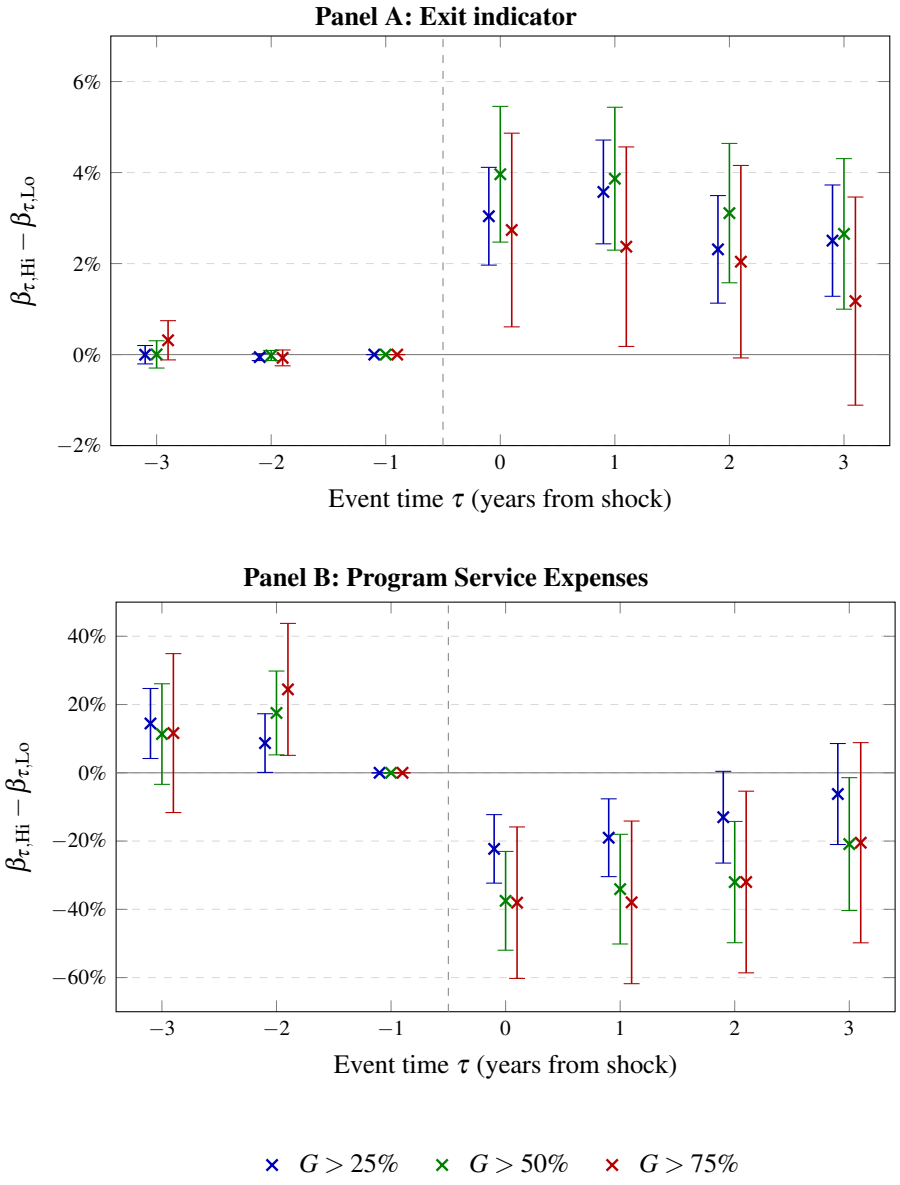
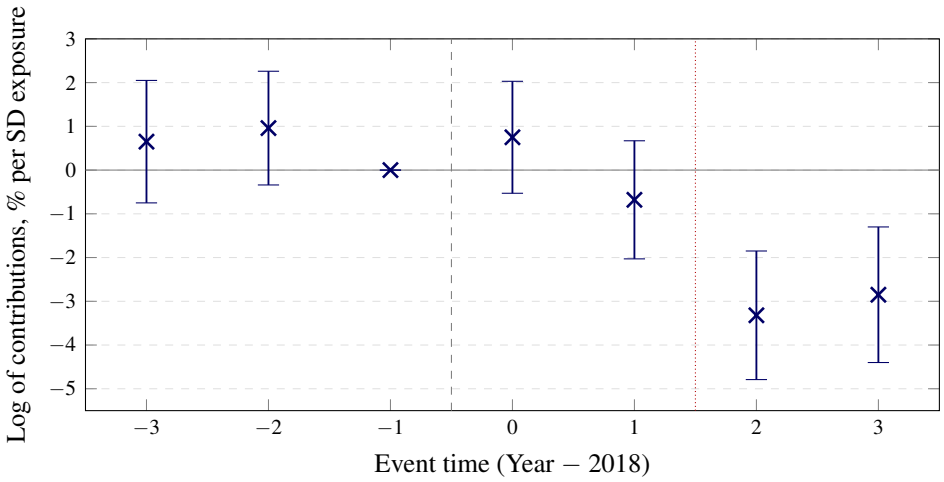


Figure 3: The TCJA Donor-Side Shock: Dynamic First Stage

This figure plots event-study coefficients from the first-stage regression of the log of total contributions on the interaction of event-time indicators with the continuous standardized Bartik exposure, the dynamic analog of the Panel B first stage in Table 9. The coefficient at event time τ is the loading on $\mathbf{1}\{t = 2018 + \tau\} \cdot \text{Exposure}_z$, where Exposure_z is the standardized TCJA shift-share instrument and $\tau = -1$ (2017) is the omitted reference. The sample consists of organizations that report nonzero contributions at least once in the pre-period. Each specification includes organization (EIN) fixed effects and Sector $\times$ Year $\times$ Revenue-Percentile fixed effects, where the percentile is based on 100 bins of 2015–2017 average total revenue ranked across all organizations. Reported coefficients are multiplied by 100, so the vertical axis is in percent per standard deviation of exposure. Standard errors are clustered by EIN; error bars are 95% confidence intervals. The red dotted vertical line marks 2020, the first year of COVID-19 stimulus. Data source: IRS Statistics of Income.



Online Appendix for "Financing Nonprofits"

August 27, 2026

Contents

Appendix 1	Model Derivations and Proofs	2
	1.1 Optimality conditions and the donor-signal wedge	2
	1.2 Donor microfoundation and fundraising policy	4
	1.3 The local buffer problem and comparative statics on target liquidity	6
	1.4 Optimized donor finance, the cash-rich effect, and governance	7
Appendix 2	Main Treatment Effects in the Stacked Event Study	10
Appendix 3	Cross-Sectional Difference-in-Differences	11
Appendix 4	Summary Statistics by Sector, Size, and Geography	14
Appendix 5	Robustness Using Cash/Assets	18
Appendix 6	Stacked Difference-in-Differences for Cash/Assets	24
Appendix 7	Additional Governance Measures	26

Appendix 1

Model Derivations and Proofs

This appendix gives the local derivations behind the propositions. All results are local to a continuation region in which the value function is differentiable, the policy under study is feasible, and the donor probabilities are interior to the support of donor heterogeneity. Kuhn-Tucker inequalities replace equalities at boundaries. The appendix also derives the target-liquidity buffer problem as a first-order approximation to the Bellman equation, how the donor-signal wedge enters the cash target, and how the same wedge governs the cash-rich result.

1.1 Optimality conditions and the donor-signal wedge

For compactness, we write the current state as $x = (K, E, b, Y, z, A)$, where A is total assets in the most recent disclosure, with governance G and debt-access parameters fixed. The organization chooses program spending $m \geq 0$, fundraising effort $f \geq 0$, a draw χ, and next period's debt b'.

Current gifts are

$$U = U^0(z) + \theta(G) f^{\alpha} p_U(a), \qquad Z = \theta(G) f^{\alpha} p_R(a), \tag{1}$$

where $a = I(n) - \phi(G)S$ and $S = (K + \varpi E)/A - \bar{c}(E/A, Y, z, G)$.

The flow equations are

$$\begin{aligned} K' = {} & K + Y + H(z) + U + \pi E + \chi - m - o(z) - c_f(f) - h_K(K) \\ & + b' - (1 + r_i) b - F_b \mathbf{1}\{b' > (1 + r_i) b\}, \end{aligned} \tag{2}$$

$$E' = (1 + r_E) E + Z - \pi E - \chi. \tag{3}$$

The constraints are

$$m \geq 0, \quad f \geq 0, \quad 0 \leq \chi \leq \bar{\chi}(G) E, \quad E' \geq 0, \quad 0 \leq b' \leq \iota \bar{b}, \quad K' \geq \underline{K}_i, \quad K' \geq 0. \tag{4}$$

The operating floor is a fixed lower bound $\underline{K}_i$.

The model treats total assets in the current donor disclosure as predetermined. The formal timing condition is as follows.

Assumption 1 (Disclosure timing)**.** Total assets in the next disclosure obey

$$A' = \mathscr{A}(A, Y, z, \xi'_A), \tag{5}$$

where ξ'_A is conditionally independent of the current choice variables and of the balance sheet stocks those variables produce. Equivalently, conditional on (A, Y, z), the law of A' does not depend on (m, f, χ, b') or on (K', E').

Assumption 1 says that donors use total assets from the most recent filing, audit, or public report. A marginal current dollar can affect future filings but not the denominator in the current signal. Hence

$$\frac{\partial A'}{\partial m} = \frac{\partial A'}{\partial f} = \frac{\partial A'}{\partial \chi} = \frac{\partial A'}{\partial b'} = 0 \tag{6}$$

for the policy derivatives, which rules out $V_A A'_q$ terms in the first-order conditions.

Let $V^X(x)$ be the exit value.

