Financing Nonprofits*

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Abstract

Nonprofits finance more than $3 trillion in annual program spending but operate without access to equity or deep 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 allocate resources to maximize the present value of mission services, choosing spending, fundraising effort, and borrowing while donors adjust giving based on observed reserves and oversight. When cash balances are high, donors restrict or redirect future gifts; when balances are low, they increase unrestricted support. Fundraising endogenously generates liquidity after shocks, but its effectiveness depends on governance and reputation. Using panel data on over 460,000 U.S. nonprofits (2010–2023), the evidence supports the model's predictions and reveals a "cash-rich paradox": organizations with large reserves attract less donor relief and retrench more after funding shocks, whereas strong governance compels the deployment of restricted reserves to sustain mission spending.

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1 Introduction

The question of how to finance investment lies at the heart of corporate finance. In the United States, the annual capital expenditure of nonfarm businesses exceeds $2 trillion.[1] A vast literature explains how firms fund these investments through the interplay of internal cash flow, debt, and equity markets. Corporate finance is fundamentally a theory of how financial frictions and capital-market access shape investment, liquidity, and value. Yet one sector that collectively deploys comparable sums operates almost entirely outside this framework: the nonprofit sector.

The nonprofit sector delivers more than $3 trillion annually in program and service expenditures, but it finances itself in an environment fundamentally different from that of for-profit firms. Nonprofits cannot issue equity and have no shareholders to monitor or discipline management. Access to debt is limited to a small minority of institutions able to issue tax-exempt bonds or to pledge tangible collateral. There is no market for corporate control, no bankruptcy-based restructuring discipline, and limited external monitoring (Hansmann, 1980; Fama and Jensen, 1983; Glaeser and Shleifer, 2001). Nevertheless, these organizations sustain long-lived missions and large-scale operations that require stable liquidity and credible governance. Understanding how they do so, and why their financial behavior differs from that of conventional firms, is the central goal of this paper.

In this paper we develop and bring to data a theory of nonprofit finance. In the absence of capital markets, liquidity and governance are the principal financial mechanisms available to mission-driven organizations. Nonprofits accumulate cash and endowment assets to self-insure against shocks, but these buffers are subject to external discipline. Donors, regulators, and boards closely monitor liquidity, rewarding organizations that appear prudent but penalizing those that appear to hoard. High cash holdings may signal solvency but can also signal inefficiency or lack of discipline, prompting donors to restrict future gifts or reduce support. Conversely, organizations that appear financially constrained attract donor relief but risk operational instability. Financing choices in this environment thus reflect an equilibrium interaction among precautionary motives, governance oversight, and donor behavior.

To capture these forces, we construct a dynamic model in which a nonprofit chooses program spending, fundraising effort, debt, and endowment withdrawals to maximize the present value of mission services. Funding arrives through two channels: earned program service revenues (PSR) and donations, which differ in volatility, persistence, and flexibility. Donors respond endogenously

[1] See, for example, United States Census Bureau, *Annual Capital Expenditures*, February 28, 2024, available at https://www.census.gov/library/publications/2023/econ/2022-aces-summary.html.

to observed liquidity and governance quality. When reserves are low, they increase unrestricted giving to preserve continuity; when reserves are high, they reduce unrestricted support or impose restrictions, a mechanism we term "donor triage." Endowments provide alternative liquidity through payouts and governance-approved appropriations, while debt access, which is available only to a small, financially credible subset, creates a sharp extensive margin that mirrors the data. Governance affects both sides of the balance sheet: it determines the flexibility with which endowment resources can be used and shapes donor perceptions of liquidity accumulation.

The model yields a series of empirical predictions. Cash holdings increase with the level and volatility of unrestricted donations and decline with the level and persistence of PSR. Endowments and stronger governance substitute for cash by providing alternative liquidity and by disciplining excess reserves. Crossing the debt-eligibility threshold reduces target cash and smooths program spending in downturns. Fundraising serves as an endogenous liquidity instrument: effort intensifies after contribution shocks, especially when governance and reputation are strong. Finally, when donors allocate relief based on perceived need, cash-rich organizations receive less support after shocks, which we refer to as a "cash-rich paradox" that emerges unless governance compels the use of reserves.

We test these implications using a new dataset built from raw IRS Form 990 filings of nonprofit organizations registered under Section 501(c)(3). The panel spans 2010–2023 and contains about 3.5 million organization-year observations for more than 460,000 entities. The results support the model's main mechanisms and document new empirical patterns in nonprofit finance, while also informing core questions in corporate finance about how firms manage liquidity, financing constraints, and governance in the absence of capital markets.

First, consistent with the model's precautionary-savings logic, liquidity rises with financial uncertainty. Organizations exposed to greater volatility in revenues, contributions, and expenses hold more cash, even after controlling for sector, geography, size, and fixed organizational characteristics. A one-standard-deviation increase in revenue volatility raises the cash ratio by roughly 1.5 percentage points, and all other volatility measures load positively and strongly on liquidity. These results confirm that when access to external finance is limited, cash serves as a self-insurance device that substitutes for capital-market smoothing. The within-organization estimates show that these are active adjustments, not static cross-sectional differences.

Second, the data confirm the substitution channels predicted by the model. Both endowments and access to tax-exempt borrowing reduce cash holdings, as alternative sources of liquidity lower the marginal value of cash (e.g., Bolton, Chen and Wang, 2011). Organizations that become

eligible for tax-exempt bonds exhibit discrete drops in liquidity, consistent with the model's debt-eligibility margin. Nonprofits with endowments also hold less cash because stable endowment payouts and board-approved appropriations provide an internal buffer against shocks. These results extend the classical substitution effects from corporate finance to a setting where equity and conventional credit are largely absent.

Third, governance has a strong disciplinary effect on liquidity policy. Nonprofits with larger boards and audited financial statements hold significantly smaller cash balances. Without shareholders or a market for corporate control, governance quality determines how well accumulated liquidity is monitored and deployed. Larger boards broaden accountability and external connections through donor representation, professional oversight, and stakeholder diversity, improving transparency and credibility (e.g., Harris, Petrovits and Yetman, 2015; Lewellen, Phillips and Sertsios, 2024). The negative relation between governance and liquidity matches the model's prediction that stronger oversight raises the opportunity cost of hoarding and increases the efficiency of cash use.

Finally, the dynamic evidence around funding shocks provides the clearest validation of the model's donor-discipline mechanism. When large government grants collapse, organizations with high pre-shock liquidity, i.e., those that appear cash-rich, cut program spending and employment more and are more likely to exit than otherwise similar low-cash organizations. In severe shocks, the exit rate for high-cash nonprofits is about 5 times higher than for low-cash ones. These findings illustrate a "cash-rich paradox": reserves that appear protective can signal slack to donors, who then redirect support to organizations that seem more constrained. Governance attenuates this effect. Among high-cash nonprofits, those with stronger boards experience smaller post-shock reductions in spending and employment, indicating that effective governance turns liquidity from passive slack into credible insurance by ensuring that reserves are used to sustain mission activities.

Overall, the evidence aligns closely with the model. Liquidity behaves as predicted by a dynamic precautionary model but is shaped by governance and donor behavior in ways that are unique to the nonprofit sector. Endowments and debt eligibility substitute for cash; governance constrains hoarding and promotes accountability; and the interaction of liquidity and governance determines resilience during financial stress. In the absence of capital markets, liquidity management, governance, and donor discipline together fulfill the allocative and disciplinary roles that debt, equity, and investor oversight play in corporate finance.

Our paper contributes to the dynamic corporate finance literature that studies how firms choose investment, financing, and liquidity in the presence of frictions in capital markets. Dynamic models such as Leland (1994), Hennessy and Whited (2005), and Riddick and Whited (2009) show that

internal liquidity serves as a buffer when raising external funds is costly, creating intertemporal links between financing, investment, and cash policy. Work by Bolton, Chen and Wang (2011, 2013) unify these decisions around the marginal value of cash, treating liquidity as a state variable that governs firm value, risk management, and financial flexibility. Our framework adapts this logic to a setting where external capital markets are effectively absent. Nonprofits cannot issue equity and have only limited debt capacity, so liquidity, fundraising, and governance jointly perform the roles that debt, equity, and shareholder oversight play in for-profit firms. The marginal value of cash in our model arises not from financing costs but from donor discipline and governance. Fundraising effort and endowment withdrawals act as the nonprofit analogues of dynamic financing and payout margins, while governance determines whether accumulated liquidity is deployed or hoarded after shocks.

Empirical work on capital structure further emphasizes how firms adjust leverage and liquidity toward targets in response to both firm characteristics and credit-market conditions (Leary and Roberts, 2005; Faulkender and Petersen, 2006; Strebulaev, 2007; Lemmon, Roberts and Zender, 2008; Sufi, 2009, among others). These studies show that access to debt markets and credit supply shifts have real effects on financing and investment. In our environment, those margins largely disappear. Because nonprofits face a near-zero equity supply and a narrow, eligibility-based debt channel, the extensive margin of tax-exempt borrowing replaces target leverage as the key constraint. Fundraising and endowment policy become the operative mechanisms for liquidity adjustment, and governance serves as a substitute for external monitoring. The resulting dynamics mirror capital-structure rebalancing but operate entirely through internal liquidity and donor behavior.

The literature on corporate liquidity management highlights the precautionary role of cash under financing frictions. Firms hold more cash when external finance is costly, volatile, or uncertain and that governance affects both the level and value of cash holdings (Opler, Pinkowitz, Stulz and Williamson, 1999; Almeida, Campello and Weisbach, 2004; Almeida and Campello, 2007). Subsequent work links liquidity accumulation to agency problems and structural shifts in firm assets (Bates, Kahle and Stulz, 2009; Denis and Sibilkov, 2009; Falato, Kadyrzhanova, Sim and Steri, 2022). Our paper extends this framework to a setting without standard liquidity substitutes, i.e., no credit lines, hedging, or seasoned equity issuance. Nonprofits rely on cash and quasi-restricted endowments as self-insurance against volatility in donations and program revenues, but visible reserves trigger donor discipline and restrictions that reduce future unrestricted inflows. This duality – liquidity as both buffer and signal – maps directly onto the precautionary-versus-

agency tension identified in the corporate literature, but in our setting the disciplining agent is the donor rather than the shareholder.

Our work complements research that views corporate finance as driven by supply-side conditions in capital markets. Stein (1996), Shleifer and Vishny (1997), and Baker and Wurgler (2002) show that fluctuations in investor sentiment, limited intermediation, and managerial opportunism generate time-variation in financing costs and issuance behavior. Our model extends this market-driven perspective to its natural limit – a world in which the external supply of capital is fixed at zero. Donors play the role of investors whose willingness to supply funds depends on perceived need, social preferences, and trust in management. Governance and fundraising effectiveness replace corporate opportunism as the mechanisms translating supply shifts into financing and investment outcomes. In this sense, our paper generalizes market-driven corporate finance to a sector where supply effects originate in altruistic preferences rather than investor sentiment, bridging the literatures on capital-supply frictions, corporate liquidity, and behavioral finance.

Finally, our paper is related to research on capital structure and governance in the healthcare segment of the nonprofit sector. Wedig, Sloan, Hassan and Morrisey (1988) and Wedig, Hassan and Morrisey (1996) test traditional trade-off theories of capital structure in nonprofit hospitals and analyze how tax-exempt debt substitutes for equity in financing long-lived assets. More recent work by Lewellen, Phillips and Sertsios (2024) examines the role of governance in nonprofit hospital behavior. Our analysis extends and generalizes these insights beyond healthcare to the entire nonprofit sector, which allows us to study how sectoral heterogeneity correlates with financing decisions. We provide a unified economic framework that explains financing choices and liquidity behavior across mission areas, showing how governance and donor discipline jointly determine the effective supply of capital in a sector that operates without equity markets and with limited debt access.

The rest of the paper proceeds as follows. Section 2 presents the theoretical framework and derives the model's key comparative statics. Section 3 describes the data, variable construction, and empirical design. Section 4 documents stylized facts and tests the model's predictions on liquidity, financing, and governance. Section 5 provides causal evidence from exogenous funding shocks. Section 6 concludes.

2 Model

Consider a nonprofit firm that operates without shareholders or equity markets. It cannot issue stock, distribute dividends, or repurchase shares. Its objective is not to maximize profits but to maximize the present value of the social or mission services it provides:

$$\max_{\{m_t, f_t, \chi_t, b_{t+1}\}_{t\geq 0}} \mathbb{E}_0 \sum_{t\geq 0} \beta^t u(m_t), \qquad \beta \in (0,1), \tag{1}$$

where $u(\cdot)$ is strictly increasing and concave; we assume a CRRA specification. The firm chooses program spending $m_t \geq 0$, fundraising effort $f_t \geq 0$, next period's debt $b_{t+1} \geq 0$, and the permissible withdrawal $\chi_t \geq 0$ from quasi-restricted or board-designated endowment assets.

The organization begins each period with a stock of unrestricted cash K_t, which serves as its primary liquid buffer. It also holds restricted or quasi-restricted assets E_t, collectively referred to as the endowment, that generate a rule-based payout and can be partially appropriated for operations subject to governance approval. Outstanding debt b_t carried into the period represents existing borrowing obligations. Current inflows include program service revenues, denoted Y_t^{ps}, which arise from earned income such as fees, tuition, or contractual reimbursements. A reputational state R_t summarizes donors' beliefs about managerial efficiency, stewardship, and financial need, affecting the productivity of future fundraising and the composition of gifts. Governance quality G_t captures institutional oversight and board capacity. It evolves slowly over time and shapes both internal discipline, i.e., how effectively the organization allocates funds, and external credibility, i.e., how donors interpret its financial reports. Finally, access to affordable borrowing is limited. Let $I_t \in \{0,1\}$ indicate eligibility for tax-exempt debt, so that only organizations satisfying specific financial and reputational conditions can borrow at preferential rates.