The continuation value is

$$V^C(x) = \sup_{(m,f,\chi,b')\in\mathscr{C}(x)} \left\{u(m) + \beta\mathbb{E}[V(x') \mid x]\right\}, \qquad V(x) = \max\{V^X(x), V^C(x)\}. \tag{7}$$

The derivations below are on the interior continuation region $V^C > V^X$. Let $\zeta \geq 0$ be the multiplier on the operating floor $K' \geq \underline{K}_i$. Define the shadow values of a dollar delivered to next period's unrestricted and restricted balances as

$$\lambda \equiv \beta\mathbb{E}[V_K(x') \mid x] + \zeta, \qquad \mu \equiv \beta\mathbb{E}[V_E(x') \mid x]. \tag{8}$$

Collecting terms in K' and E' gives the local first-order conditions. Program spending satisfies

$$u'(m) = \lambda. \tag{9}$$

Fundraising effort satisfies

$$\lambda c'_f(f) = \lambda U_f + \mu Z_f. \tag{10}$$

A draw moves one dollar from E' to K', so an interior draw satisfies

$$\lambda = \mu, \tag{11}$$

with $\lambda \leq \mu$ at the no-draw boundary and $\lambda \geq \mu$ at the upper draw cap. Define

$$\eta \equiv \frac{\mu}{\lambda}. \tag{12}$$

The propositions evaluate the local shortfall region in which cash is weakly more valuable than restricted wealth for the binding current use, so $0 \leq \eta \leq 1$ is imposed locally.

For debt, consider a smooth region away from the borrowing limit and away from the fixed-cost kink $b' = (1+r_i)b$. The derivative with respect to b' gives

$$0 = \lambda + \beta\mathbb{E}[V_b(x') \mid x]. \tag{13}$$

The envelope condition for inherited debt is, away from the same kink,

$$V_b(x) = -(1+r_i)\lambda(x). \tag{14}$$

Thus interior borrowing satisfies

$$\lambda = \beta(1+r_i)\mathbb{E}[\lambda(x') \mid x]. \tag{15}$$

At the upper debt limit, the liquidity value of an additional borrowed dollar exceeds the expected repayment cost. At the net-new-borrowing threshold $b' = (1+r_i)b$, the fixed cost creates a discrete participation decision: the organization raises net new debt only when the intramarginal liquidity gain exceeds F_b. Otherwise it can roll over, reduce debt, or leave it unused.

The reported-liquidity signal is

$$S = \frac{K + \varpi E}{A} - \bar{c}\left(\frac{E}{A}, Y, z, G\right). \tag{16}$$

Because A is predetermined,

$$S_K = \frac{1}{A} > 0, \qquad S_L = \frac{1}{A} > 0. \tag{17}$$

Current unrestricted and restricted gifts move with the signal. Since $a = I(n) - \phi(G)S$,

$$U_S = -\theta(G) f^{\alpha} \phi(G) p_U'(a), \qquad Z_S = -\theta(G) f^{\alpha} \phi(G) p_R'(a). \tag{18}$$

On the interior donor region, $p_U'(a) > 0$ and $p_R'(a) < 0$, so $U_S < 0$ and $Z_S > 0$. Differentiating the Bellman equation with respect to beginning-of-period cash, using the lagged disclosure condition, gives

$$V_K(x) = \lambda \{1 - h_K'(K) + U_S S_K\} + \mu Z_S S_K. \tag{19}$$

The direct term $1 - h_K'(K)$ is the cash carried into the next period net of its carrying cost. The two remaining terms are the current donor response to visible cash. Dividing by λ and using $\eta = \mu/\lambda$,

$$\frac{V_K(x)}{\lambda} = 1 - \left[h_K'(K) - (U_S + \eta Z_S) S_K\right], \qquad g_K(x) = h_K'(K) - (U_S + \eta Z_S) S_K. \tag{20}$$

The first component of g_K is the carry cost; the second is the donor-signal wedge. With $d(a, \eta) = p_U(a) + \eta p_R(a)$ and $d_a = p_U'(a) + \eta p_R'(a)$,

$$-(U_S + \eta Z_S) S_K = \theta(G) f^{\alpha} \phi(G) d_a(a, \eta) S_K > 0, \tag{21}$$

where the inequality uses $d_a > 0$ on the interior donor region derived below. Thus visible cash carries a positive donor wedge in the local shortfall region.

Carry cost. The model treats h_K as a reduced-form carrying cost of idle balances. It can reflect low cash returns relative to mission uses, inflation, bank and compliance costs, or internal control costs. Discounting alone does not, by itself, imply a strictly positive per-period storage wedge in every state; it enters the Euler equation. The propositions require only the local marginal cost $h_K'(K) \geq 0$. Another option for a primitive storage foundation is to add depreciation or a storage return below the organization's mission discount rate and absorb the resulting wedge into h_K.

1.2 Donor microfoundation and fundraising policy

Each contacted donor has one dollar and chooses among no gift, an unrestricted gift, and a restricted gift. Let q be the donor's outside opportunity cost and τ the private cost of imposing a restriction. Utilities are

$$v^0 = 0, \qquad v^U = a - q, \qquad v^R = a_R - \tau - q, \tag{22}$$

where a is the perceived impact of an unrestricted dollar and a_R is the impact of a designated dollar on the donor's preferred program. Let $q \sim U[0, \bar{q}]$ and $\tau \sim U[0, \bar{\tau}]$, independently, and work on the interior region

$$0 < a < \bar{q}, \qquad 0 < a_R - a < \bar{\tau}, \qquad a_R \leq \bar{q}. \tag{23}$$

The donor gives unrestricted when $q \leq a$ and $\tau \geq a_R - a$, and restricted when $\tau \leq a_R - a$ and $q \leq a_R - \tau$. Integrating over the uniform supports,

$$p_U(a) = \frac{a(\bar{\tau} - a_R + a)}{\bar{q}\bar{\tau}}, \qquad p_R(a) = \frac{a_R^2 - a^2}{2\bar{q}\bar{\tau}}. \tag{24}$$

Let $Q = \bar{q}\bar{\tau}$. Then

$$p_U'(a) = \frac{\bar{\tau} - a_R + 2a}{Q} > 0, \qquad p_R'(a) = -\frac{a}{Q} < 0, \qquad [p_U + p_R]'(a) = \frac{\bar{\tau} - a_R + a}{Q} > 0, \tag{25}$$

with the signs following from $a > a_R - \bar{\tau}$.

The restricted share $s_R(a) = p_R(a)/[p_U(a) + p_R(a)]$ satisfies

$$s_R'(a) = \frac{p_R'(a)p_U(a) - p_R(a)p_U'(a)}{[p_U(a) + p_R(a)]^2} < 0. \tag{26}$$

Since $a_S = -\phi(G) < 0$, the restricted share rises with the visible-liquidity signal.

Define the shadow-value-weighted value of a donor contact,

$$d(a,\eta) = p_U(a) + \eta p_R(a), \qquad 0 \le \eta \le 1. \tag{27}$$

On the interior region,

$$d_a(a,\eta) = \frac{\bar{\tau} - a_R + (2-\eta)a}{Q} > 0, \qquad d_{aa}(a,\eta) = \frac{2-\eta}{Q} > 0. \tag{28}$$

This convexity is one source of the cash-rich result.

With $c_f(f) = \gamma f^{1+\nu}/(1+\nu)$, the fundraising condition (10) becomes

$$\gamma f^{\nu} = \theta(G)\alpha f^{\alpha-1} d(a,\eta). \tag{29}$$

Let $k = 1 + \nu - \alpha > 0$. The interior effort is

$$f^*(a,\eta,G) = \left(\frac{\alpha\theta(G)d(a,\eta)}{\gamma}\right)^{1/k}. \tag{30}$$

Holding η fixed locally,

$$\frac{\partial \log f^*}{\partial S} = \frac{1}{k}\frac{d_a}{d}a_S = -\frac{\phi(G)}{k}\frac{d_a}{d} < 0, \qquad \frac{\partial \log f^*}{\partial n} = \frac{1}{k}\frac{d_a}{d}I'(n) > 0. \tag{31}$$

For any gift component $g(a)$, solicited dollars are $\theta(G)[f^*]^{\alpha}g(a)$, so

$$\frac{\partial \log\{\theta(G)[f^*]^{\alpha}g(a)\}}{\partial S} = \alpha\frac{\partial \log f^*}{\partial S} - \phi(G)\frac{g_a(a)}{g(a)}. \tag{32}$$

For $g = p_U$ and $g = p_U + p_R$, both terms are negative. Thus unrestricted solicited gifts and total solicited gifts fall with visible liquidity. Replacing a_S with $a_n = I'(n) > 0$ proves the opposite sign for a shortfall. Restricted gift dollars have ambiguous sign because the restricted share and contact effects oppose. This proves Proposition 4 under fixed η.

If η varies with the state, then

$$\frac{\partial \log f^*}{\partial S} = \frac{-\phi(G)d_a + p_R(a)\eta_S}{kd(a,\eta)}, \qquad \frac{\partial \log f^*}{\partial n} = \frac{I'(n)d_a + p_R(a)\eta_n}{kd(a,\eta)}. \tag{33}$$

The fixed-η signs survive when $\phi(G)d_a > p_R(a)\eta_S$ for the signal effect and $I'(n)d_a + p_R(a)\eta_n > 0$ for the need effect. The signal condition is automatic when $\eta_S \le 0$.

1.3 The local buffer problem and comparative statics on target liquidity

This section derives the buffer equation used in the target liquidity propositions as a local approximation to the optimality condition for carrying cash into the next short window. Fix a continuation state and a reference policy. Let K_0 be the cash carried by that policy. Consider a one dimensional perturbation in carried cash K, holding other policy functions at their local optima. Let X' be the next period cash requirement from baseline service commitments and operating costs net of predictable earned revenue, government support, and routine giving. Let $D^{nc\prime}$ be cash-equivalent noncash finance available before the cash buffer: regular restricted payouts, predictable lawful draws, and net borrowing contributions after repayment, interest, and the fixed cost of net new borrowing. The residual shortfall before cash is

$$R' = X' - D^{nc\prime}. \tag{34}$$

The marginal signal response of solicited donor finance is not included in R'; it is captured by the donor-signal component of g_K in (20).