Total book assets at the beginning of period t are denoted A_t, and the central measure of liquidity is the cash ratio, $c_t = K_t/A_t$. This variable, observable to donors and boards alike, plays a central role in both managerial decision-making and donor responses. For analytical purposes, the state of the organization at the beginning of each period can be summarized by $s_t = (K_t, E_t, b_t, Y_t^{ps}, R_t, G_t, I_t)$, which collects the endogenous and exogenous elements that determine the evolution of liquidity, borrowing, reputation, and mission spending.

Funding processes, visibility, and restrictions. The firm relies on two major sources of cash flow. The first is the program service revenue (PSR), which represents payments by customers for receives services. The services could be highly subsidized, i.e., their costs exceed revenue, or

provided for free, in which case PSR is zero. We assume that PSR is governed by a stationary AR(1) process:

$$Y_{t+1}^{ps} = \mu_{ps} + \rho_{ps} Y_t^{ps} + \sigma_{ps} \varepsilon_{t+1}^{ps}, \qquad |\rho_{ps}| < 1, \tag{2}$$

with innovations ε_{t+1}^{ps} mean-zero and unit-variance.

The second source of cash flows are contributions and donations to the firm. These contributions arrive in two forms. The unrestricted gifts, U_{t+1}. These gifts are cash-like and can be immediately spendable on any mission activity. Restricted gifts Z_{t+1} on the other hand go directly into endowment and are spendable only through a rule-based payout. These payouts must be approved by boards.

The donations depend on fundraising effort f_t and the firm's current level of unrestricted cash in relation to its reasonable cash buffer. This cash buffer depends on firm fundamentals, such as firm's dependence on program service revenue, volatility PSR as well as unrestricted contributions, and the quality of governance.[2] In particular,

$$S_t \equiv c_t - \bar{c}(x_t), \qquad x_t = (Y_t^{ps}, \sigma_u, \sigma_{ps}, G_t), \tag{3}$$

where c_t is the cash ratio measured by unrestricted cash divided by the value of assets, $\bar{c}(\cdot)$ is the benchmark buffer and x_t is the vector of fundamentals. G_t captures governance quality (e.g., board capacity and oversight) and varies slowly over time. A positive S_t denotes visible reserves exceeding need, while a negative value signals financial strain.

Fundraising effort translates into expected gifts according to

$$U_{t+1} = \theta_u(R_t, G_t)\, f_t^{\alpha} \Big(1 + \eta_N [S_t]_- - \phi_K [S_t]_+\Big) + \sigma_u \varepsilon_{t+1}^{u}, \qquad 0 < \alpha < 1, \tag{4}$$

$$Z_{t+1} = \theta_r(R_t, G_t)\, f_t^{\alpha_r} \Big(\bar{s} + \psi_K [S_t]_+\Big) + \sigma_r \varepsilon_{t+1}^{r}, \qquad 0 < \alpha_r \leq \alpha, \tag{5}$$

with $[z]_+ \equiv \max\{z, 0\}$ and $[z]_- \equiv \max\{-z, 0\}$.

Equation (4) describes unrestricted gifts. Productivity parameters $\theta_u(R_t, G_t)$ rise with reputation and governance because donors convert effort into more credible, flexible support when stewardship is strong (e.g., Andreoni, 1998). When liquidity is tight ($S_t < 0$), donors increase unrestricted giving to preserve continuity ($\eta_N > 0$). When liquidity is abundant ($S_t > 0$), they reduce unrestricted support by $\phi_K [S_t]_+$, crowding out new cash inflows.

[2] We assume that restricted contributions do not affect the required buffer because they are earmarked for specific purpose.

Equation (5) governs restricted gifts. The term $\bar{s}$ is the baseline share of donations that arrive with restrictions even under normal liquidity, reflecting foundations, capital campaigns, and statutory grants. When reserves are visibly high, donors shift additional giving toward earmarked or endowment forms ($\psi_K > 0$), ensuring that new dollars finance specific programs rather than expand idle balances. This behavior can be viewed as a donor-side governance mechanism: as internal slack increases, external discipline takes the form of restrictions rather than withdrawal. The sensitivity of this shift declines with better governance, because strong boards and transparency already assure donors of prudent resource use.

Together, (4) and (5) embed donor discipline directly in the funding technology. The organization's objective remains the discounted present value of mission spending, but visible liquidity alters the composition and flexibility of future inflows rather than entering the utility function directly.

Restricted assets: payout, appropriation, and liquidity. Restricted assets evolve according to

$$E_{t+1} = (1 + r_E)E_t + Z_{t+1} - \pi E_t - \chi_t, \qquad 0 < \pi < 1, \tag{6}$$

where πE_t is a rule-based payout available in t and χ_t is a discretionary draw from quasi-restricted funds. The key friction is appropriation capacity:

$$0 \leq \chi_t \leq \bar{\chi}(G_t)\, E_t, \tag{7}$$

with $\bar{\chi}'(\cdot) > 0$. Governance relaxes the ability to reclassify or temporarily designate funds for operations, consistent with board oversight and donor consent processes.

Access to debt finance. Eligibility for tax-exempt borrowing at rate r^{ex} is determined by pledgeable cash flows and institutional quality. We model the extensive margin as

$$I_t = \mathbf{1}\{\psi_1 Y_t^{ps} + \psi_2 E_t + \psi_3 G_t \geq \bar{\Psi}\}. \tag{8}$$

When $I_t = 1$, the organization can choose $b_{t+1} \in [0, \bar{B}_t]$ at rate r^{ex}; otherwise it either does not borrow or faces a higher cost of debt r^{tax} in the taxable debt market. The rare, threshold nature of eligibility mirrors the empirical fact that only a small fraction of organizations ever tap the bond market. The intensive margin is captured by the choice of b_{t+1}.

Flow of funds, overhead, and survival. Let o_t denote management and general overhead in t, and let the convex fundraising cost be $c_f(f_t) = \gamma f_t^{1+\nu}/(1+\nu)$ with $\gamma, \nu > 0$. Choosing m_t commits the organization to deliver the period's mission services. Unrestricted cash follows

$$K_{t+1} = K_t + Y_t^{ps} + U_t + \pi E_t + \chi_t - m_t - o_t - c_f(f_t) + b_{t+1} - (1 + r_d(I_t))\, b_t, \tag{9}$$

$$r_d(I_t) = \begin{cases} r^{ex}, & I_t = 1, \\ r^{tax}, & I_t = 0. \end{cases}$$

A minimal working-capital constraint $K_{t+1} \geq \underline{K}$ ensures going concern; if it is violated persistently the organization exits. The constraint can be interpreted as payroll and vendor obligations that must be met before new period revenues and gifts arrive.

Reputation and information dynamics. Reputation R_t summarizes donor beliefs about stewardship and truthful reporting of need. It is persistent and improves when the organization channels resources to program and avoids idle hoarding:

$$R_{t+1} = (1-\lambda) R_t + \lambda \left(\eta_1 \frac{m_t}{m_t + o_t} - \eta_2 c_t \right) + \upsilon_{t+1}, \qquad \lambda \in (0,1),\ \eta_1, \eta_2 > 0, \tag{10}$$

with noise υ_{t+1} capturing media coverage and donor-specific narratives. Through $\theta_u(R_t, G_t)$ and $\theta_r(R_t, G_t)$, reputation feedback influences the productivity of future fundraising, thereby making cash policy dynamically consequential even though the objective contains no direct penalty on cash.

2.1 Optimality conditions

Let $V(s_t)$ denote the value function. The Bellman equation is

$$V(s_t) = \max_{m_t, f_t, \chi_t, b_{t+1}} \left\{ u(m_t) + \beta\, \mathbb{E}\left[V(s_{t+1}) \mid s_t \right] \right\} \quad \text{subject to (2)–(10).}$$

Let λ_t be the multiplier on the cash recursion (9) and let $V_E(s_{t+1})$ be the marginal value of endowment. The first-order condition for m_t equates the marginal utility of mission to the shadow value of a dollar kept in cash plus the reputational return:

$$u'(m_t) = \lambda_t + \beta\, \mathbb{E}\left[V_R(s_{t+1}) \frac{\partial R_{t+1}}{\partial m_t} \right].$$

Fundraising effort is chosen so that the marginal cost equals the discounted marginal value of additional gifts, with unrestricted and restricted channels weighted by their liquidity:

$$\lambda_t \, c_f'(f_t) = \beta \, \mathbb{E}\left[\lambda_{t+1} \frac{\partial U_{t+1}}{\partial f_t} + V_E(s_{t+1}) \frac{\partial Z_{t+1}}{\partial f_t}\right].$$

Intertemporal liquidity is governed by a buffer-stock Euler equation with an endogenous wedge reflecting donor responses to visible reserves. Differentiating V with respect to K_t yields

$$\lambda_t = \beta \, \mathbb{E}\left[\lambda_{t+1}\left(1 - \phi_K \frac{\partial U_{t+1}}{\partial c_t}\frac{1}{A_t}\right)\right] + \beta \, \mathbb{E}\left[V_R(s_{t+1}) \frac{\partial R_{t+1}}{\partial c_t}\frac{1}{A_t}\right] + \beta \, \mathbb{E}\left[V_E(s_{t+1}) \frac{\partial Z_{t+1}}{\partial c_t}\frac{1}{A_t}\right],$$

where $\partial U_{t+1}/\partial c_t = -\theta_u f_t^{\alpha} \phi_K \mathbf{1}\{S_t > 0\}$ by (4), $\partial Z_{t+1}/\partial c_t = \theta_r f_t^{\alpha_r} \psi_K \mathbf{1}\{S_t > 0\}$ by (5), and $\partial R_{t+1}/\partial c_t = -\lambda \eta_2$ by (10). A dollar of additional cash therefore reduces the expected marginal value of cash tomorrow through three channels: donors give fewer unrestricted dollars, donors tilt toward restrictions, and reputation worsens, each scaled by governance via θ_u, θ_r and by visibility through $\mathbf{1}\{S_t > 0\}$. When $I_t = 1$ the debt condition is standard,

$$\lambda_t = \beta(1 + r^{ex}) \, \mathbb{E}[\lambda_{t+1}] \quad \text{if } b_{t+1} \in (0, \bar{B}_t),$$

and an analogous condition holds with r^{tax} when ineligible; since r^{tax} is high, interior solutions for b_{t+1} under $I_t = 0$ rarely obtain.

Appropriations equate the shadow value of unrestricted cash to the marginal value of endowment:

$$\lambda_t = \beta \, \mathbb{E}\big[V_E(s_{t+1})\big] \quad \text{if } \chi_t \in (0, \bar{\chi}(G_t)E_t),$$

with Kuhn–Tucker bounds when the cap (7) binds.

The model relates closely to recent work on dynamic liquidity management under financing frictions. Hartman-Glaser, Mayer and Milbradt (2019) show that when managerial incentives interact with refinancing risk, the optimal cash policy becomes non-linear: insufficient liquidity increases the risk of financial distress, while excessive liquidity weakens incentives. Abel and Panageas (2023) demonstrate that in a financially constrained firm without external funding, the link between volatility and cash can even turn negative when cash flows are highly persistent, because internal accumulation substitutes for precautionary savings. In our setting, governance and donor discipline perform the role of incentive compatibility, determining whether reserves are used or hoarded, while volatility in donations and program revenues, typically short-lived and non-

persistent, creates a precautionary motive that yields a positive relationship between volatility and cash holdings.

2.2 Propositions

Proposition 1 (Funding mix and volatility)**.** *The stationary cash ratio $c^\star$ is increasing in the level and volatility of unrestricted gifts and decreasing in the level and persistence of program-service revenues: $\partial c^\star/\partial U > 0$, $\partial c^\star/\partial \sigma_u > 0$, $\partial c^\star/\partial Y^{ps} < 0$, and $\partial c^\star/\partial \rho_{ps} < 0$. Holding total contributions fixed, a higher restricted share raises transactional cash needs but can reduce $c^\star$ measured as cash plus short-term investments when the payout rate π is high and stable.*

Proposition 1 captures the fundamental liquidity trade-off. Nonprofits finance their operations through two broad revenue sources: discretionary, donor-driven contributions and relatively stable PSR. Donations and contributions are inherently more volatile, more discretionary, and often less contractually guaranteed than PSR. Consequently, the marginal value of internal liquidity is higher when operations depend heavily on these unstable inflows. In equilibrium, organizations with a larger contribution share, or with greater volatility in those inflows, hold higher cash balances to smooth expenditures and preserve mission continuity.

By contrast, organizations that rely primarily on PSR, i.e., revenues tied to service fees, tuition, or health reimbursements, face more predictable cash flows and can safely operate with leaner cash buffers. In such entities, liquidity risk is lower, and idle cash entails a higher opportunity cost in terms of forgone mission spending. The negative sensitivity of cash to PSR share thus reflects lower precautionary demand for liquidity.

The proposition also implies that revenue volatility, irrespective of its source, increases cash holdings because volatility raises the shadow value of internal liquidity in the budget constraint. Restricted contributions, however, differ from unrestricted ones: they augment endowment-like assets but cannot be freely deployed, thereby raising the need for transactional cash to meet short-term obligations. Hence, holding total contributions constant, a higher restricted share can increase the need for cash-on-hand. Conversely, when endowment payout rules are stable, restricted inflows provide a steady liquidity stream, allowing overall cash plus short-term investments to decline.

Proposition 2 (Endowment substitution and governance discipline)**.** *The cash ratio is decreasing in endowment size and in governance quality: $\partial c^\star/\partial E < 0$ and $\partial c^\star/\partial G < 0$. The endowment effect strengthens with $\bar{\chi}(G)$, and the governance effect strengthens with ϕ_K and the responsiveness of fundraising productivity θ_u to G.*

Proposition 2 formalizes two complementary disciplining forces on liquidity: the endowment substitution channel and the governance discipline channel. First, endowments act as an alternative source of internal liquidity. When the stock of restricted or quasi-restricted assets E is large, their rule-based payout πE_t and potential appropriation χ_t provide predictable funding that smooths expenditures even when current revenues fluctuate. This liquidity services the same insurance function that cash would otherwise provide. In equilibrium, a higher E therefore raises the marginal value of endowment resources V_E relative to that of cash λ_t, leading the organization to hold less idle cash. The substitution is stronger when governance permits greater appropriation flexibility, $\bar{\chi}(G_t)$, because boards with better oversight or legal capacity can reclassify a portion of quasi-restricted assets for operational use during stress. Hence, the more flexible the endowment, the smaller the need for transactional reserves.

Second, governance directly disciplines cash holdings through two distinct mechanisms. Stronger governance increases the efficiency of converting effort into donations, $\theta_u(R_t, G_t)$ and $\theta_r(R_t, G_t)$, providing an endogenous liquidity channel through which future fundraising can replace stored cash. At the same time, better oversight makes donor reactions to hoarding more pronounced: when reserves are visibly high, donors and boards impose stronger scrutiny, tightening the effective wedge in the intertemporal Euler condition. Both forces reduce the steady-state shadow value of liquidity and lead to smaller optimal cash buffers. Intuitively, when boards and audits enhance transparency and responsiveness, managers can rely on credible fundraising and oversight instead of idle cash to ensure mission continuity.

Proposition 3 (Debt eligibility reduces target cash)**.** *Crossing the eligibility threshold $I : 0 \to 1$ induces a discrete fall in the target cash ratio and weakens program-spending cuts in response to adverse revenue shocks. The drop is larger in PSR-intensive environments.*

Proposition 3 highlights the role of capital-market access in shaping liquidity policy. When an organization becomes eligible for tax-exempt borrowing (I switches from 0 to 1), it effectively acquires an external substitute for holding cash. Access to debt lowers the shadow price of liquidity because future shortfalls can now be financed at a relatively low cost r^{ex} rather than through costly internal savings. In the optimality condition, this manifests as a lower multiplier λ_t on the liquidity constraint, implying that the marginal utility of an additional dollar of cash declines. Consequently, the organization's target cash ratio $c^\star$ falls discretely at the point of eligibility.

The easing of liquidity constraints also alters the organization's behavior during downturns. Once borrowing becomes feasible, shocks to inflows can be smoothed through credit rather than by cutting program expenditures. The model therefore predicts milder program-spending contractions

among debt-eligible entities. This channel resembles the classical liquidity-insurance mechanism in corporate finance: access to credit substitutes for internal buffers and enhances intertemporal smoothing.

The effect is strongest in PSR-intensive environments. PSR revenues generate pledgeable receivables that enhance borrowing capacity and raise the effective credit limit $\bar{B}_t$. Organizations with stable fee-based income can credibly pledge future cash flows and therefore benefit most from external financing. In contrast, donation-reliant organizations, whose revenues are more discretionary and unpledgeable, extract little advantage from debt access and thus maintain higher internal reserves even when formally eligible.

Proposition 4 (Fundraising as a liquidity instrument)**.** *Following a negative contribution shock, optimal f_t rises. The fundraising yield, defined as incremental unrestricted dollars per unit effort, is increasing in G and R and decreasing in the pre-shock cash ratio when $S_t > 0$.*

Proposition 4 emphasizes that fundraising serves as an active liquidity-management tool in the absence of external capital markets. When a negative contribution shock reduces available resources, the marginal value of liquidity λ_t rises. In response, managers optimally increase fundraising effort f_t to replenish unrestricted cash inflows. The fundraising channel thus plays the same stabilizing role that external financing or dividend cuts would in a traditional corporate setting: it endogenously generates liquidity when balance-sheet slack declines.

The effectiveness of this response depends critically on governance and reputation. Stronger governance G_t enhances oversight, transparency, and professionalization of fundraising operations, which raises the productivity parameter $\theta_u(R_t, G_t)$. Similarly, higher reputation R_t increases donor trust and amplifies the conversion rate between effort and unrestricted gifts. As a result, both governance and reputation increase the fundraising yield, i.e., the amount of unrestricted liquidity raised per unit of effort, and make fundraising a more efficient substitute for cash in restoring financial balance.

In contrast, when reserves are visibly high ($S_t > 0$), donors infer less need and become less responsive to additional fundraising appeals. The term $-\phi_K[S_t]_+$ in the unrestricted-gift equation captures this visibility effect: large idle cash holdings reduce the marginal return to fundraising effort by dampening donor willingness to contribute freely. As a result, cash-rich organizations display muted fundraising responses to shocks, relying instead on existing reserves or curtailing expenditures.

Proposition 5 (Cash-rich paradox under donor triage)**.** *If donors prioritize continuity by channeling relief to visibly needy organizations ($\eta_N > 0$) and discipline hoarding ($\phi_K > 0$), then conditional on a negative shock the expected change in unrestricted giving is strictly decreasing in the pre-shock cash ratio whenever $S_t > 0$. Absent strong governance (low $\bar{\chi}$ and weak θ_u), cash-rich organizations cut m_t more and exit more often.*

Proposition 5 formalizes the "cash-rich paradox," the idea that large reserves do not necessarily translate into resilience when donors allocate resources based on perceived need. When a negative revenue shock hits, donors engage in a form of *triage*: they channel relief funds toward organizations that appear most financially constrained. If donors prioritize continuity and social impact ($\eta_N > 0$), a higher cash ratio c_t reduces the perceived urgency of support. At the same time, if donors also penalize hoarding ($\phi_K > 0$), visible excess liquidity directly discourages additional unrestricted gifts. Consequently, conditional on a shock, the expected change in unrestricted giving declines monotonically with pre-shock cash holdings. Organizations that entered the shock with larger buffers receive less relief precisely because they appear to need it less.

The paradox arises because cash-rich organizations may thus face worse post-shock outcomes. When external aid is allocated by need rather than by merit, high reserves crowd out donor transfers, leaving these organizations to absorb shocks internally. If governance is weak, so that endowment appropriations are tightly constrained (low $\bar{\chi}$) or fundraising productivity is low (weak θ_u), management lacks the flexibility to deploy reserves effectively. In such cases, the liquidity wedge in the intertemporal condition magnifies adjustment: program spending m_t is cut sharply to preserve solvency, and exit risk rises.

By contrast, well-governed organizations can mitigate this effect. Strong boards and transparent financial practices reassure donors that reserves will be used responsibly, attenuating the crowd-out channel. Governance thus determines whether cash functions as insurance or as an inefficient signal of slack. In equilibrium, donor triage and managerial rigidity jointly explain why cash-rich nonprofits may contract or fail more after adverse shocks. This phenomenon is consistent with the empirical finding that high-cash entities experience greater program cuts and higher exit rates unless governance oversight is strong.

Proposition 6 (Within-entity dynamics)**.** *Increases in contribution dependence or in the volatility of revenues and expenses predict subsequent increases in cash for the same entity, whereas increases in the PSR share predict subsequent declines in cash.*

Proposition 6 characterizes the dynamic, within-organization adjustment of cash holdings in response to evolving funding structures and risk exposures. When a given nonprofit becomes

more dependent on contributions, its cash flows become less predictable and more discretionary. Because contributions, particularly donations, are not contractually guaranteed and can fluctuate with donor sentiment, the organization rationally increases its internal liquidity buffer to insure against shortfalls. The same logic applies to increases in revenue or expense volatility: greater uncertainty raises the shadow value of liquidity λ_t and prompts higher cash accumulation, even for the same entity over time. These adjustments represent precautionary saving behavior in the absence of reliable external finance.

By contrast, increases in PSR share signal a shift toward more stable, fee-based income streams. Program service revenues are typically earned contemporaneously with service delivery and reimbursed through contracts, making them closer substitutes for external financing. As the PSR share rises, the marginal insurance value of cash falls, leading to gradual reductions in cash holdings. Additionally, higher program intensity implies that a larger portion of resources must be committed to mission expenditures each period, leaving less managerial discretion for hoarding. In the model, this manifests through lower λ_t and higher reputational returns to spending in the reputation equation, both of which diminish the incentive to retain idle balances.

Proposition 7 (Restriction dynamics and governance)**.** *Persistent periods with $S_t > 0$ increase the probability that future gifts are restricted and reduce the share of unrestricted gifts. The effect is stronger when governance is high, because θ_r is more sensitive to reputation and donor scrutiny.*

Proposition 7 describes how persistent liquidity surpluses alter the composition of future giving through donor behavior and governance-mediated scrutiny. When an organization repeatedly reports reserves above the benchmark level ($S_t > 0$), donors interpret this as a signal of reduced financial need or as evidence of managerial slack. In response, they shift the composition of their support away from flexible, unrestricted dollars and toward earmarked or endowment-like gifts that carry restrictions on use. This shift represents a form of donor discipline: rather than withdrawing entirely, donors continue to give but attach conditions that ensure their funds are directed toward specific programs or long-term purposes.

Mechanically, higher observed cash holdings depress reputation in the reputation-update equation, lowering R_{t+1} and thereby reducing the productivity of future unrestricted fundraising. At the same time, the $[S_t]_+$ term in the restricted-gift equation directly raises the inflow of restricted contributions, tilting the overall mix of new donations. Over time, periods of sustained surplus thus produce a structural reallocation of inflows from unrestricted to restricted channels.

The strength of this reallocation depends on governance. When governance quality G_t is high, donors pay closer attention to financial disclosures and interpret them more accurately. Because

fundraising productivity $\theta_r(R_t, G_t)$ is more sensitive to governance under scrutiny, donor reactions to visible slack are amplified: well-governed organizations face a sharper compositional shift toward restrictions when they accumulate excess cash. Intuitively, strong oversight makes donor behavior more state-contingent, rewarding need and penalizing excess, without necessarily altering total giving.

Proposition 8 (Geographic and sectoral environments)**.** *In environments where the donation technology is deeper or more volatile (high θ_u or high σ_u), the stationary cash ratio is higher; in environments dominated by contractual grants and timely reimbursement, it is lower.*

Proposition 8 links the equilibrium level of liquidity to the structural characteristics of an organization's operating environment, specifically, the depth and volatility of its donation technology relative to its exposure to contractual, reimbursed funding.

In regions or sectors where the donation process is highly developed, reflected in a large θ_u, organizations can mobilize substantial philanthropic inflows but also face greater dependence on discretionary giving. This environment amplifies both the scale and the uncertainty of cash inflows. When the volatility of donations σ_u is high, the value of internal liquidity as self-insurance increases: managers hold larger cash buffers to offset the unpredictability of donor-driven revenues. A deeper donation market therefore supports higher steady-state liquidity ratios, not because fundraising itself is inefficient, but because its underlying uncertainty and discretion heighten the need for precautionary savings.

Conversely, in environments dominated by contractual grants, reimbursements, or service-based revenues, funding is received on a predictable schedule with low idiosyncratic risk. These inflows act as a substitute for holding cash since they function much like working capital credit lines in the for-profit sector. When grants are timely and contracts enforce payment discipline, the marginal insurance value of cash diminishes, and the stationary cash ratio declines.

3 Data and Empirical Design

In this section, we describe the data sources and the empirical framework used to test the model's predictions. We assemble a comprehensive panel of U.S. charitable organizations that allows us to measure liquidity, financing constraints, and governance. We then outline the empirical strategy that links these measures to the model's comparative statics and to organizations' responses to large funding shocks.

3.1 Data Sources and Variable Construction

Our empirical analysis uses the universe of IRS Form 990 filings for charitable organizations exempt under Section 501(c)(3) of the Internal Revenue Code. These forms provide detailed, standardized financial statements for nearly all reporting nonprofits in the United States, including balance sheets, income statements with itemized revenues and expenses, and disclosures on debt, endowment holdings, and board composition. We obtain all electronically filed returns released by the IRS between 2010 and 2023, excluding Form 990-EZ and Form 990-N filers that provide limited financial information. After removing organizations with nonpositive assets or missing revenue data, the final sample includes more than 460,000 unique organizations and approximately 3.5 million organization-year observations.

The data allow us to map the model's theoretical constructs, i.e., internal liquidity, financing capacity, and governance discipline, onto observable measures. Internal liquidity corresponds to the organization's ability to self-insure against shocks when external capital markets are absent. We construct two measures of liquidity. The first, *Cash Ratio (CR)*, is cash divided by total assets and captures immediately deployable funds. The second, *Cash plus Short-Term Investments Ratio (CSTIR)*, equals cash plus short-term investments divided by total assets and reflects broader precautionary reserves available for strategic use.[3] Both measures correspond to the model's notion of retained liquidity serving as a buffer against volatility in contributions and program revenues.

Access to financing is captured through indicators that correspond to the model's external and internal capital substitutes. The variable *Has Tax-Exempt Debt* equals one if an organization reports outstanding tax-exempt debt, identifying entities that can borrow in long-term public markets. *Has Unsecured Loans* equals one if the organization reports a credit line or short-term borrowing facility, reflecting access to private debt markets. *Has Endowment* equals one if the nonprofit reports an endowment fund, which represents an internal pool of quasi-restricted assets that can substitute for cash when governance permits appropriation. Together, these indicators separate organizations that can smooth shocks through either external borrowing or internal asset reallocation from those that must rely on accumulated liquidity.

Revenue composition variables capture the structure of the organization's funding mix and link directly to the model's first proposition, in which reliance on volatile or discretionary revenue sources raises the demand for liquidity. We compute the shares of program service revenues, total contributions, and private donations in total revenue. Program-service revenue includes

[3]Cash+STI Ratio is more directly comparable to the cash ratios typically used in the corporate finance literature, e.g., where Compustat CHE (cash and short-term investments) is scaled by total assets.

earned income from service fees, tuition, and reimbursements. Total contributions encompass all philanthropic inflows, while donations exclude federated campaigns, membership dues, related-organization transfers, and government grants. Expense variables, including program, management, and fundraising expenses scaled by total revenue, describe the functional allocation of spending and reflect how resources are deployed toward mission and administrative activities.

Governance variables capture the degree of oversight and correspond to the model's governance-discipline mechanism. We measure governance through board size (in logs and discrete categories), the presence of an external audit or review, and whether the organization receives government grants, which impose additional oversight and reporting requirements.[4] All ratios are winsorized at the 1st and 99th percentiles and lagged by one year in regressions to mitigate simultaneity concerns.