Let Λ' be the cash-equivalent marginal value of an additional dollar in states where the residual shortfall exceeds the cash target. A first-order, piecewise-linear expansion of the Bellman continuation value around the reference policy has the form

$$\text{constant} - g_K(K_0)K - \mathbb{E}\left[\Lambda'(R'-K)^+\right] + o(|K-K_0|), \tag{35}$$

where $g_K(K_0)$ is evaluated at the reference policy and is treated as fixed in K for this local approximation. Dropping constants and changing signs gives the local target problem

$$K^* \in \arg\min_{K\geq 0}\left\{g_K K + \mathbb{E}\left[\Lambda'(R'-K)^+\right]\right\}. \tag{36}$$

If R' has no atom at K^* and the solution is interior,

$$g_K = \mathbb{E}\left[\Lambda'\mathbf{1}\{R' > K^*\}\right]. \tag{37}$$

The right side is a weighted upper tail of residual shortfalls; the left side is the marginal cost of cash, including both carrying cost and the donor-signal wedge.

Let

$$\Psi(K;\theta) = \mathbb{E}_\theta\left[\Lambda'\mathbf{1}\{R' > K\}\right] \tag{38}$$

for a parameter θ that shifts the shortfall distribution, deployable resources, or the marginal cost of cash. At an interior solution $\Psi(K^*;\theta) = g_K(\theta)$, and when $\Psi_K < 0$,

$$\frac{\partial K^*}{\partial \theta} = -\frac{\Psi_\theta(K^*;\theta) - g_{K,\theta}}{\Psi_K(K^*;\theta)}. \tag{39}$$

Holding g_K fixed, any change that raises the weighted upper tail Ψ raises K^*. This proves the general risk statement of Proposition 1. A predictable dollar of funding that shifts R' down lowers K^*: if $R' = R'_0 - D$ for deterministic cash-equivalent deployable finance D, then

$$\frac{\partial K^*}{\partial D} = -1 \tag{40}$$

for an interior solution.

For the AR(1) revenue process,

$$Y' = \bar{Y} + \rho(Y - \bar{Y}) + \varepsilon'_Y, \qquad |\rho| < 1, \qquad \varepsilon'_Y \sim (0, \sigma_Y^2). \tag{41}$$

Evaluated at $Y = \bar{Y}$, the conditional mean is fixed at $\bar{Y}$. If processes are compared at common long-run variance $v_Y = \sigma_Y^2/(1-\rho^2)$ with $\rho \in [0,1)$, then

$$\sigma_Y^2 = v_Y(1-\rho^2) \tag{42}$$

decreases with ρ. Higher persistence therefore lowers the one-period innovation variance at the mean and lowers the cash target whenever this reduction lowers the relevant weighted upper tail $\Psi(K^*)$. Away from the mean, higher ρ also changes the conditional forecast mean by $(Y-\bar{Y})$, so the sign is not generally determined. If σ_Y^2 rather than long-run variance is held fixed, the forecast-risk statement also does not follow.

For restricted wealth, let $D = \delta_E(G)E$ be the deterministic deployable component. Equation (40) gives

$$\frac{\partial K^*}{\partial E} = -\delta_E(G), \qquad \frac{\partial L^*}{\partial E} = \varpi - \delta_E(G), \tag{43}$$

holding the donor-signal cost, debt policy, and other dynamic channels fixed. If E also moves g_K, the full local derivative is

$$\frac{\partial K^*}{\partial E} = -\delta_E(G) + \frac{g_{K,E}}{\Psi_K}. \tag{44}$$

If $K^* = 0$ binds, the derivative with respect to deployable wealth is weakly negative rather than exactly $-\delta_E(G)$. These statements prove Proposition 2.

For debt, let

$$B^{sh\prime} = b'' - (1+r_i)b' - F_b\mathbf{1}\{b'' > (1+r_i)b'\}, \qquad 0 \le b'' \le \iota\bar{b}, \tag{45}$$

be the optimized net borrowing contribution in the shortfall window. Increasing $\bar{b}$ or ι, or lowering r_i, inherited debt b', or F_b, raises $B^{sh\prime}$ when borrowing is used, shifts R' down, and weakly lowers K^* by (40). The effect is strict when the debt margin is used in positive-probability states with $R' > K^*$ and positive Λ'. It is zero when fixed costs, existing debt service, or high interest make the optimal net contribution nonpositive in those states. In a realized binding state, $u'(m) = \lambda$; a larger net borrowing contribution weakly lowers λ, and since u' is decreasing, spending weakly rises relative to no debt capacity. This proves Proposition 3.

1.4 Optimized donor finance, the cash-rich effect, and governance

Holding η fixed locally, define optimized donor finance in unrestricted-cash-equivalent units by

$$D(L,n,G) = \max_{f\ge 0}\left\{\theta(G)f^{\alpha}d(a,\eta) - \frac{\gamma}{1+\nu}f^{1+\nu}\right\}, \qquad a = I(n) - \phi(G)S(L,G). \tag{46}$$

Using (30), and noting that at the optimum the effort cost is the fixed fraction $\alpha/(1+\nu)$ of solicited revenue,

$$D(L,n,G) = \Omega(G)d(a,\eta)^r, \qquad r = \frac{1+\nu}{1+\nu-\alpha} > 1, \tag{47}$$

where

$$\Omega(G) = \frac{1+\nu-\alpha}{1+\nu}\theta(G)\left(\frac{\alpha\theta(G)}{\gamma}\right)^{\alpha/(1+\nu-\alpha)} > 0. \tag{48}$$

Net fundraising cost is already included in D and must not be subtracted again in any short-window resource index.

By the envelope theorem applied to (46), $D_a = \theta(G)[f^*]^{\alpha}d_a$. With $a_L = -\phi(G)S_L = -\phi(G)/A$,

$$D_L = D_a a_L = -\theta(G)[f^*]^{\alpha}\phi(G)d_a S_L = (U_S + \eta Z_S)S_K. \tag{49}$$

Thus the donor-signal wedge in the marginal cost of cash equals $-D_L$.

Lemma 1 (Donor triage and intensification)**.** *On the interior donor region, suppose $a_L < 0$, $a_n > 0$, and $a_{Ln} = 0$. Holding η fixed locally,*

$$D_a > 0, \qquad D_{aa} > 0, \qquad D_L = D_a a_L < 0, \qquad D_{Ln} = D_{aa} a_L a_n < 0. \tag{50}$$

Proof. From (47),

$$D_a = \Omega r d^{r-1} d_a > 0 \tag{51}$$

because $d > 0$ and $d_a > 0$. Differentiating again,

$$D_{aa} = \Omega r d^{r-2} \left[(r-1) d_a^2 + d d_{aa} \right] > 0, \tag{52}$$

since $r > 1$, $d > 0$, $d_a > 0$, and $d_{aa} > 0$. Because D depends on L and n only through a, $D_L = D_a a_L < 0$. Differentiating with respect to n and using $a_{Ln} = 0$ gives $D_{Ln} = D_{aa} a_L a_n < 0$. □

Equation (52) separates the convexity into two sources. The term $(r-1)d_a^2$ is the optimization source: when perceived impact is high, the organization optimally raises effort and captures more of the benefit, and when perceived impact is low, it scales effort back and truncates the loss. The term $d d_{aa}$ is the donor-margin source from (28). The result does not rest on the donor margin alone; even if d_{aa} were mildly negative, $D_{aa} > 0$ would survive as long as $d_{aa} > -(r-1)d_a^2/d$.

Let two short-window states satisfy $n_1 > n_0$, and define cash-equivalent resources

$$W_j(L, G) = \bar{W}_j + \kappa_j(G) L + D(L, n_j, G), \qquad j \in \{0, 1\}, \tag{53}$$

where $\kappa_j(G)$ is the deployable share of reported liquidity in state j. The resource contraction caused by the shock is $C(L, G) = W_0(L, G) - W_1(L, G)$, so

$$C_L = D_L(L, n_0, G) - D_L(L, n_1, G) - [\kappa_1(G) - \kappa_0(G)]. \tag{54}$$

By the lemma, $D_{Ln} < 0$, so $D_L(L, n_0, G) - D_L(L, n_1, G) > 0$: a liquid organization loses more donor relief in the higher-need state. Therefore

$$C_L > 0 \quad \Longleftrightarrow \quad D_L(L, n_0, G) - D_L(L, n_1, G) > \kappa_1(G) - \kappa_0(G). \tag{55}$$

This is an exact necessary and sufficient condition for the resource index W_j.

If actual short-window spending is $m_j = M_j(W_j)$ with $M_j' > 0$, then the derivative of the spending contraction is

$$\frac{\partial}{\partial L} [M_0(W_0) - M_1(W_1)] = M_0'(W_0) W_{0L} - M_1'(W_1) W_{1L}. \tag{56}$$

With a locally common marginal spending response, $M_0'(W_0) = M_1'(W_1)$, condition (55) also characterizes when the spending contraction rises with liquidity. If the slopes differ, (56) is the required slope-weighted analogue.

For exit, suppose organizations exit in state j when $W_j < F_i$, where F_i has CDF F and density ρ_F. The shock-induced increase in exit probability is $F(W_0) - F(W_1)$, with derivative

$$\rho_F(W_0) W_{0L} - \rho_F(W_1) W_{1L}. \tag{57}$$

If the density is locally flat over $[W_1, W_0]$, this is proportional to C_L; more generally the exit result requires the density-weighted analogue of (55). This completes the proof of Proposition 5.