For the part of our analysis that examines how nonprofits respond to contribution shocks, we focus on large collapses in government funding. Prior research shows that changes in public grants strongly influence private giving and overall fundraising conditions for nonprofits, as donors adjust their contributions when government support rises or falls (Andreoni and Payne, 2003, 2011). These findings imply that sharp reductions in government grants represent meaningful negative shocks to the supply of external funds available to the organization. We identify such shocks as cases in which government grants fall from exceeding a given share of total revenues to less than 1% in the following year. We construct four thresholds at 90%, 75%, 50%, and 25% of revenues, which we refer to as shock intensities. This design allows us to study how the severity of funding losses affects organizational outcomes and how these effects differ across levels of liquidity and governance.

Organizations are classified by mission area using National Center for Charitable Statistics (NCCS) codes, which map to sectors such as health, education, human services, arts, and environmental relief. States are identified using the registered mailing address, and Employer Identification Numbers (EINs) serve as unique identifiers that allow us to track organizations over time.

[4] Although nonprofits report which board members are independent on Form 990, we do not use this information because it is widely regarded as unreliable. The measure is based on self-reported data, definitions vary across organizations, and prior research has found it unsuitable for credible empirical analysis.

3.2 Empirical Design

3.2.1 Baseline analysis

We begin by documenting the relationship between organizational characteristics and internal liquidity using the following specification:

$$\text{CashRatio}_{i,s,d,t} = \alpha_{s,d,t} + \beta' X_{i,t-1} + \varepsilon_{i,s,d,t}, \tag{11}$$

where $\text{CashRatio}_{i,s,d,t}$ (or alternatively $\text{Cash+STI Ratio}_{i,s,d,t}$) denotes the ratio of cash to total assets (or cash plus short-term investments to total assets) for organization i operating in industry s, state d, and year t. The vector $X_{i,t-1}$ includes lagged organizational characteristics capturing the structure of revenues and expenditures. Specifically, it contains the contribution ratio, program-service ratio, donation and grant shares, and the program-service-expense ratio, as well as an indicator for whether the organization maintains an endowment fund, which provides an internal substitute for liquid assets.

To remove systematic differences across sectors, locations, and size groups documented in the summary statistics, the specification includes a full set of State $\times$ Sector $\times$ Size-Decile $\times$ Year fixed effects ($\alpha_{s,d,t}$). This saturated design compares organizations within the same state, sector, and size group in a given year, absorbing time-varying macroeconomic, fiscal, and sectoral shocks. Standard errors are double-clustered by organization and year to account for serial correlation and correlated time shocks.

In subsequent specifications, we further include organization fixed effects (α_i) to remove all time-invariant heterogeneity such as mission type, program mix, or business model. The within-organization specification identifies how changes in revenue composition, cost structure, or endowment status translate into adjustments in liquidity for the same entity over time. The estimated coefficients β capture dynamic correlations consistent with the comparative statics of the model: nonprofits that become more contribution-dependent or more volatile in revenues should increase cash holdings, while those that gain access to endowments or credit markets should reduce them.

Next, we extend the analysis to examine whether liquidity management responds to changes in governance. We augment Equation (11) with time-varying measures of board oversight, audit status, and external monitoring:

$$\text{CashRatio}_{i,s,d,t} = \alpha_i + \alpha_{s,d,t} + \delta' \text{Governance}_{i,t-1} + \beta' X_{i,t-1} + \varepsilon_{i,s,d,t}. \tag{12}$$

The vector Governance$_{i,t-1}$ includes the log of board size, indicators for board-size categories, board independence, whether financial statements are audited or reviewed, and whether the organization receives government grants. This specification isolates the effect of stronger internal or external oversight on liquidity policy, testing the model's prediction that governance disciplines excessive cash accumulation.

3.2.2 Contribution Shocks: Difference-in-Differences

To assess whether cash holdings provide protection or instead reflect excess liquidity during financial stress, we analyze contribution shocks using a difference-in-differences framework. Specifically, we estimate

$$Y_{i,s,t} = \alpha_i + \alpha_{s,t} + \sum_{q=1}^{3} \beta_q \left(\text{After}_{i,t} \times \text{CashMedian}_{i,pre}\right) + \varepsilon_{i,s,t}, \tag{13}$$

where $Y_{i,s,t}$ denotes post-shock outcomes such as exit or program-service spending, After$_{i,t}$ equals one in the three years following the shock, and CashMedian$_{i,pre}$ indicates whether the organization's pre-shock cash ratio was above or below the sample median. We include organization fixed effects (α_i) and sector $\times$ year fixed effects ($\alpha_{s,t}$), which absorb time-varying sectoral shocks and macroeconomic fluctuations that may simultaneously affect funding and performance.

This specification measures how outcomes evolve following a large reduction in government grants and whether the adjustment path differs for organizations with high versus low pre-shock liquidity. The inclusion of sector-year fixed effects allows for flexible time variation across sectors while keeping the model computationally tractable. We also estimate dynamic versions that replace After$_{i,t}$ with event-time indicators ($t = -3, \ldots, +3$) to trace adjustment paths. The difference-in-differences design captures how outcomes evolve around funding shocks by varying degrees of cash holdings; in later specifications, pre-shock cash holdings are also interacted with pre-shock governance. Standard errors are two-way clustered by organization and year.

4 Stylized Facts on Nonprofit Financing and Liquidity

In this section, we document key empirical facts about nonprofit balance sheets and liquidity, and link them to the financing mechanisms highlighted in the model. The evidence shows that liquidity is central to nonprofit financial management, yet its levels and determinants vary systematically with organization size, mission, and funding structure. The regressions that follow focus on these

relationships, distinguishing precautionary from disciplinary motives for holding cash. Statements of more causal interpretation are deferred to Section 5.

4.1 Summary statistics

Table 1 presents descriptive statistics on the scale, composition, and liquidity of the universe of nonprofit organizations between 2010 and 2023. The dataset contains more than 460,000 unique organizations and roughly 3.5 million organization-year observations. All variable definitions are provided in Online Appendix A.

Panel A summarizes the full organization-year sample. Nonprofits hold large liquid buffers on average. Mean cash equals 29.5% of total assets and mean cash plus short-term investments equals 45% of total assets. These means conceal very wide dispersion. The standard deviation of the cash ratio is 35 percentage points, and the 10th to 90th percentile range spans nearly the entire [0,1] interval. Assets and revenues are extremely right-skewed, with median total assets below $1 million but a mean of $23 million, reflecting the coexistence of small community organizations and large hospital systems or universities. Median revenues are $0.5 million, while the mean exceeds $10 million, and the median nonprofit has no paid employees, whereas nearly one in ten employs more than 100.

Access to external finance is very rare. Only 2.4% of organization-year observations report outstanding tax-exempt bonds. About 6.3% report unsecured loans or credit lines. By contrast, roughly 11% report an endowment fund. These figures show that most nonprofits operate with little access to long-term public debt or private credit and that endowments are a relatively rare but important internal liquidity source.

Revenue composition also varies widely. On average, 39% of revenues come from program-service activities and 47% from contributions, with substantial variation across entities. The average program-service-expense ratio is 72%, again with wide dispersion, consistent with differences in operational focus and spending rigidity.

Panels B and C of Table 1 document systematic heterogeneity across mission and scale. In addition, Appendix C provides heterogeneity across geography. Panel B groups organizations by National Center for Charitable Statistics industry codes. Cash ratios vary sharply by mission. Hospital and higher-education institutions operate with low cash ratios, around 11% to 12%, consistent with stable, contract-based revenue streams and with access to endowments and bond markets. At the other extreme, international relief, religion, as well as public and societal benefit organizations hold much higher cash ratios, often in the 30% to 48% range and higher for cash plus

short-term investments. These sectors depend heavily on discretionary giving and on lumpy project funding. Figure 1 illustrates time-series variation is sectoral averages. The cross-sector dispersion aligns with the model prediction that donation dependence and revenue volatility increase the precautionary demand for cash.

Panel C reports cash statistics by 2018 asset deciles and computes 2019 cash for each decile (before the onset of COVID-19). Figure 2 shows time-series variation. The relationship between size and cash is strongly negative. The smallest decile reports an average cash ratio of 71% and a cash plus short-term investments ratio of 81%. The largest decile reports average cash of 4.7% and cash plus short-term investments of 12.7%. This pattern mirrors the corporate-finance regularity that smaller organizations hold more liquid buffers. The size gradient is consistent with precautionary motives and with differential access to alternative liquidity sources such as bond markets and endowment payouts.

Figure 3 displays mean cash ratios by state in 2019. States with deep philanthropic markets, such as California, New York, New Jersey, and the District of Columbia, show mean cash ratios that are eight to ten percentage points above the national median. These geographic differences are economically meaningful and reflect regional variation in funding mix and in working-capital needs.

Nonprofit cash holdings exceed typical corporate benchmarks (see Appendix D). Using a size-matched comparison to Compustat firms, nonprofits hold on average 7.5 percentage points more cash and maintain substantially higher liquidity at the 25th, 50th, and 75th percentiles (for comparison, see Bolton, Chen and Wang, 2024; Denis and Wang, 2024). The difference is persistent over time and is not driven by a small number of very large organizations. This evidence underscores that, in the absence of equity markets and with limited access to debt, cash serves as the central instrument of financial policy for nonprofits.

Overall, two empirical facts stand out. First, cash and short-term investment holdings are large on average and wildly dispersed across organizations. Second, the dispersion is structured by fund-raising technology, organization size, and geography. Smaller organizations and those that are donation-dependent hold substantially more cash. These patterns motivate the empirical strategy that follows. In the regressions we control for sector, state, and size decile fixed effects to isolate within-group variation and to test the model predictions on volatility, endowment substitution, debt eligibility, and governance.

The cross-sector and geographic variation in liquidity documented in Table 1 and Figures 1–3 also aligns with Proposition 8: organizations operating in donation-dependent environments or re-

gions with deeper philanthropic markets hold structurally higher cash buffers as a rational response to greater revenue uncertainty, whereas those embedded in contract-based sectors, such as health care and higher education, maintain leaner liquidity positions.

4.2 Volatility and precautionary liquidity

Part of Proposition 1 predicts that organizations increase liquidity when cash flows become more uncertain. Table 2 tests this prediction by examining whether cash holdings respond to changes in revenue and expense volatility. The dependent variables are the *Cash Ratio* and the *Cash + Short-Term Investments Ratio*. Each specification includes five-year rolling standard deviations of key financial aggregates and controls for organization fixed effects as well as State × Sector × Year fixed effects. This design identifies whether time-series variation in volatility translates into adjustments in liquidity.

The results show that nonprofits increase cash when their revenues become more volatile. A one-standard-deviation increase in overall revenue volatility (about 0.67) is associated with a 1 percentage-point increase in the Cash Ratio, or roughly 3.3% of the mean. Volatility in contributions, donations, and program-service revenues also raises cash by 0.1–0.2 percentage points, while a one-standard-deviation (≈ 1.49) rise in program-expense volatility increases cash by 0.3 percentage points. Similar magnitudes appear when liquidity is measured using cash plus short-term investments. The estimates support Proposition 1: when revenues or expenses are more uncertain, nonprofits accumulate liquidity to self-insure against funding shocks rather than because of managerial slack.

This mechanism captures the model's fundamental liquidity trade-off. Organizations accumulate cash when revenues are uncertain, unpledgeable, or discretionary and economize on it when revenues are predictable or contractually reimbursed. In equilibrium, donation-heavy or volatile nonprofits hold larger buffers, while PSR-intensive or grant-dependent entities operate with leaner cash.

4.3 Access to finance and revenue model

To further test the ideas put forward in Proposition 1 and to examine the substitution channels described in Propositions 2 and 3, we regress cash holdings on measures of access to finance and revenue composition. The following section extends this analysis to dynamic adjustments in cash holdings to test Proposition 6.

4.3.1 Statics

Table 3 investigates how liquidity varies with financial access and revenue structure while controlling for the rich heterogeneity in nonprofit characteristics documented in Table 1. Each regression includes a saturated set of State × Sector × Size-percentile × Year fixed effects, where size percentiles are based on beginning-of-year assets. The key explanatory variables capture how organizations finance their operations, i.e., through contributions, donations, or program-service revenues, and whether they have access to long-term or short-term borrowing or endowment funding. All covariates are lagged one year.

Access to finance. To test whether endowments and debt eligibility substitute for internal liquidity (Propositions 2 and 3), we examine whether the presence of an endowment, tax-exempt bonds, or unsecured loans is associated with lower cash holdings. The results show that access to financing is strongly correlated with lower liquidity. Organizations with tax-exempt bonds hold 1.2 percentage points less cash and 3.3 percentage points less cash plus short-term investments than comparable nonprofits. The reductions for organizations with unsecured loans and endowments are 2.8 (8.6) percentage points and 4.7 (7.6) percentage points, respectively. These patterns are consistent with the idea that external or quasi-internal financing substitutes for precautionary cash, reducing the need to self-insure, a mechanism also observed among for-profit firms.

These patterns reflect two distinct model channels. First, the endowment-substitution mechanism (Proposition 2) implies that large, accessible endowments provide liquidity services equivalent to cash, especially when governance permits appropriation. Second, the debt-eligibility margin (Proposition 3) shifts organizations from a regime of self-insurance to one of market-based liquidity smoothing. The discrete drop in target cash observed for bond-eligible entities is consistent with a fall in the marginal value of internal liquidity once external credit becomes a credible substitute.

Revenue model. Cross-sectional evidence shows a strong and economically meaningful link between revenue composition and cash holdings. Nonprofits that depend more on contributions hold significantly more cash. A one-standard-deviation increase in the contribution share (about 41 percentage points) is associated with a 3-percentage-point higher cash ratio, or about 10% of the mean. This relationship is almost entirely driven by donations, which account for most contributions and are inherently discretionary. A one-standard-deviation rise in donations (approximately 0.36) increases cash holdings by 2.9 percentage points, nearly matching the total effect of contributions. These findings align with Proposition 1, which predicts higher liquidity when revenue sources are more uncertain or unpledgeable.