Endogenous η. The baseline uses the single local weight $\eta = \mu/\lambda$ to value restricted gifts in the fundraising problem and the resource index. If η varies with liquidity and need, then D depends on L and n through both a and η. In general,

$$D_L = D_a a_L + D_\eta \eta_L, \tag{58}$$

$$D_{Ln} = D_{aa} a_L a_n + D_a a_{Ln} + D_{a\eta}(a_L \eta_n + a_n \eta_L) + D_{\eta\eta} \eta_L \eta_n + D_\eta \eta_{Ln}. \tag{59}$$

With $a_{Ln} = 0$, the leading fixed-η term is $D_{aa} a_L a_n < 0$. The cash-rich derivative continues to have the stated sign when the induced-η terms are dominated by this leading term. The propositions therefore maintain local fixed η, or equivalently local insensitivity of η to (L,n). An interior draw margin, which sets $\lambda = \mu$ locally, is one case in which η is pinned at one; inequality boundaries do not by themselves pin the ratio.

Governance affects deployability and the donor reliance on the coarse liquidity signal. A parsimonious parameterization is

$$\delta_E(G) = \psi(G)\bar{\delta}_E, \qquad \bar{\chi}(G) = \psi(G)\bar{\chi}_0, \qquad \phi(G) = \phi_0[1 - \kappa_\psi \psi(G)], \tag{60}$$

where $\psi(G) \in [0,1]$, $\psi'(G) \geq 0$, $\bar{\delta}_E, \bar{\chi}_0 \in [0,1]$, and $\kappa_\psi \in [0,1)$. Governance may also affect fundraising productivity $\theta(G)$, so attenuation of the cash-rich gradient is not automatic. Differentiating (54),

$$C_{LG} = \frac{\partial}{\partial G}[D_L(L,n_0,G) - D_L(L,n_1,G)] - [\kappa_{1G}(G) - \kappa_{0G}(G)]. \tag{61}$$

Governance attenuates the gradient when $C_{LG} \leq 0$. A sufficient condition is

$$\frac{\partial}{\partial G}[D_L(L,n_0,G) - D_L(L,n_1,G)] \leq \kappa_{1G}(G) - \kappa_{0G}(G). \tag{62}$$

This condition allows governance to attenuate the effect through a smaller donor penalty, greater adverse-state deployability, or both. It also makes clear why lower $\phi(G)$ alone is not, without further curvature restrictions, a universal proof of attenuation: changing ϕ changes both the loading on reported liquidity and the level of perceived impact at which the nonlinear donor-finance function is evaluated.

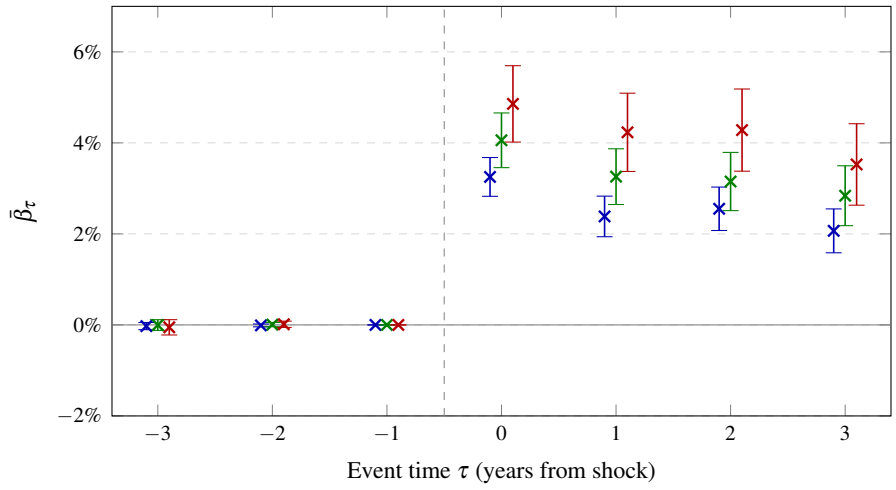
Appendix 2

Main Treatment Effects in the Stacked Event Study

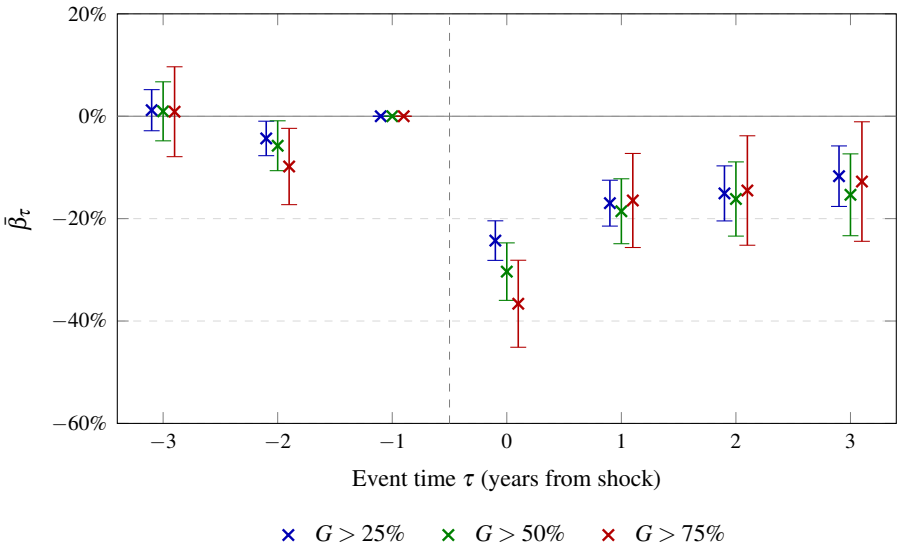
A2 Figure 1: Dynamic Main Treatment Effects of Government-Grant Collapses

This figure plots the dynamic main treatment effects $\bar{\beta}_\tau$ from the stacked difference-in-differences specification underlying Figure 2 of the main paper, where $\bar{\beta}_\tau$ is the simple average of the three pre-shock liquidity-tercile coefficients rather than the high-minus-low differential. Panel A reports the exit indicator and Panel B the log of program-service expenses. A shock is defined at the organization-year level as the lagged government-grant share of revenue exceeding a threshold (25%, 50%, or 75%) and falling below 1% in the current year, with the three thresholds overlaid and horizontally offset. "X" markers are point estimates and vertical caps are 95% confidence intervals; $\tau = -1$ is the omitted reference. For exit, the sample is restricted to organizations alive throughout the pre-shock window $\tau \in [-3, -1]$, and the exit indicator is set to missing in 2023. Each specification includes Cohort $\times$ Organization (EIN) and Cohort $\times$ Sector $\times$ Pre-shock-Revenue-Percentile $\times$ Year fixed effects. Standard errors are clustered by EIN.

Panel A: Exit



Panel B: Program Service Expenses



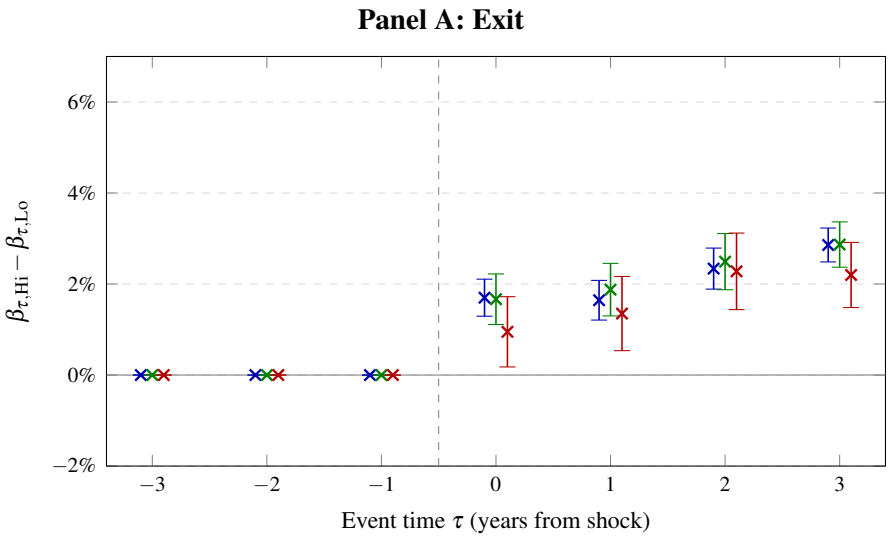
Appendix 3

Cross-Sectional Difference-in-Differences

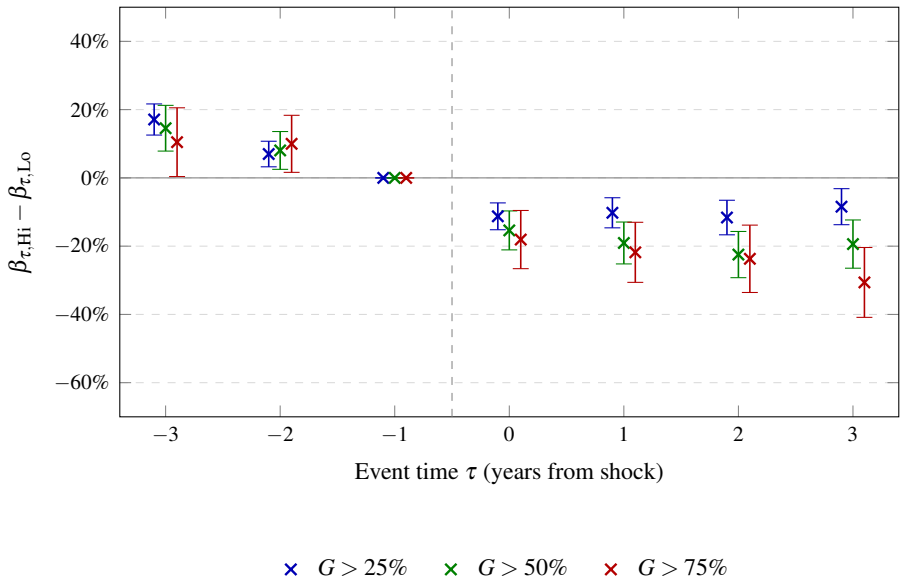
This appendix reports the cross-sectional, single-event analog of the stacked difference-in-differences results in the main paper, using the preferred liquidity measure (Cash + Short-Term Investments) / Assets. Rather than stacking cohorts, each organization contributes a single event window, so the design complements the stacked estimates in Tables 7 and 8 and Figure 2 of the main paper. The results deliver the same cash-rich pattern. Standard errors are clustered by EIN and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

A3 Figure 1: Cross-Sectional High-Cash Differential

This figure plots the cross-sectional high-cash differential $\beta_{\tau,\text{Hi}} - \beta_{\tau,\text{Lo}}$ from a single-event difference-in-differences specification, the static analog of Figure 2 of the main paper. Panel A reports the exit indicator and Panel B the log of program-service expenses. High and Low are organizations above and below the within-sector-by-year median of pre-shock (Cash + Short-Term Investments) / Assets; a shock is the lagged government-grant share of revenue exceeding a threshold (25%, 50%, or 75%) and falling below 1% in the current year, with the three thresholds overlaid and horizontally offset. "X" markers are point estimates and vertical caps are 95% confidence intervals; $\tau = -1$ is the omitted reference. Each specification includes organization (EIN) and Sector $\times$ Year fixed effects, with standard errors clustered by EIN.



Panel B: Program Service Expenses



A3 Table 1: Government-Grant Collapses by Pre-Shock Cash Tercile [Cross-Sectional]

This table reports the cross-sectional, single-event analog of Table 7 of the main paper, Effects of Government-Grant Collapses on Exit and Program Spending, using (Cash + Short-Term Investments) / Assets. The outcomes (an indicator for exit and the log of program-service expenses), the shock thresholds, the pre-shock cash terciles (formed within Sector × pre-shock Revenue-Percentile cells), and p(Low Cash = High Cash) are as in Table 7, except that each organization enters a single event window rather than the stacked cohort design. Each specification includes organization (EIN) and Sector × pre-shock Revenue-Percentile × Year fixed effects. As in the main text, exit rises and program spending contracts most for the high-cash tercile at every threshold.

	Exit			**Program Service Expenses**		
	(1) G>25%	(2) G>50%	(3) G>75%	(4) G>25%	(5) G>50%	(6) G>75%
T × Post × Low Cash	0.0133***	0.0194***	0.0360***	-0.0551	-0.0395	-0.0081
	(0.0019)	(0.0027)	(0.0038)	(0.0366)	(0.0481)	(0.0706)
T × Post × Medium Cash	0.0147***	0.0218***	0.0333***	-0.0862***	-0.0442	-0.1219*
	(0.0021)	(0.0029)	(0.0041)	(0.0334)	(0.0468)	(0.0683)
T × Post × High Cash	0.0448***	0.0565***	0.0726***	-0.2955***	-0.3821***	-0.4545***
	(0.0028)	(0.0040)	(0.0062)	(0.0391)	(0.0565)	(0.0915)
p(Low Cash = High Cash)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,680,770	2,680,770	2,680,770	2,909,614	2,909,614	2,909,614
Adj. R^2	0.158	0.158	0.158	0.839	0.839	0.839

A3 Table 2: Government-Grant Collapses, Pre-Shock Cash, and Board Size [Cross-Sectional]

This table reports the cross-sectional, single-event analog of Table 8 of the main paper, Government-Grant Collapses, Pre-Shock Cash, and Board Size, using (Cash + Short-Term Investments) / Assets. The dependent variable is an indicator for exit in Panel A and the log of program-service expenses in Panel B. The cash split, the board-size terciles, the fixed effects, and the within- and cross-sample tests are as in Table 8, except for the single-event (rather than stacked) design. Each specification includes organization (EIN) and Sector × pre-shock Revenue-Percentile × Year fixed effects.

Panel A: Exit

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	0.0252***	0.0520***	0.0329***	0.0657***	0.0445***	0.0795***
	(0.0028)	(0.0036)	(0.0037)	(0.0051)	(0.0049)	(0.0072)
T × Post × Cash-grp × Medium Board	0.0103***	0.0275***	0.0123***	0.0392***	0.0258***	0.0433***
	(0.0028)	(0.0036)	(0.0038)	(0.0051)	(0.0056)	(0.0072)
T × Post × Cash-grp × Large Board	-0.0020	0.0180***	0.0006	0.0205***	0.0167***	0.0412***
	(0.0026)	(0.0034)	(0.0038)	(0.0046)	(0.0059)	(0.0080)
p(CashLo = CashHi | Small Board)	<0.001		<0.001		<0.001	
p(CashLo = CashHi | Medium Board)	<0.001		<0.001		0.056	
p(CashLo = CashHi | Large Board)	<0.001		0.001		0.013	
p(Small Board = Large Board)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,680,770		2,680,770		2,680,770	
Adj. R^2	0.158		0.158		0.158	

Panel B: Program Service Expenses

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	-0.1680***	-0.2828***	-0.1270**	-0.3518***	-0.1068	-0.4267***
	(0.0496)	(0.0495)	(0.0627)	(0.0724)	(0.0867)	(0.1048)
T × Post × Cash-grp × Medium Board	0.0519	-0.2320***	0.1049*	-0.2052***	0.0734	-0.3415***
	(0.0485)	(0.0533)	(0.0620)	(0.0762)	(0.0935)	(0.1309)
T × Post × Cash-grp × Large Board	-0.0232	-0.1427***	-0.0014	-0.2263***	0.0098	-0.1363
	(0.0509)	(0.0538)	(0.0782)	(0.0753)	(0.1267)	(0.1011)
p(CashLo = CashHi | Small Board)	0.100		0.019		0.019	
p(CashLo = CashHi | Medium Board)	<0.001		0.002		0.010	
p(CashLo = CashHi | Large Board)	0.106		0.038		0.367	
p(Small Board = Large Board)	0.041	0.055	0.209	0.229	0.447	0.046
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,909,614		2,909,614		2,909,614	
Adj. R^2	0.839		0.839		0.839	

Appendix 4

Summary Statistics by Sector, Size, and Geography

This appendix reports nonprofit summary statistics disaggregated by sector and size, complementing the pooled statistics in Table 1 and the funding-model discussion in Section 3 of the main paper. Throughout, liquidity is measured as (Cash + Short-Term Investments) / Assets, the preferred measure of the main paper.

- A4 Table 1 and Figure 1 report means by NCCS major sector, with the figure tracing within-sector liquidity over time.
- A4 Table 2 and Figure 2 report the size gradient by lagged one-year revenue decile.
- A4 Table 3 and Figure 3 fix each organization's decile at its 2011 revenue and follow those cohorts through 2023, separating compositional turnover from within-cohort evolution.

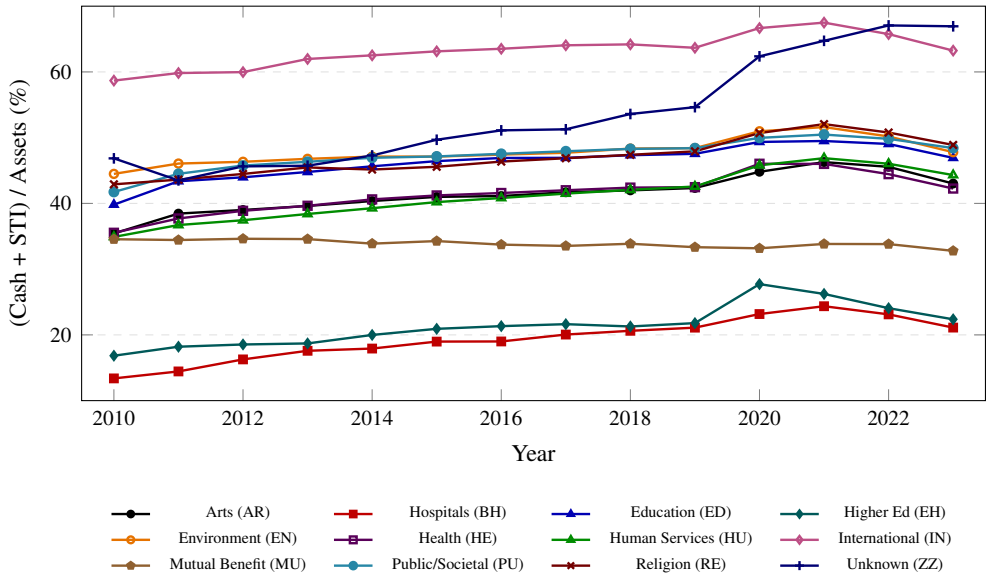
A4 Table 1: Summary Statistics by NCCS Sector

This table reports pooled means of total assets, total revenue, and the two liquidity ratios by NCCS major sector over the 2010–2023 Form 990 panel. It disaggregates the aggregate summary statistics in Table 1 of the main paper and the funding-model heterogeneity discussed in Section 3. Assets and revenue are in thousands of dollars. Cash / Assets uses Form 990 Part X line 1, and (Cash + STI) / Assets adds short-term investments (line 2), both scaled by total assets (line 16), following the definitions in the main paper. Sectors with the most forecastable program-service revenue, such as hospitals and higher education, hold the least liquidity, while donation-reliant sectors hold the most, consistent with the precautionary logic of Section 3.

Sector	Obs	Mean assets ($000s)	Mean revenue ($000s)	Cash/ Assets	(Cash+STI)/ Assets
Arts Culture Humanities	240,210	8,348	2,407	28.5%	42.3%
Hospitals	50,249	371,840	245,137	11.2%	21.5%
Education	394,510	15,143	4,512	30.8%	47.0%
Environment	126,381	6,108	2,394	30.9%	48.4%
Health	351,241	20,999	18,033	26.3%	42.1%
Higher Education	24,967	465,823	143,852	11.8%	19.7%
Human Services	1,123,122	5,923	3,549	27.0%	42.1%
International	54,891	14,601	9,893	47.7%	63.9%
Mutual Benefit	100,628	54,108	20,079	15.5%	33.8%
Unknown	170,302	8,330	4,481	52.2%	63.1%
Public & Societal Benefit	586,340	30,022	5,885	29.7%	48.0%
Religion	137,887	3,621	1,620	36.7%	47.8%

A4 Figure 1: Internal Liquidity across Nonprofit Sectors over Time

This figure plots within-sector mean (Cash + STI) / Assets by year over 2010–2023, tracing the sector pattern in A2 Table 1 through time. The sector ranking is stable across the panel: hospitals (BH) and higher education (EH) hold the least liquidity throughout, and internationally focused and donation-reliant sectors the most. Mean liquidity rises gradually over the sample and increases in 2020–2021, consistent with the sector-wide rise documented in Appendix B of the main paper.