In contrast, nonprofits that rely more on program-service revenues hold less cash. The coefficient of -0.013 implies that a one-standard-deviation increase in the program-service share (41%) reduces the cash ratio by roughly 0.5 percentage points. Program-based income streams are more stable and contractually predictable, lowering the precautionary demand for liquidity. For the broader liquidity measure (cash plus short-term investments), the coefficient is positive, suggesting that organizations with reliable revenue streams may invest excess working capital in short-term instruments rather than holding idle cash.

Overall, the patterns in Table 3 provide strong cross-sectional evidence consistent with Propositions 1–3. Nonprofits reliant on discretionary, donor-driven revenues maintain higher liquidity buffers, while those with more stable or contractual revenues economize on cash. Access to endowments, credit lines, and tax-exempt bonds substitutes for cash and alleviates the need for self-insurance. The results support a precautionary-savings motive in which nonprofits hold cash primarily to buffer against funding risk rather than as a by-product of inefficiency.

4.3.2 Within-Organization Adjustments

Table 4 extends the analysis by including organization fixed effects to absorb persistent heterogeneity across entities. This approach examines whether changes in access to finance and funding composition are associated with within-organization adjustments in cash holdings, as predicted by Proposition 6. These regressions are descriptive and not intended to identify causal effects but rather to illustrate the dynamic sensitivity of liquidity policy to evolving financial conditions.

Organizations that establish tax-exempt bond financing or an endowment reduce cash holdings by 0.8 and 1.5 percentage points, respectively. The corresponding declines in the broader cash plus short-term investment measure are 1.2 and 2.1 percentage points. A one-standard-deviation increase in contribution dependence raises the cash ratio by 0.4 percentage points, primarily through changes in donations, while a similar increase in program-service revenues reduces cash holdings by 0.3 percentage points. Although modest in annual magnitude, these within-entity changes are economically important given the persistence of nonprofits' funding structures.

Taken together, the results in Table 4 reinforce the conclusions from the cross-sectional analysis. Liquidity adjustments occur both across and within organizations in predictable ways: nonprofits respond to shifts in their financing environment and revenue mix by altering cash buffers, consistent with dynamic precautionary-savings behavior.

The within-organization dynamics mirror the model's prediction that liquidity evolves endogenously as funding composition and volatility change (Proposition 6). Nonprofits self-adjust their

cash policies: they build reserves when revenue sources become more volatile or discretionary and draw them down as operations stabilize or become more program-intensive. This reinforces the interpretation of cash as an evolving buffer against financial risk rather than a static stock of idle assets.

4.4 Governance and liquidity discipline

We next test the prediction that governance quality disciplines liquidity accumulation (Proposition 2). Table 5 augments the within-organization specification presented in Table 4 by introducing time-varying governance characteristics.

The results show that stronger governance is associated with smaller cash buffers. Increases in board size are negatively related to both the Cash Ratio (Column 1) and the Cash + Short-Term Investments Ratio (Column 5). The indicator variables for different board-size categories confirm that this relationship is monotonic. Relative to boards with nine to ten members, organizations with boards of eleven to fourteen members hold about 0.4 percentage points less cash, whereas those with smaller boards hold more. These patterns suggest that larger, more representative boards impose stronger oversight and limit excess liquidity accumulation.

External monitoring has similar effects. When an organization becomes subject to an audit or review, it holds 1.1 percentage points less cash, consistent with tighter financial scrutiny constraining idle reserves. Nonprofits that receive government grants also hold less cash (declines of roughly 0.2–0.3 percentage points), although these estimates are not statistically significant.

All of these results hold after controlling for revenue composition and the three financing-access variables: endowments, unsecured loans, and tax-exempt debt, shown to be significant in Table 4. Taken together, the evidence supports Proposition 2: governance and external oversight substitute for shareholder monitoring in for-profit firms, acting as a disciplining force that keeps cash holdings close to efficient levels.

These findings correspond closely to the model's governance-discipline mechanism. Governance and endowment structure jointly substitute for liquidity in the absence of capital markets (Proposition 2). At the same time, persistent accumulation of idle reserves activates a donor-discipline channel (Proposition 7): as organizations accumulate visible slack, donors increasingly impose restrictions or earmarks that convert liquidity into constrained, mission-directed capital. Strong governance amplifies this channel by enhancing donor monitoring and credibility, thereby preventing excess liquidity from persisting unchecked.

4.5 Interpretation

Taken together, the evidence indicates that nonprofit cash holdings are broadly consistent with precautionary motives. In line with Propositions 1–3, organizations facing limited access to debt markets, no access to equity finance, volatile cash flows, and less pledgeable revenue sources hold more cash as self-insurance. Governance, by contrast, is associated with smaller and more disciplined cash buffers, consistent with the role of oversight in constraining idle liquidity.

We also find evidence consistent with dynamic adjustment to changes in volatility, revenue composition, and governance quality, as described in Proposition 6. Liquidity policies respond predictably to evolving financial conditions, even in the absence of shareholder discipline or market-based payout pressures.

Overall, the results suggest that nonprofit liquidity management parallels the precautionary-saving behavior of financially constrained firms but operates in an environment without equity markets, external monitoring, or distribution requirements. Well-governed organizations hold cash primarily for insurance against funding shocks, while weakly governed entities may allow cash balances to accumulate inefficiently, reflecting managerial inertia or agency frictions rather than deliberate precaution.

5 Identification from Government Contribution Shocks

To assess whether nonprofit cash holdings causally buffer organizations against adverse funding shocks, we exploit large, plausibly exogenous collapses in government grants as a quasi-natural experiment. Because such grants are typically determined by budget cycles and policy changes outside the control of individual organizations, they provide a clean setting to study how pre-shock liquidity affects resilience.

If cash serves a precautionary function, liquid reserves should allow managers to smooth expenditures and sustain mission-critical activities when revenues contract. Conversely, if cash reflects inefficient accumulation, weak governance, or low perceived need for external assistance, high pre-shock liquidity may fail to cushion shocks or may even amplify distress. This latter outcome corresponds to the "cash-rich paradox" predicted by Proposition 5, in which donor triage and reputational frictions limit the insurance value of reserves.

We estimate staggered difference-in-differences regressions that compare organizational outcomes before and after sharp grant collapses across nonprofits with high versus low pre-shock cash holdings. Government grant shocks are defined at several intensity thresholds. The most severe

occurs when government grants exceed 90% of total revenues and subsequently fall below 1%; alternative thresholds use 75%, 50%, and 25% cutoffs. To ensure the shocks capture genuine funding losses rather than changes in revenue composition, we exclude cases in which grant declines are offset by increases in other contribution sources. All regressions include organization fixed effects and sector × year fixed effects to absorb unobserved heterogeneity, with standard errors clustered at the organization level. The identifying assumption is that, absent the shock, high- and low-cash nonprofits would have followed parallel trends within the same sector-year. We then extend the analysis to test whether governance moderates these effects.

5.1 Baseline Results

Table 6 presents the baseline results for organizational outcomes (*Exit*, *Program-Service Expenses*, and *Employment*) following contribution shocks. The results run counter to a purely precautionary interpretation of cash holdings, under which liquidity cushions adverse shocks. Across all definitions of shock intensity, organizations with higher ex ante cash ratios are more likely to exit in the three years after a grant collapse (Panel A, Columns 1–4). The magnitudes are economically large. High-cash nonprofits experience exit rates 1.5–9.5 percentage points above the unconditional baseline rate of 2.8%, corresponding to an increase of roughly 150% for moderate shocks (25% intensity) and 300% for the most severe (90% intensity) shocks. Low-cash organizations also exit more frequently after shocks, but the increase (1.4–3.2 percentage points) is smaller and less statistically pronounced. The results are robust when using the *Cash + Short-Term Investments Ratio* to classify high- and low-cash organizations (Columns 5–8).

Program-service expenditures exhibit similar patterns. Cash-rich organizations reduce program spending by 19.8% (for 25% intensity shocks) to 36.1% (for 90% intensity shocks), compared with smaller declines of 9.3–18.2% for low-cash organizations. These differences also hold when liquidity is measured by the broader *Cash + Short-Term Investments Ratio*. Employment falls for both groups after grant collapses, but the contraction is significantly larger for high-cash organizations. Although these magnitudes appear large, they correspond to cases in which nonprofits lose roughly nine out of ten revenue dollars.

Several mechanisms could explain these patterns. First, donors may reallocate support toward visibly distressed, cash-poor organizations, leaving cash-rich entities with less external relief, consistent with the cash-rich paradox of Proposition 5. Second, weak oversight may lead managers to retrench rather than deploy reserves strategically, indicating liquidity hoarding rather than use. Third, organizations that anticipate volatility may accumulate cash precisely because their revenues

are fragile, in which case higher exits reflect underlying risk rather than inefficient reserve management. However, if this last mechanism dominated, surviving high-cash organizations would display smaller spending and employment cuts, which we do not observe.

These findings are consistent with the "cash-rich paradox" described in Proposition 5. When donors allocate relief according to perceived need and penalize visible reserves, the insurance value of cash weakens. High-cash organizations thus experience deeper contractions not because cash is unproductive, but because reputational and donor-allocation frictions crowd out external support. Weak governance further limits the ability to deploy reserves, transforming liquidity from protection into a source of rigidity.

5.2 Governance Around Contribution Shocks

Table 7 examines whether internal governance moderates these dynamics by interacting pre-shock cash holdings with board-size measures. Governance materially affects how organizations adjust to funding shocks. Larger boards slightly reduce the effect of grant collapses on exit and employment and substantially mitigate cuts to program-service spending among high-cash organizations.

For exit, the *Strong Governance* interaction terms are negative and statistically significant for lower-intensity shocks; for higher-intensity shocks, the signs remain consistent though statistical power declines. For program-service expenditures, the *High Cash* × *Strong Governance* interactions are positive and highly significant across all specifications, with stronger governance reducing the spending contraction by roughly half. Governance also dampens the employment declines observed after shocks.

Overall, governance does not eliminate the cash-rich paradox but significantly moderates it. Larger boards reduce the probability of exit and attenuate program-spending cuts, indicating that governance influences not only how much liquidity nonprofits hold (Table 5) but also how effectively they deploy it during financial distress. These findings reinforce the broader conclusion that precautionary and excess-cash motives coexist in nonprofit liquidity management. Nonprofits accumulate cash in anticipation of uncertainty and limited external finance, consistent with precautionary saving, yet ex post behavior reveals that reserves are not always deployed efficiently in crisis. Strong governance helps convert liquidity from idle insurance into active resilience.

In model terms, governance enhances the effectiveness of fundraising and liquidity deployment following shocks (Proposition 4). Fundraising effort functions as the nonprofit analogue of short-term financing capacity: when liquidity tightens, effort rises, and the yield of that effort is higher in well-governed, high-reputation organizations. Strong governance therefore plays a dual role: it

disciplines cash accumulation ex ante and improves liquidity utilization ex post, aligning observed adjustments with the theory's predictions.

6 Conclusion

This paper develops a theory of nonprofit finance and tests its implications using a new, comprehensive panel of IRS Form 990 filings. The theory highlights three mechanisms that replace equity markets in shaping nonprofit financial policy. First, internal liquidity serves as the primary insurance device when external finance is limited. Second, endowments and eligibility for tax-exempt debt act as substitutes for cash. Third, governance and donor responses discipline how reserves are accumulated and used. The empirical evidence delivers a consistent picture. Nonprofits raise cash in response to revenue uncertainty, endowments and debt eligibility reduce cash holdings, and stronger governance correlates with smaller and more effective reserves. At the same time, large pre-shock cash balances can fail to insure organizations in practice. When major government grants collapse, cash-rich organizations reduce program spending and exit at higher rates unless governance is strong enough to ensure reserves are deployed.

These findings contribute to corporate finance literatures. They extend dynamic models of precautionary liquidity to an environment with near-zero equity supply and eligibility-based borrowing. They show that ideas developed for corporate finance about the marginal value of cash and substitution between internal and external finance apply in a qualitatively different institutional setting. They also place donor behavior at the center of the financing margin. Donors allocate relief by perceived need and fit donor reactions into a model of supply-side discipline. That mechanism generates a cash-rich paradox that empirical tests confirm. The result is a unified account of how liquidity, governance, and donor allocation jointly determine organizational resilience.

The results also carry practical implications for donors, regulators, and nonprofit managers. Donors and grantmakers should recognize that visible reserves change incentives. When donors allocate aid primarily on the basis of visible need, they may unintentionally penalize well-capitalized but poorly governed organizations. Grant design that conditions support on governance and on credible plans to use reserves can help ensure that liquidity serves its insurance role. Regulators and standard setters should consider harmonizing reporting on board composition, endowment flexibility, and the liquidity classification of assets. Better and more standardized disclosures would improve donor decision making and reduce the measurement problems that complicate empirical analysis.

For nonprofit managers and boards the evidence stresses the dual role of reserves. Reserves are valuable as insurance, but only when governance translates reserves into mission continuity. Boards should therefore adopt clear appropriation policies, publish contingency plans for reserve use, and strengthen fundraising transparency. Those actions preserve the insurance value of liquidity while reducing the risk that reserves become a signal of slack.

From a methodological standpoint, the nonprofit setting offers rich administrative data that enable large-scale analysis of liquidity and financing behavior. The tax filings provide detailed balance sheets, income statements, and governance disclosures for the entire sector, enabling tests of dynamic comparative statics at a scale rarely possible elsewhere. At the same time, measurement and identification challenges remain. Board independence is poorly measured in public filings, and while our staggered difference-in-differences design exploits plausibly exogenous grant collapses, selection into grant exposure and compositional responses to shocks require careful interpretation. Future work could leverage more granular grant-level data, donor-level gifts, or matched administrative records to strengthen causal inference.

Taken together, liquidity, governance, and donor allocation together form the effective capital supply for nonprofit organizations. In the absence of equity markets and with limited debt access, these mechanisms determine whether reserves protect mission continuity or instead become a source of fragility. Understanding this balance matters for researchers and for practitioners who design funding strategies and oversight institutions. The results in this paper provide a first step toward that understanding and point to concrete reforms that could improve resilience across the sector.