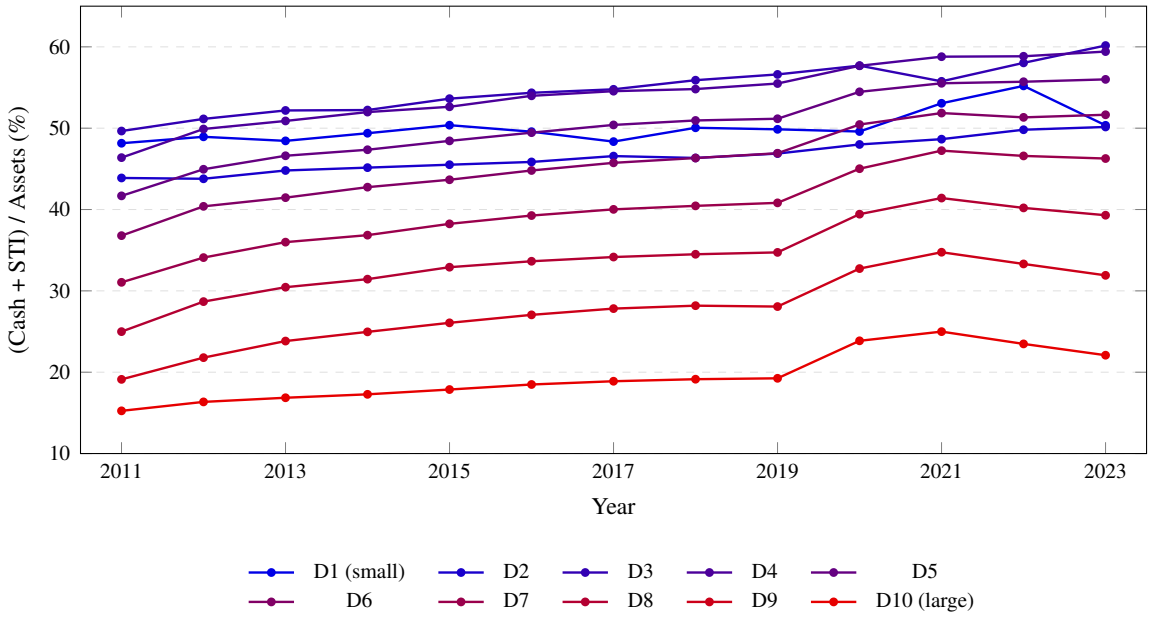
A4 Table 2: Summary Statistics by Lagged 1-Year Revenue Decile

This table reports pooled means of total assets, total revenue, and the liquidity ratios by lagged one-year revenue decile, with deciles formed each year on prior-year total revenue. Assets and revenue are in thousands of dollars. The table documents a steep inverse size gradient: (Cash + STI) / Assets falls from 80.7% in the smallest decile to 12.7% in the largest. This gradient underlies the size-matched comparison with for-profit firms in Appendix B of the main paper and motivates the revenue-percentile fixed effects used throughout the main specifications.

Decile	Assets ($000s)	Revenue ($000s)	Cash/ Assets	(Cash+STI)/ Assets
1 (small)	75.74	457.8	71.4%	80.7%
2	150.5	387.1	55.8%	72.6%
3	285.6	504.8	42.5%	63.5%
4	472.9	617.6	31.4%	52.2%
5	735.2	829.1	22.5%	41.6%
6	1,172	1,030	18.1%	35.1%
7	1,942	1,699	14.7%	29.8%
8	3,808	3,062	11.5%	24.4%
9	9,485	7,074	8.7%	19.5%
10 (large)	231,544	98,150	4.7%	12.7%

A4 Figure 2: Internal Liquidity by Lagged 1-Year Revenue Decile over Time

This figure plots mean (Cash + STI) / Assets by lagged one-year revenue decile over 2011–2023. Deciles are reassigned each year, so each line follows a fixed point in the contemporaneous size distribution rather than a fixed set of organizations. Liquidity is lower for the larger deciles in every year, and rises across the distribution after 2019, consistent with the precautionary accumulation discussed in Section 3 of the main paper.



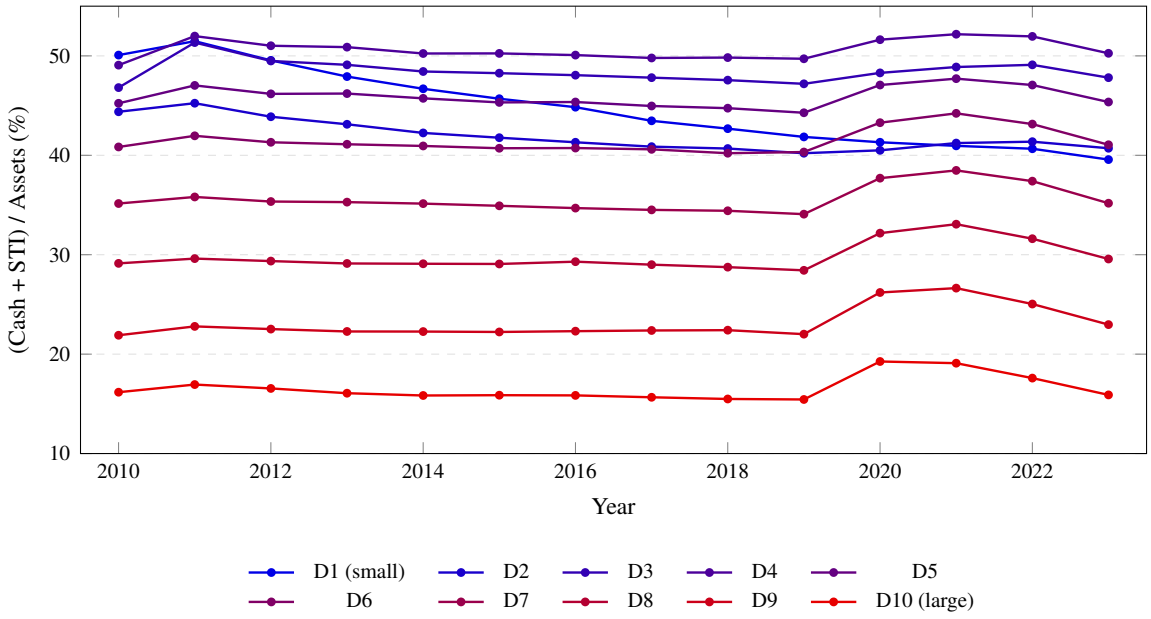
A4 Table 3: Summary Statistics by 2011-Fixed Revenue Decile

This table reports pooled means of total assets, total revenue, and the liquidity ratios by 2011-fixed revenue decile. Each organization is assigned to a decile based on its 2011 total revenue, and the assignment is held fixed thereafter, so the cells follow fixed cohorts rather than the contemporaneous size distribution. Assets and revenue are in thousands of dollars. Comparing this table with A2 Table 2 separates within-cohort evolution from the compositional turnover that drives the contemporaneous gradient, both relevant to the size controls in Section 3 of the main paper.

2011-fixed Decile	Assets ($000s)	Revenue ($000s)	Cash/ Assets	(Cash+STI)/ Assets
1 (small in 2011)	1,453	239	27.4%	45.4%
2	1,062	197	25.5%	42.2%
3	1,139	353	30.0%	48.8%
4	1,246	464	31.3%	50.7%
5	1,903	700	27.1%	45.6%
6	2,896	1,031	23.4%	41.4%
7	5,129	1,762	18.7%	35.5%
8	10,566	3,560	14.9%	29.7%
9	26,125	9,436	10.9%	23.1%
10 (large in 2011)	325,734	153,497	6.8%	16.5%

A4 Figure 3: Internal Liquidity by 2011-Fixed Revenue Decile over Time

This figure plots mean (Cash + STI) / Assets by 2011-fixed revenue decile over 2010–2023. Because decile membership is fixed at 2011 revenue, each line follows the same cohort of organizations through the panel. The cohorts preserve the inverse size ordering of A2 Table 3, and all of them share the broad increase in liquidity after 2019, indicating that the post-2019 rise reflects within-organization accumulation rather than compositional change.



Appendix 5

Robustness Using Cash/Assets

This appendix repeats the liquidity-consequence and shock results of the main paper using Cash/Assets, the narrower liquidity measure, in place of (Cash + Short-Term Investments) / Assets, the preferred measure used in the main text. Cash/Assets is non-interest-bearing cash (Form 990 Part X line 1) scaled by total assets (line 16). Appendix 3 Tables 1–5 correspond to Tables 4, 5, and 6 of the main paper and include organization (EIN) and Sector $\times$ Revenue-Percentile $\times$ Year fixed effects; Tables 6–7 correspond to Tables 7 and 8 and include organization and Sector $\times$ Pre-Shock-Revenue-Percentile $\times$ Year fixed effects. Variable definitions, controls, and fixed effects are as in the corresponding main-paper tables. Standard errors are clustered by EIN and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

A5 Table 1: Governance and Internal Liquidity [Cash/Assets]

This table repeats Table 4 of the main paper, Governance and Internal Liquidity, with Cash/Assets as the dependent variable in place of (Cash + Short-Term Investments) / Assets. The governance variables, the contribution ratio and debt and endowment controls, the fixed effects, and the clustering are as in Table 4. As in the main text, liquidity declines with board size, audited statements, and government-grant receipt, and board independence is unrelated to liquidity once the other characteristics are controlled for.

	(1)	(2)	(3)	(4)	(5)	(6)
ln(Board Size)	-1.0170***					
	(0.0658)					
Board Size $\leq$4		1.6588***				1.6248***
		(0.1197)				(0.1248)
Board Size 5-6		0.7963***				0.7786***
		(0.0901)				(0.0909)
Board Size 7-8		0.3912***				0.3840***
		(0.0676)				(0.0678)
Board Size 11-14		-0.4288***				-0.4227***
		(0.0645)				(0.0645)
Board Size $\geq$15		-0.8384***				-0.8275***
		(0.0879)				(0.0881)
Board Independence			-0.2877**			-0.1643
			(0.1211)			(0.1210)
Audited or Reviewed				-1.4632***		-1.4298***
				(0.0724)		(0.0727)
Receives Govmt Grant					-0.3796***	-0.3555***
					(0.0538)	(0.0537)
Contribution Ratio	1.2449***	1.2436***	1.2557***	1.2456***	1.3537***	1.3433***
	(0.1054)	(0.1054)	(0.1059)	(0.1054)	(0.1067)	(0.1070)
Tax-exempt Debt	-1.8945***	-1.8939***	-1.9040***	-1.9023***	-1.9128***	-1.8637***
	(0.1403)	(0.1404)	(0.1398)	(0.1400)	(0.1402)	(0.1399)
Secured Debt	-3.0668***	-3.0646***	-3.0495***	-3.0503***	-3.0704***	-3.0103***
	(0.0660)	(0.0660)	(0.0660)	(0.0660)	(0.0660)	(0.0659)
Unsecured Debt	-0.8941***	-0.8921***	-0.8849***	-0.8997***	-0.8948***	-0.8854***
	(0.0744)	(0.0744)	(0.0745)	(0.0744)	(0.0744)	(0.0744)
Endowment	-2.0196***	-2.0148***	-2.0335***	-1.9855***	-2.0360***	-1.9509***
	(0.1129)	(0.1129)	(0.1128)	(0.1128)	(0.1129)	(0.1125)
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec$\times$RevPct$\times$Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,677,538	2,677,538	2,645,671	2,677,538	2,677,463	2,645,596
Adj. R^2	0.815	0.815	0.815	0.815	0.815	0.815

A5 Table 2: Fundraising and Donations [Cash/Assets]

This table repeats Panel A of Table 5 of the main paper, Fundraising and Donations, with the lagged liquidity regressor measured as Cash / Assets rather than (Cash + Short-Term Investments) / Assets. The dependent variables, controls, fixed effects, and clustering are as in Table 5. As in the main text, higher lagged liquidity predicts lower fundraising effort and lower realized donor support on both the extensive and intensive margins.

	(1) 1[FRexp>0]	(2) ln(1+FRexp)	(3) 1[FRrev>0]	(4) ln(1+FRrev)	(5) ln(1+Don)
Cash / Assets	-0.0159***	-0.1947***	-0.0098***	-0.1137***	-0.0443***
	(0.0015)	(0.0145)	(0.0014)	(0.0147)	(0.0152)
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,677,394	2,677,394	2,677,113	2,677,113	2,677,142
Adj. R^2	0.818	0.862	0.661	0.702	0.847

A5 Table 3: Restricted Asset Donations and Endowment Contributions [Cash/Assets]

This table repeats Panel B of Table 5 of the main paper with the lagged liquidity regressor measured as Cash / Assets. Column 1 is the change in donor-restricted net assets scaled by average total assets; Columns 2 and 3 are endowment contributions scaled by average total assets and average endowment value, among endowment holders. Controls, fixed effects, and clustering are as in Table 5. As in the main text, higher lagged liquidity predicts larger subsequent inflows of restricted and endowment giving.

	(1) ΔRestricted/ Avg Total Assets	(2) Endowment Contr./ Avg Total Assets	(3) Endowment Contr./ Avg Endowment
Cash / Assets	0.0161***	0.0388***	0.0895***
	(0.0006)	(0.0025)	(0.0073)
Other lagged governance controls	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes
Observations	2,047,820	310,149	312,354
Adj. R^2	0.010	0.433	0.397

A5 Table 4: Board Size and the Liquidity Sensitivity of Fundraising [Cash/Assets]

This table repeats Panel A of Table 6 of the main paper, with Liquidity measured as lagged Cash/Assets. Each coefficient is the interaction of Liquidity with a board-size tercile defined within Sector × Revenue-Percentile × Year cells; p(Small = Large) is the Wald test that the small- and large-board interactions are equal. Controls, fixed effects, and clustering are as in Table 6. Under the narrower cash measure the monotone weakening of the liquidity sensitivity with board size found in Table 6 is less pronounced: the small- and large-board interactions differ significantly only for the fundraising-event-revenue margins (Columns 3 and 4).

	(1) 1[FRexp>0]	(2) ln(1+FRexp)	(3) 1[FRrev>0]	(4) ln(1+FRrev)	(5) ln(1+Don)
Liquidity × Small Board	-0.0136***	-0.1623***	-0.0042**	-0.0441***	-0.0307
	(0.0019)	(0.0181)	(0.0016)	(0.0168)	(0.0198)
Liquidity × Medium Board	-0.0179***	-0.2167***	-0.0107***	-0.1256***	-0.0620***
	(0.0019)	(0.0178)	(0.0018)	(0.0183)	(0.0184)
Liquidity × Large Board	-0.0155***	-0.1996***	-0.0152***	-0.1784***	-0.0334
	(0.0021)	(0.0204)	(0.0022)	(0.0227)	(0.0214)
p(Small = Large)	0.433	0.116	<0.001	<0.001	0.916
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes
Observations	2,677,394	2,677,394	2,677,113	2,677,113	2,677,142
Adj. R^2	0.818	0.862	0.661	0.702	0.847

A5 Table 5: Board Size and the Liquidity Sensitivity of Restricted Assets and Endowment Contributions [Cash/Assets]

This table repeats Panel B of Table 6 of the main paper, with Liquidity measured as lagged Cash/Assets. Column 1 is the change in donor-restricted net assets scaled by average total assets; Columns 2 and 3 are endowment contributions scaled by average total assets and average endowment value, among endowment holders. Controls, fixed effects, and clustering are as in Table 6. As in the main text, the shift toward restricted and endowment giving is broadly uniform across board sizes; the small- and large-board interactions are statistically indistinguishable for the endowment-contribution margins and economically close for restricted net assets.

	(1) ΔRestricted/ Avg Total Assets	(2) Endowment Contr./ Avg Total Assets	(3) Endowment Contr./ Avg Endowment
Liquidity × Small Board	0.0147***	0.0431***	0.0932***
	(0.0008)	(0.0052)	(0.0159)
Liquidity × Medium Board	0.0156***	0.0373***	0.0863***
	(0.0008)	(0.0033)	(0.0098)
Liquidity × Large Board	0.0183***	0.0385***	0.0904***
	(0.0009)	(0.0029)	(0.0085)
p(Small = Large)	<0.001	0.410	0.869
Other lagged governance controls	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes
Observations	2,047,820	310,149	312,354
Adj. R^2	0.010	0.433	0.397

A5 Table 6: Government-Grant Collapses on Exit and Program Spending [Cash/Assets]

This table repeats Table 7 of the main paper, Effects of Government-Grant Collapses on Exit and Program Spending, sorting organizations by pre-shock Cash/Assets rather than (Cash + Short-Term Investments) / Assets. It is estimated as a single-panel difference-in-differences with organization and Sector × 3-year pre-shock Revenue-Percentile × Year fixed effects; the stacked-cohort design used in Table 7 is reproduced for Cash/Assets separately. The outcomes (an indicator for exit and the log of program-service expenses), the shock thresholds, the cash terciles, and p(Low Cash = High Cash) are defined as in Table 7. As in the main text, exit rises and program spending contracts most for the high-cash tercile, and the high-minus-low contrast is significant at all thresholds.

	Exit			**Program Service Expenses**		
	(1) G>25%	(2) G>50%	(3) G>75%	(4) G>25%	(5) G>50%	(6) G>75%
T × Post × Low Cash	0.0076***	0.0104***	0.0253***	-0.1064***	-0.0676	-0.0516
	(0.0017)	(0.0023)	(0.0039)	(0.0389)	(0.0520)	(0.0914)
T × Post × Medium Cash	0.0126***	0.0193***	0.0278***	-0.0589*	-0.0476	-0.0165
	(0.0017)	(0.0025)	(0.0037)	(0.0330)	(0.0481)	(0.0701)
T × Post × High Cash	0.0375***	0.0468***	0.0533***	-0.2448***	-0.2691***	-0.3088***
	(0.0022)	(0.0030)	(0.0039)	(0.0373)	(0.0502)	(0.0679)
p(Low Cash = High Cash)	<0.001	<0.001	<0.001	0.010	0.005	0.024
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,909,784	2,909,784	2,909,784	2,909,784	2,909,784	2,909,784
Adj. R^2	0.795	0.795	0.795	0.839	0.839	0.839

A5 Table 7: Government-Grant Collapses, Pre-Shock Cash, and Board Size [Cash/Assets]

This table repeats Table 8 of the main paper, Government-Grant Collapses, Pre-Shock Cash, and Board Size, sorting organizations by pre-shock Cash/Assets in place of (Cash + Short-Term Investments) / Assets. The dependent variable is an indicator for organizational exit in Panel A and the log of program-service expenses in Panel B. The sample is split by pre-shock cash into Low Cash and High Cash groups, and within each group $T \times$ Post is interacted with Small, Medium, and Large board terciles. The fixed effects, cash and board-size splits, and within- and cross-sample tests are as in Appendix 3 Table 6 and Table 8 of the main paper.