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Table 1: Summary Statistics

Panel A reports overall summary statistics for all charitable organizations in the sample over the 2010–2023 period. Panel B presents summary statistics for key variables by NCCS sector. Panel C reports summary statistics for 2019 by asset deciles constructed using 2018 asset values. All variables are defined in Appendix B.

Panel A: Full Sample

Variable	Number of Organizations	Number of Observations	Mean	SD	P10	P25	P50	P75	P90
Revenues $000s	460,772	3,486,232	10,557.25	178,369.30	71.61	200.15	486.23	1,853.05	8,460.60
Assets $000s	461,254	3,502,375	23,244.49	432,541.80	60.80	227.24	797.46	3,304.44	15,614.43
Number of Employees	461,254	3,502,375	81.49	1,764.07	0.00	0.00	3.00	19.00	94.00
Cash Ratio	453,379	3,438,098	29.48%	34.96%	0%	1.53%	12.17%	50.07%	98.27%
Cash+STI Ratio	453,348	3,436,796	45.03%	37.28%	2.39%	9.60%	34.55%	85.82%	100%
Has Tax-Exempt Debt	461,254	3,502,375	2.44%	15.43%	0%	0%	0%	0%	0%
Has Unsecured Loans	461,254	3,502,375	6.31%	24.32%	0%	0%	0%	0%	0%
Has Endowment	461,254	3,502,375	11.10%	31.41%	0%	0%	0%	0%	100%
Program service revenue ratio	457,004	3,456,033	38.88%	40.87%	0%	0%	20.31%	85.67%	99.07%
Contribution ratio	457,028	3,457,337	46.77%	40.95%	0%	1.27%	43.05%	92.62%	99.99%
Government grants ratio	457,028	3,457,230	10.91%	24.87%	0%	0%	0%	2.77%	50.70%
Donation ratio	457,025	3,457,015	27.54%	35.84%	0%	0%	5.76%	52.66%	95.05%
Program service expense ratio	457,028	3,457,337	71.93%	53.72%	0%	45.06%	76.30%	92.55%	108.96%
Fundraising ratio	457,028	3,457,337	1.99%	4.85%	0%	0%	0%	1.12%	6.93%
Management expense-to-revenue	457,028	3,457,337	13.65%	19.75%	0%	0.36%	7.94%	17.29%	32.20%
Wages-to-revenue	457,013	3,456,826	29.50%	28.07%	0%	0%	25.72%	51.97%	68.99%
Travel expenses-to-revenue	457,022	3,456,234	1.08%	2.70%	0%	0%	0%	0.83%	3.01%
Number of board members	461,254	3,502,375	12.43	16.75	3	5	9	14	21
Board independence	453,263	3,450,013	84.95%	31.93%	0%	91.67%	100%	100%	100%
Audited financial statements	461,254	3,502,375	54.25%	49.82%	0%	0%	100%	100%	100%
Receives government grants	461,254	3,502,375	28.75%	45.26%	0%	0%	0%	100%	100%
Nonprofit exit	426,467	2,780,239	2.68%	16.14%	0%	0%	0%	0%	0%

Table 1 Continued: Summary Statistics

Panel B: Sector Breakdown

Sector	Number of Orgs	Number of Obs	Assets $000s	Revenue $000s	Number of Employees	Cash Ratio	Cash+STI Ratio
Arts	29,872	249,478	8,378.26	2,409.61	31.39	28.46%	42.34%
Higher Education	2,372	26,091	468,611.30	144,024.40	1,473.36	11.77%	19.67%
Education	49,627	415,465	15,245.35	4,566.37	45.75	30.69%	46.98%
Hospitals	4,854	51,149	371,823.90	245,395.30	1,556.46	11.22%	21.57%
Environment	16,153	130,186	6,145.98	2,401.94	23.38	30.83%	48.43%
Health	40,404	361,457	20,881.19	17,828.47	95.28	26.24%	42.04%
Human Services	132,709	1,163,764	5,938.71	3,575.29	63.34	27.01%	42.22%
International	7,501	56,363	14,866.75	9,997.06	24.36	47.65%	63.89%
Mutual Benefit	13,257	104,409	52,865.80	19,728.98	22.82	15.59%	33.83%
Public & Societal Benefit	72,234	607,200	29,835.91	5,874.69	27.05	29.69%	47.96%
Religion	20,069	142,039	3,618.87	1,622.35	34.25	36.58%	47.85%
Uncategorized	79,827	194,774	7,674.73	4,123.25	21.96	52.38%	63.79%

Panel C: Size Breakdown (2019)

Size Decile	Assets $000s	Revenue $000s	#Employees	Cash Ratio	Cash+STI Ratio
Smallest	75.75	457.8	16.97	71.43%	80.69%
Decile 2	150.46	387.26	7.17	55.82%	72.61%
Decile 3	285.6	504.26	8.12	42.52%	63.46%
Decile 4	472.9	617.96	16.52	31.41%	52.25%
Decile 5	735.25	828.82	10.84	22.50%	41.63%
Decile 6	1,172.43	1028.8	16.66	18.05%	35.13%
Decile 7	1,942.41	1,700.85	24.72	14.69%	29.79%
Decile 8	3,807.81	3,059.62	52.05	11.52%	24.38%
Decile 9	9,485.38	7,079.83	93.24	8.66%	19.47%
Largest	231,543.50	98,147.30	580.73	4.66%	12.70%

Table 2: Volatility and Internal Liquidity.

This table tests the model's prediction that greater revenue and expense volatility increases nonprofits' demand for internal liquidity. The dependent variable is either *Cash/Assets*, abbreviated as *CR*, or *(Cash + Short-Term Investments)/Assets*, abbreviated as *CSTIR*. Each column introduces one measure of volatility, defined as the standard deviation of the indicated variable over the prior five years: *Program Expense Growth*, *Revenue Growth*, *Contribution Growth*, *Donation Growth*, and *Program Service Growth*. All right-hand-side variables are lagged one year. Regressions are estimated at the organization–year level with organization fixed effects and State × Sector × Year fixed effects. Standard errors are clustered by EIN and year. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) CR	(2) CSTIR	(3) CR	(4) CSTIR	(5) CR	(6) CSTIR	(7) CR	(8) CSTIR	(9) CR	(10) CSTIR
SD Program Expense Growth	0.197***	0.147***								
	(10.34)	(7.45)								
SD Revenue Growth			1.445***	1.679***						
			(12.75)	(14.83)						
SD Contribution Growth					0.107***	0.084***				
					(7.40)	(5.39)				
SD Donation Growth							0.074***	0.020*		
							(6.98)	(1.77)		
SD Program Service Growth									0.114***	0.088***
									(8.43)	(7.28)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,935,409	1,934,620	1,935,409	1,934,620	1,935,397	1,934,608	1,935,117	1,934,328	1,935,409	1,934,620
Adjusted R^2	0.827	0.866	0.827	0.866	0.827	0.866	0.827	0.866	0.827	0.866

Table 3: Liquidity, Capital Market Access, and Funding Mix

This table reports organization-year associations between liquidity measures and lagged characteristics related to access to finance and revenue composition. The dependent variable is either *Cash/Assets* (Columns (1)–(4)) or *(Cash + Short-Term Investments)/Assets* (Columns (5)–(8)). *Has Tax-Exempt Debt* and *Has Unsecured Loans* indicate access to external borrowing. *Has Endowment* captures the availability of alternative internal liquidity. *Total Contributions/Revenue* measures the overall share of contributions in total revenue, while *Donations/Revenue* isolates private giving by excluding federated campaigns, membership dues, related-organization transfers, and government grants. *Program Service Revenue (PSR)/Revenue* measures the share of earned income. All right-hand-side variables are lagged one year. Regressions are estimated at the organization-year level and include State × Sector × Revenue-Percentile × Year fixed effects. Standard errors are two-way clustered by organization (EIN) and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Cash / Assets				**(Cash + STI) / Assets**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Has Tax-Exempt Debt	-0.012***	-0.003**	-0.003**	-0.009***	-0.033***	-0.024***	-0.025***	-0.035***
	(-7.63)	(-2.32)	(-2.77)	(-6.59)	(-17.65)	(-14.63)	(-14.82)	(-19.73)
Has Unsecured Loans	-0.028**	-0.030**	-0.028**	-0.028**	-0.086***	-0.089***	-0.087***	-0.087***
	(-2.62)	(-3.04)	(-2.71)	(-2.64)	(-4.54)	(-4.86)	(-4.65)	(-4.58)
Has Endowment	-0.047***	-0.059***	-0.062***	-0.050***	-0.076***	-0.087***	-0.090***	-0.075***
	(-16.01)	(-17.06)	(-18.08)	(-16.09)	(-19.30)	(-20.20)	(-21.15)	(-18.09)
(Total Contributions)/Revenue		0.072***				0.068***		
		(13.58)				(11.76)		
Donations/Revenue			0.083***				0.078***	
			(16.08)				(14.75)	
PSR/Revenue				-0.013***				0.010***
				(-8.89)				(6.84)
State-Sector-Size-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,613,976	2,588,615	2,588,368	2,587,553	2,612,930	2,587,576	2,587,329	2,586,516
Adjusted R^2	0.392	0.398	0.397	0.391	0.384	0.39	0.389	0.385

Table 4: Within-Organization Variation in Internal Liquidity

This table reports regressions of liquidity on lagged characteristics related to access to finance and revenue composition, estimated with organization fixed effects. The dependent variables are the *Cash Ratio* (Columns (1)–(4)) and the *Cash + Short-Term Investments Ratio* (Columns (5)–(8)). Independent variables are the same as in Table 3. Variable definitions are provided in Appendix B. All specifications include organization fixed effects as well as State × Industry × Size-Percentile × Year fixed effects. Standard errors are two-way clustered by organization (EIN) and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Cash / Assets				**(Cash + STI) / Assets**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Has Tax-Exempt Debt	-0.008***	-0.008***	-0.008***	-0.008***	-0.012***	-0.011***	-0.011***	-0.011***
	(-6.73)	(-6.61)	(-6.62)	(-6.47)	(-6.38)	(-6.28)	(-6.29)	(-6.12)
Has Unsecured Loans	-0.003	-0.003	-0.003	-0.003	-0.009	-0.009	-0.009	-0.009
	(-0.89)	(-0.96)	(-0.88)	(-0.97)	(-1.47)	(-1.54)	(-1.47)	(-1.55)
Has Endowment	-0.015***	-0.015***	-0.015***	-0.015***	-0.021***	-0.021***	-0.021***	-0.021***
	(-10.10)	(-10.05)	(-10.02)	(-10.06)	(-10.42)	(-10.41)	(-10.40)	(-10.43)
(Total Contributions)/Revenue		0.015***				0.018***		
		(7.08)				(7.06)		
Donations/Revenue			0.018***				0.023***	
			(10.32)				(13.48)	
PSR/Revenue				-0.019***				-0.026***
				(-8.30)				(-9.04)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Sector-Size-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,568,091	2,542,141	2,541,889	2,541,052	2,567,027	2,541,089	2,540,837	2,540,002
Adjusted R^2	0.814	0.814	0.814	0.814	0.852	0.853	0.853	0.853

Table 5: Governance and Internal Liquidity

This table reports organization-year associations between liquidity measures and governance characteristics. The dependent variables are the *Cash Ratio* (Columns (1)–(4)) and the *Cash + Short-Term Investments Ratio* (Columns (5)–(8)). The specification extends Table 4, Column (2), by adding controls for the natural logarithm of board size, indicator variables for board-size categories, and indicators for whether an organization's financial statements are *Audited or Reviewed* and whether it received a *Government Grant*. All regressions include organization fixed effects and State × Sector × Revenue-Percentile × Year fixed effects. All variables are defined in Online Appendix B. Standard errors are two-way clustered by organization (EIN) and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Cash / Assets				**(Cash + STI) / Assets**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Board Size)	-0.009***				-0.006***			
	(-9.37)				(-7.60)			
D[1;4] Board Members		0.013***		0.012***		0.009***		0.008***
		(8.88)		(8.73)		(6.76)		(6.58)
D[5;6] Board Members		0.006***		0.006***		0.004***		0.004***
		(6.20)		(6.03)		(3.59)		(3.43)
D[7;8] Board Members		0.003***		0.003***		0.002**		0.002**
		(4.83)		(4.71)		(2.61)		(2.50)
D[11;14] Board Members		-0.004***		-0.004***		-0.003***		-0.003***
		(-5.62)		(-5.56)		(-4.12)		(-4.07)
D[15;∞) Board Members		-0.007***		-0.007***		-0.005***		-0.005***
		(-7.76)		(-7.67)		(-5.76)		(-5.67)
Audited or Reviewed			-0.011***	-0.010***			-0.010***	-0.009***
			(-11.28)	(-11.26)			(-8.54)	(-8.55)
Has Gov Grant			-0.002	-0.002			-0.001	-0.001
			(-1.54)	(-1.46)			(-0.73)	(-0.68)
Has Tax-Exempt Debt	-0.008***	-0.008***	-0.008***	-0.008***	-0.012***	-0.012***	-0.012***	-0.012***
	(-6.57)	(-6.58)	(-6.67)	(-6.52)	(-6.40)	(-6.40)	(-6.45)	(-6.39)
Has Unsecured Loans	-0.003	-0.003	-0.003	-0.003	-0.009	-0.009	-0.009	-0.009
	(-0.88)	(-0.88)	(-0.89)	(-0.89)	(-1.45)	(-1.45)	(-1.45)	(-1.45)
Has Endowment	-0.015***	-0.015***	-0.015***	-0.014***	-0.020***	-0.020***	-0.020***	-0.020***
	(-10.07)	(-10.06)	(-9.98)	(-9.94)	(-10.30)	(-10.30)	(-10.34)	(-10.32)
Contribution Ratio	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(5.93)	(5.95)	(6.61)	(6.62)	(3.95)	(3.95)	(4.34)	(4.34)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Sector-Size-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,544,579	2,544,579	2,544,579	2,544,579	2,543,522	2,543,522	2,543,522	2,543,522
Adjusted R^2	0.823	0.823	0.823	0.823	0.860	0.860	0.860	0.860

Table 6: Effects of Government-Grant Collapses on Exit, Program Spending, and Employment

This table reports results from difference-in-differences regressions on Exit (Panel A), log program-service expenses (Panel B), and log number of employees (Panel C) around large government-grant shocks. Shocks are defined as cases in which government grants fall from more than 90% (Columns (1) and (5)), 75% (Columns (2) and (6)), 50% (Columns (3) and (7)), or 25% (Columns (4) and (8)) of total revenues to less than 1% in the following year. The coefficients of interest correspond to indicator variables for years 1, 2, and 3 after the shock for organizations with below-median cash (*Low Cash*) and above-median cash (*High Cash*) prior to the shock. Cash is measured using the Cash Ratio (Columns (1)–(4)) and the Cash plus Short-Term Investments Ratio (Columns (5)–(8)). *p-Value Low = High* reports a test of equality between the *Low Cash* and *High Cash* coefficients. All regressions include organization fixed effects and Sector × Year × Revenue-Percentile fixed effects, where revenue percentiles are defined by sector in the year prior to the shock. All variables are defined in Appendix B. Standard errors are clustered by organization (EIN) and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Exit

	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	0.025*	0.032***	0.026***	0.014***	0.028*	0.031***	0.023***	0.014***
	(2.03)	(4.33)	(4.74)	(4.02)	(2.18)	(5.90)	(5.09)	(4.55)
High Cash	0.123***	0.082***	0.071***	0.043***	0.120***	0.085***	0.078***	0.044***
	(3.46)	(3.63)	(6.94)	(8.64)	(3.72)	(4.97)	(8.00)	(8.75)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001
Adjusted R^2	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154
p-Value Low = High	0.031	0.091	0.007	0.001	0.030	0.013	0.001	0.000

Table 6 Continued: Organizational Outcomes Around Government Grant Shocks

Panel B: Program Service Expenses

	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	-0.116	-0.182**	-0.142***	-0.093**	-0.084	-0.147**	-0.113**	-0.074**
	(-1.55)	(-2.95)	(-3.67)	(-2.95)	(-1.20)	(-2.44)	(-2.94)	(-2.63)
High Cash	-0.361***	-0.320***	-0.276***	-0.198***	-0.419***	-0.378***	-0.322***	-0.229***
	(-4.45)	(-5.11)	(-6.18)	(-6.57)	(-4.10)	(-4.80)	(-5.96)	(-6.16)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,751,666	2,751,934	2,752,792	2,754,583	2,751,666	2,751,934	2,752,792	2,754,583
Adjusted R^2	0.862	0.862	0.862	0.862	0.862	0.862	0.862	0.862
p-Value Low = High	0.019	0.103	0.025	0.026	0.012	0.036	0.008	0.005

Panel C: Employment

	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	-0.234**	-0.213***	-0.180***	-0.119***	-0.254**	-0.210***	-0.166***	-0.113***
	(-2.63)	(-3.93)	(-5.45)	(-6.15)	(-2.90)	(-4.40)	(-5.47)	(-5.86)
High Cash	-0.559***	-0.401***	-0.324***	-0.190***	-0.530***	-0.405***	-0.356***	-0.207***
	(-4.24)	(-5.30)	(-5.97)	(-6.33)	(-4.40)	(-5.06)	(-6.05)	(-6.61)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840
Adjusted R^2	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
p-Value Low = High	0.046	0.041	0.011	0.010	0.051	0.020	0.003	0.002

Table 7: The Role of Governance Around Government Grant Shocks

This table reports results from difference-in-differences regressions on Exit (Panel A), log program-service expenses (Panel B), and log number of employees (Panel C) around large government grant shocks. Shocks are defined as cases in which government grants fall from more than 90% (Columns (1) and (5)), 75% (Columns (2) and (6)), 50% (Columns (3) and (7)), or 25% (Columns (4) and (8)) of total revenues to less than 1% in the following year. The coefficients of interest correspond to indicator variables for years 1, 2, and 3 after the shock for organizations with below-median cash (*Low Cash*) and above-median cash (*High Cash*) prior to the shock, and their interactions with an indicator for above-median board size (*Strong Governance*). Cash is measured using the Cash Ratio (Columns (1)–(4)) and the Cash plus Short-Term Investments Ratio (Columns (5)–(8)). *p-Value Cash* reports a test of equality between *Low Cash* and *High Cash* coefficients. *p-Value Cash* × *Gov* tests equality between the interaction terms (*Low Cash* × *Strong Governance* and *High Cash* × *Strong Governance*). *p-Value Gov* tests equality between the sum of these terms, i.e., whether total effects differ across governance levels. All regressions include organization fixed effects and Sector × Year × Revenue-Percentile fixed effects, where revenue percentiles are defined by sector in the year prior to the shock. All variables are defined in Appendix B. Standard errors are clustered by organization (EIN) and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Exit

	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	0.017	0.028**	0.026***	0.019***	0.021	0.029***	0.024***	0.019***
	(1.45)	(2.98)	(4.48)	(3.36)	(1.46)	(3.27)	(4.12)	(3.95)
Low Cash x Strong Gov	0.026	0.013	0.000	-0.011	0.024	0.004	-0.002	-0.012*
	(0.93)	(0.99)	(0.01)	(-1.56)	(0.82)	(0.26)	(-0.22)	(-1.99)
High Cash	0.141*	0.102**	0.087***	0.053***	0.150**	0.104***	0.097***	0.055***
	(2.20)	(2.97)	(6.23)	(7.07)	(2.94)	(3.59)	(7.32)	(7.19)
High Cash x Strong Gov	-0.042	-0.043	-0.035*	-0.021*	-0.060	-0.037	-0.039**	-0.022**
	(-0.47)	(-1.12)	(-1.93)	(-2.20)	(-0.80)	(-1.06)	(-2.31)	(-2.35)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001	2,733,001
Adjusted R^2	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154
p-Value Cash	0.104	0.080	0.003	0.002	0.033	0.035	0.001	0.000
p-Value Gov	0.221	0.472	0.173	0.014	0.329	0.081	0.036	0.005
p-Value Cash × Gov	0.474	0.165	0.091	0.416	0.249	0.284	0.057	0.312

Table 7 Continued: The Role of Governance Around Government Grant Shocks

Panel B: Program Service Expenses

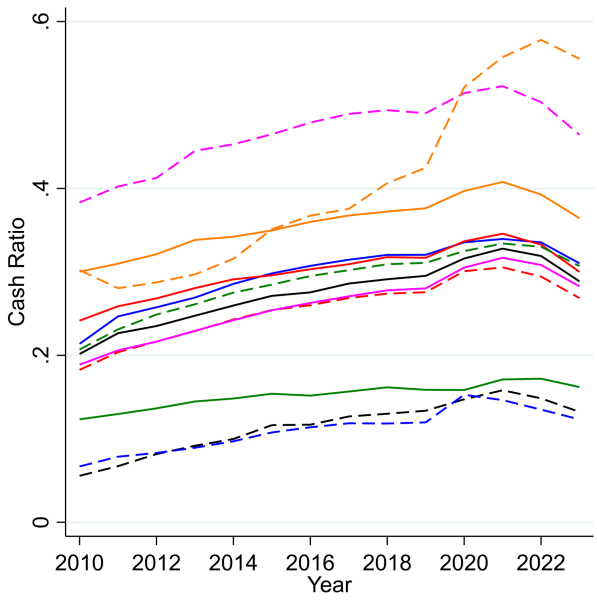
	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	-0.128***	-0.147***	-0.102***	-0.127***	-0.070	-0.088	-0.133**	-0.156**
	(-3.12)	(-3.41)	(-3.09)	(-3.37)	(-1.05)	(-1.16)	(-2.25)	(-2.43)
Low Cash x Strong Gov	0.044	0.017	0.074	0.087	-0.049	-0.096	-0.048	-0.087
	(0.66)	(0.21)	(1.68)	(1.64)	(-0.38)	(-0.63)	(-0.48)	(-0.73)
High Cash	-0.415***	-0.376***	-0.309***	-0.266***	-0.489***	-0.450***	-0.461***	-0.414***
	(-6.48)	(-6.76)	(-6.52)	(-7.47)	(-4.35)	(-4.50)	(-5.09)	(-5.39)
High Cash x Strong Gov	0.246***	0.269***	0.190***	0.162***	0.210	0.266*	0.231*	0.262**
	(3.13)	(3.94)	(3.63)	(3.54)	(1.24)	(1.83)	(1.97)	(2.58)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,752,792	2,752,792	2,754,583	2,754,583	2,751,666	2,751,666	2,751,934	2,751,934
Adjusted R^2	0.862	0.862	0.862	0.862	0.862	0.862	0.862	0.862
p-Value Cash	0.003	0.006	0.003	0.014	0.005	0.011	0.011	0.025
p-Value Gov	0.357	0.781	0.138	0.347	0.437	0.999	0.742	0.487
p-Value Cash × Gov	0.065	0.039	0.115	0.342	0.252	0.136	0.093	0.054

Panel C: Employment

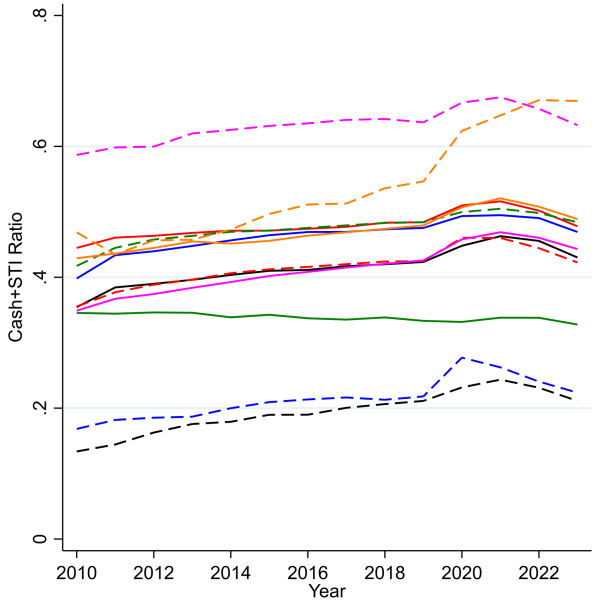
	CR				CSTIR			
Shock Intensity	90%	75%	50%	25%	90%	75%	50%	25%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low Cash	-0.127*	-0.158***	-0.196***	-0.142***	-0.159**	-0.164***	-0.183***	-0.134***
	(-1.99)	(-3.13)	(-5.10)	(-5.93)	(-2.38)	(-3.67)	(-5.21)	(-5.95)
Low Cash x Strong Gov	-0.330	-0.154	0.038	0.050*	-0.319	-0.138	0.040	0.047*
	(-1.74)	(-1.69)	(0.92)	(2.03)	(-1.58)	(-1.45)	(1.01)	(2.11)
High Cash	-0.696***	-0.476***	-0.374***	-0.216***	-0.712***	-0.487***	-0.424***	-0.241***
	(-4.10)	(-4.67)	(-6.08)	(-6.65)	(-4.01)	(-4.20)	(-5.83)	(-6.84)
High Cash x Strong Gov	0.315*	0.163	0.112	0.055	0.354*	0.159	0.139*	0.069**
	(1.97)	(1.71)	(1.68)	(1.50)	(2.06)	(1.52)	(2.02)	(2.20)
Organization FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector x Year x P_{Size} FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	3,310,840	2,751,934
Adjusted R^2	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
p-Value Cash	0.005	0.009	0.005	0.016	0.006	0.012	0.002	0.002
p-Value Gov	0.751	0.997	0.167	0.099	0.613	0.794	0.048	0.027
p-Value Cash × Gov	0.021	0.028	0.337	0.919	0.028	0.058	0.205	0.569

Figure 1: Internal Liquidity Across Nonprofit Sectors

This figure presents time series of liquidity measures for U.S. nonprofit organizations classified according to the National Center for Charitable Statistics (NCCS) sector codes. Panel A plots the ratio of cash to total assets, and Panel B reports the ratio of cash plus short-term investments to total assets. The sample includes all nonprofit organizations from 2010 through 2023.



Panel A: Cash-to-Assets Ratio



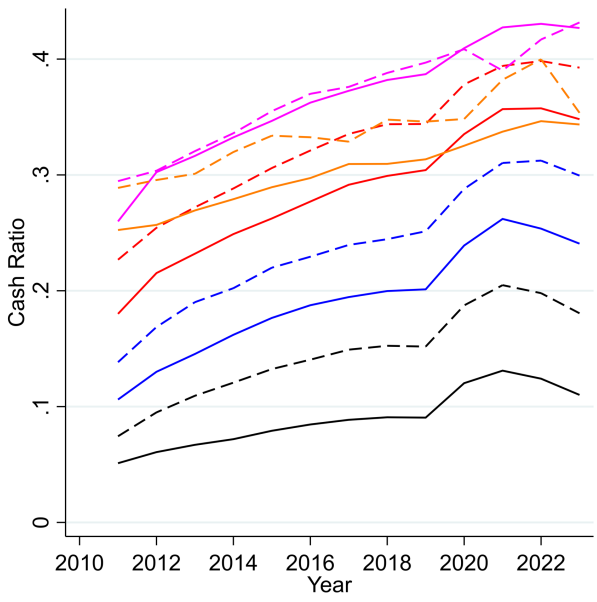
Panel B: Cash and STI-to-Assets Ratio



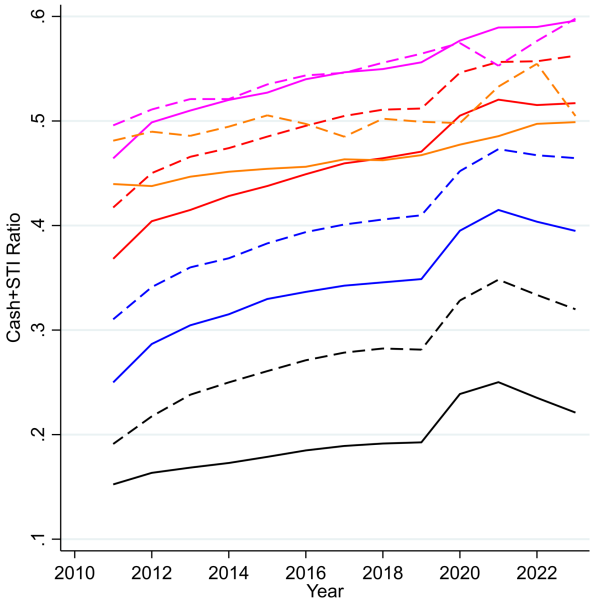
Sectors are classified based on 12 major industry groups (NTMAJ12): AR = Arts, Culture, and Humanities; BH = Higher Education; ED = Education (Other); EN = Environment; HE = Hospitals; HL = Health (Other); HU = Human Services; IN = International; PU = Public and Societal Benefit; RE = Religion; MU = Mutual Benefit; and ZZ = Unknown.