Panel A: Exit

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	0.0215***	0.0432***	0.0279***	0.0553***	0.0420***	0.0612***
	(0.0029)	(0.0035)	(0.0040)	(0.0048)	(0.0060)	(0.0058)
T × Post × Cash-grp × Medium Board	0.0030	0.0318***	0.0056*	0.0384***	0.0167***	0.0420***
	(0.0022)	(0.0031)	(0.0031)	(0.0044)	(0.0053)	(0.0058)
T × Post × Cash-grp × Large Board	-0.0032	0.0091***	-0.0078**	0.0109***	-0.0037	0.0127**
	(0.0022)	(0.0027)	(0.0031)	(0.0039)	(0.0048)	(0.0056)
p(CashLo = CashHi | Small Board)	<0.001		<0.001		0.021	
p(CashLo = CashHi | Medium Board)	<0.001		<0.001		0.001	
p(CashLo = CashHi | Large Board)	<0.001		<0.001		0.026	
p(Small Board = Large Board)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Program Service Expenses

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	-0.1956***	-0.3222***	-0.1182	-0.4107***	-0.0993	-0.4129***
	(0.0650)	(0.0601)	(0.0817)	(0.0819)	(0.1274)	(0.1055)
T × Post × Cash-grp × Medium Board	-0.0206	-0.2436***	-0.0052	-0.3074***	-0.0077	-0.3713***
	(0.0469)	(0.0527)	(0.0621)	(0.0773)	(0.1079)	(0.1000)
T × Post × Cash-grp × Large Board	-0.0424	-0.1455***	-0.0702	-0.1000	0.0243	-0.1009
	(0.0501)	(0.0553)	(0.0818)	(0.0740)	(0.1463)	(0.1132)
p(CashLo = CashHi | Small Board)	0.153		0.011		0.058	
p(CashLo = CashHi | Medium Board)	0.002		0.002		0.013	
p(CashLo = CashHi | Large Board)	0.167		0.787		0.499	
p(Small Board = Large Board)	0.061	0.030	0.678	0.005	0.524	0.044
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 6

Stacked Difference-in-Differences for Cash/Assets

This appendix reports the stacked difference-in-differences results for Cash/Assets, the narrower liquidity measure, in place of (Cash + Short-Term Investments) / Assets. It is the stacked-cohort counterpart of the single-panel Cash/Assets results in Appendix 5 and the direct robustness analog of the stacked Tables 7 and 8 of the main paper. Standard errors are clustered by EIN and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

A6 Table 1: Government-Grant Collapses by Pre-Shock Cash Tercile [Cash/Assets, Stacked]

This table reports the stacked difference-in-differences analog of Table 7 of the main paper, Effects of Government-Grant Collapses on Exit and Program Spending, using Cash/Assets in place of (Cash + Short-Term Investments) / Assets. The stacked-cohort design, the outcomes (an indicator for exit and the log of program-service expenses), the shock thresholds, the pre-shock cash terciles, and p(Low Cash = High Cash) are as in Table 7. As in the main text, exit rises and program spending contracts most for the high-cash tercile.

Panel A: Exit

	(1) G>25%	(2) G>50%	(3) G>75%
T × Post × Low Cash	0.0145***	0.0195***	0.0336***
	(0.0024)	(0.0032)	(0.0052)
T × Post × Medium Cash	0.0177***	0.0275***	0.0354***
	(0.0025)	(0.0038)	(0.0055)
T × Post × High Cash	0.0458***	0.0529***	0.0586***
	(0.0030)	(0.0039)	(0.0050)
p(Low Cash = High Cash)	<0.001	<0.001	0.001
Cohort × EIN FE	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes
Observations	12,802,261	13,132,860	13,307,675
Adj. R^2	0.115	0.115	0.114

Panel B: Program Service Expenses

	(1) G>25%	(2) G>50%	(3) G>75%
T × Post × Low Cash	-0.1368***	-0.1140**	-0.0449
	(0.0355)	(0.0491)	(0.0869)
T × Post × Medium Cash	-0.0936***	-0.1186**	-0.2133***
	(0.0305)	(0.0466)	(0.0710)
T × Post × High Cash	-0.2645***	-0.3247***	-0.3320***
	(0.0339)	(0.0469)	(0.0613)
p(Low Cash = High Cash)	0.009	0.002	0.007
Cohort × EIN FE	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes
Observations	13,771,637	14,124,614	14,311,299
Adj. R^2	0.892	0.891	0.890

A6 Table 2: Government-Grant Collapses, Pre-Shock Cash, and Board Size [Cash/Assets, Stacked]

This table reports the stacked difference-in-differences analog of Table 8 of the main paper, Government-Grant Collapses, Pre-Shock Cash, and Board Size, using Cash/Assets in place of (Cash + Short-Term Investments) / Assets. The dependent variable is an indicator for exit in Panel A and the log of program-service expenses in Panel B. The cash split, the board-size terciles, the fixed effects, and the within- and cross-sample tests are as in Table 8.

Panel A: Exit

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	0.0331***	0.0566***	0.0409***	0.0682***	0.0540***	0.0718***
	(0.0035)	(0.0039)	(0.0046)	(0.0052)	(0.0068)	(0.0061)
T × Post × Cash-grp × Medium Board	0.0073**	0.0294***	0.0094**	0.0363***	0.0299***	0.0413***
	(0.0032)	(0.0039)	(0.0044)	(0.0056)	(0.0080)	(0.0075)
T × Post × Cash-grp × Large Board	-0.0023	0.0127***	-0.0061	0.0158***	-0.0056	0.0118
	(0.0033)	(0.0039)	(0.0046)	(0.0056)	(0.0071)	(0.0075)
p(CashLo = CashHi | Small Board)	<0.001		<0.001		0.052	
p(CashLo = CashHi | Medium Board)	<0.001		<0.001		0.298	
p(CashLo = CashHi | Large Board)	0.003		0.002		0.093	
p(Small Board = Large Board)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cohort × EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,802,261		13,132,860		13,307,675	
Adj. R^2	0.115		0.115		0.114	

Panel B: Program Service Expenses

	G>25%		G>50%		G>75%	
	CashLo	CashHi	CashLo	CashHi	CashLo	CashHi
T × Post × Cash-grp × Small Board	-0.1694***	-0.3278***	-0.1240*	-0.3975***	-0.0479	-0.4495***
	(0.0482)	(0.0449)	(0.0649)	(0.0603)	(0.1040)	(0.0785)
T × Post × Cash-grp × Medium Board	-0.0569	-0.1813***	-0.0565	-0.2211***	-0.1124	-0.2591***
	(0.0442)	(0.0441)	(0.0621)	(0.0641)	(0.1055)	(0.0816)
T × Post × Cash-grp × Large Board	-0.0618	-0.1171**	-0.0587	-0.1559**	0.0242	-0.1239
	(0.0476)	(0.0501)	(0.0811)	(0.0714)	(0.1539)	(0.1063)
p(CashLo = CashHi | Small Board)	0.016		0.002		0.002	
p(CashLo = CashHi | Medium Board)	0.046		0.065		0.271	
p(CashLo = CashHi | Large Board)	0.423		0.368		0.429	
p(Small Board = Large Board)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cohort × EIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Coh×Sec×RevPct3y×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,771,637		14,124,614		14,311,299	
Adj. R^2	0.892		0.891		0.890	

Appendix 7

Additional Governance Measures

This appendix extends the governance analysis of the main paper by adding a travel expense ratio and four measures of CEO compensation to the liquidity regression. These are additional governance and agency proxies not included in the main text. The results sit alongside the board-size, audit, and government-grant patterns of Table 4 of the main paper. Higher CEO compensation is associated with lower liquidity and greater concentration of compensation in the principal officer with higher liquidity, while the travel expense ratio is unrelated to liquidity, with similar patterns across the two measures.

A7 Table 1: Additional Governance Measures and Internal Liquidity

This table extends Table 4 of the main paper, Governance and Internal Liquidity, by adding a travel expense ratio and four measures of CEO compensation to the baseline governance, financing access, and contribution controls. Travel Expense Ratio is travel expense (Form 990 Part IX line 17) over total functional expenses (Part IX line 25, column A). ln(CEO Base Pay) and ln(CEO Total Pay) are the log of the base and total compensation of the principal officer reported in Part VII. CEO Share [Base] and CEO Share [Total] are the principal officer's base and total compensation as a share of total officer compensation. Panel A uses Cash / Assets and Panel B uses (Cash + Short-Term Investments) / Assets as the dependent variable; both are in percentage points. Every column includes the full set of baseline governance controls (board-size buckets, board independence, audited or reviewed, and government-grant receipt), the financing-access indicators, and the lagged contribution ratio. All right-hand-side variables are lagged one year. Each specification includes organization (EIN) and Sector × Revenue-Percentile × Year fixed effects, with percentiles formed from lagged revenue. Standard errors are clustered by EIN. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Cash / Assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Travel Expense Ratio	-0.9552						
	(1.0894)						
ln(CEO Base Pay)		-0.0601***		-0.1300***			
		(0.0121)		(0.0142)			
CEO Share [Base]			0.5862***	1.2778***			
			(0.1214)	(0.1430)			
ln(CEO Total Pay)					-0.7900***		-0.8239***
					(0.0467)		(0.0476)
CEO Share [Total]						0.3926***	0.7401***
						(0.1263)	(0.1292)
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,652,988	1,305,658	1,305,658	1,305,658	1,305,658	1,305,658	1,305,658
Adj. R^2	0.813	0.793	0.793	0.793	0.793	0.793	0.793

Panel B: (Cash + STI) / Assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Travel Expense Ratio	1.3684						
	(1.0075)						
ln(CEO Base Pay)		-0.0244*		-0.0708***			
		(0.0129)		(0.0151)			
CEO Share [Base]			0.4710***	0.8473***			
			(0.1257)	(0.1468)			
ln(CEO Total Pay)					-0.5917***		-0.6186***
					(0.0465)		(0.0476)
CEO Share [Total]						0.3254**	0.5862***
						(0.1328)	(0.1360)
Other lagged governance controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other lagged controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sec×RevPct×Yr FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,651,944	1,305,002	1,305,002	1,305,002	1,305,002	1,305,002	1,305,002
Adj. R^2	0.852	0.838	0.838	0.838	0.838	0.838	0.838