Figure 2: Liquidity by Size Deciles

This figure presents the time series of liquidity measures for U.S. nonprofit organizations, grouped by one-year lagged revenue deciles. Panel A plots the ratio of cash to total assets (cash-to-assets ratio), while Panel B reports the ratio of cash and short-term investments to total assets (cash + short-term investments–to–assets ratio). The sample includes all nonprofit organizations from 2010 through 2023.



Panel A: Cash-to-Assets Ratio

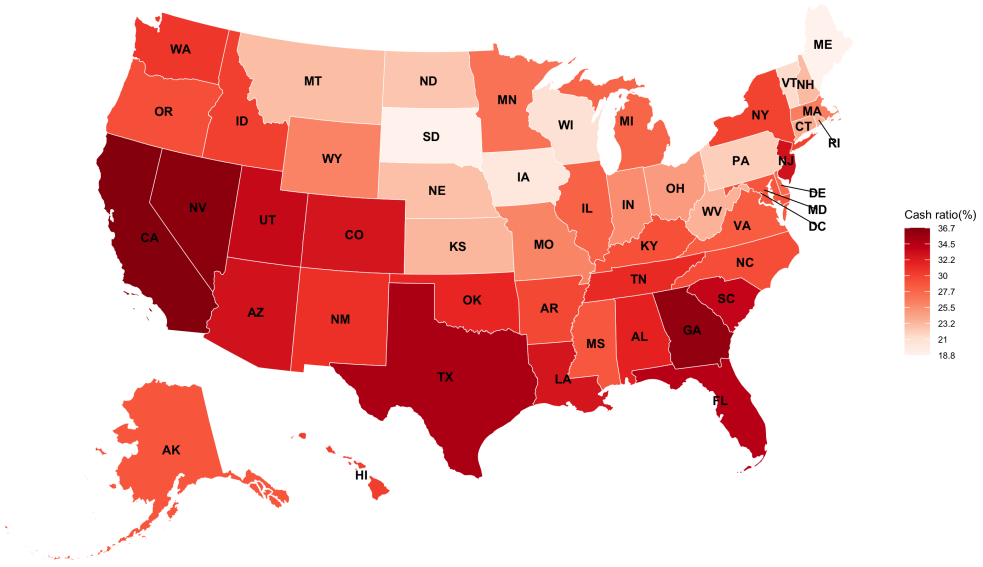


Panel B: Cash and STI-to-Assets Ratio

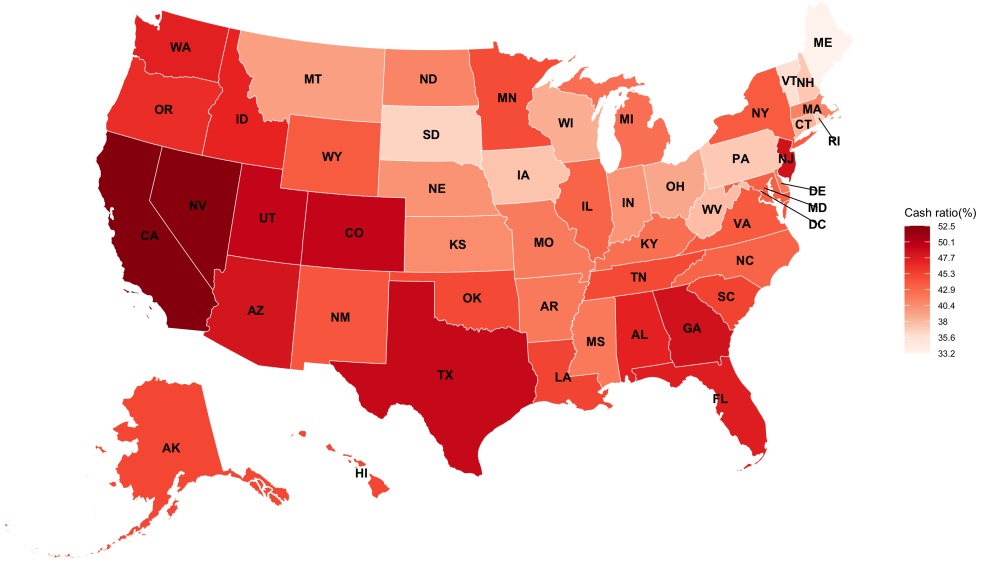


Figure 3: Liquidity by Geographic Region

This figure presents the time series of liquidity measures for all U.S. nonprofit organizations, aggregated by state. Panel A plots the ratio of cash to total assets (cash-to-assets ratio), while Panel B reports the ratio of cash and short-term investments to total assets (cash + short-term investments-to-assets ratio). The sample covers the entire nonprofit sector from 2010 through 2023.



Panel A: Cash-to-Assets Ratio



Panel B: Cash and Short-Term Investments-to-Assets Ratio

Figure 4: Response to Government Funding Shocks

This figure shows the dynamics of exit (Panel A), logged program service expenses (Panel B), and logged number of employees (Panel C) around government grant shocks, defined as government grants dropping from >90% of revenues (Columns (1)), >75% of revenues (Columns (2)), >50% of revenues (Columns (3)), or >25% of revenues (Columns (4)) to less than 1% of total revenues. The coefficients of interest are indicator variables for years [-3,. . . , 3] around the shock for organizations that had below median cash (blue/left) and above median cash (red/right) prior to the shock. Cash is based on the Cash Ratio (top row) and Cash+STI Ratio (bottom row). Standard errors are clustered at EIN and Year level. Confidence intervals are at 95% level.

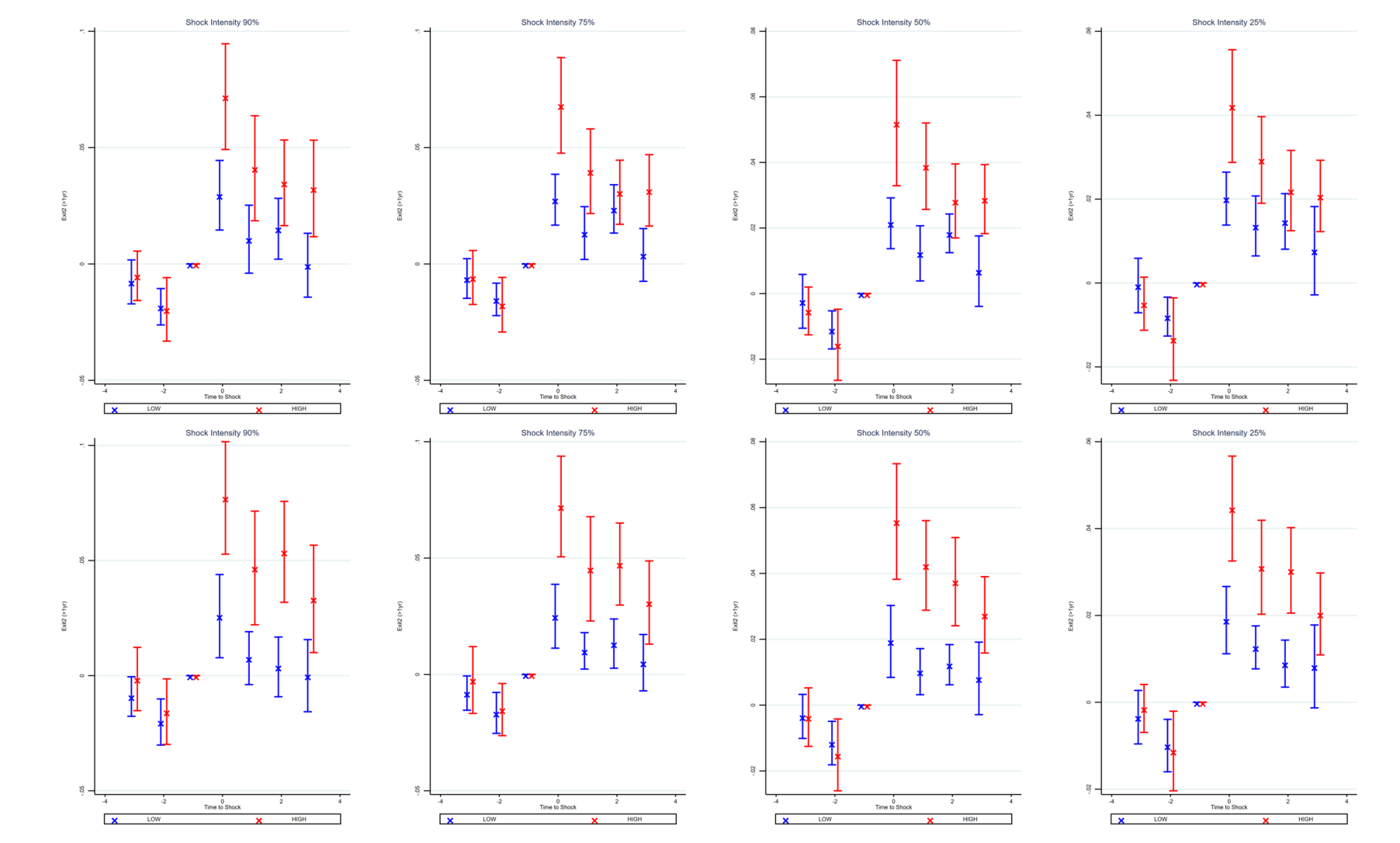


Figure 4 Continued: Response to Government Funding Shocks

Panel B: Logarithm of Program Service Expenses

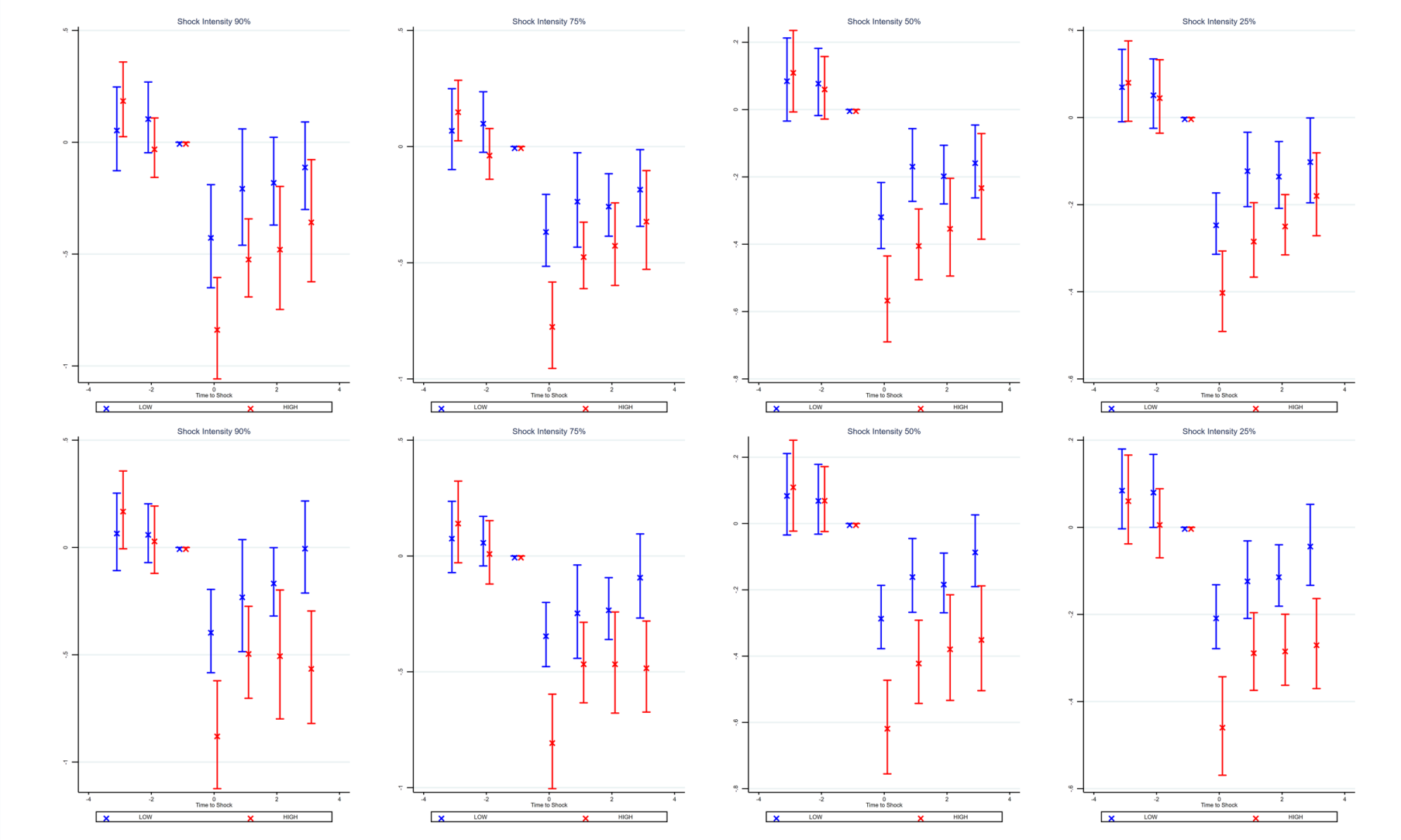
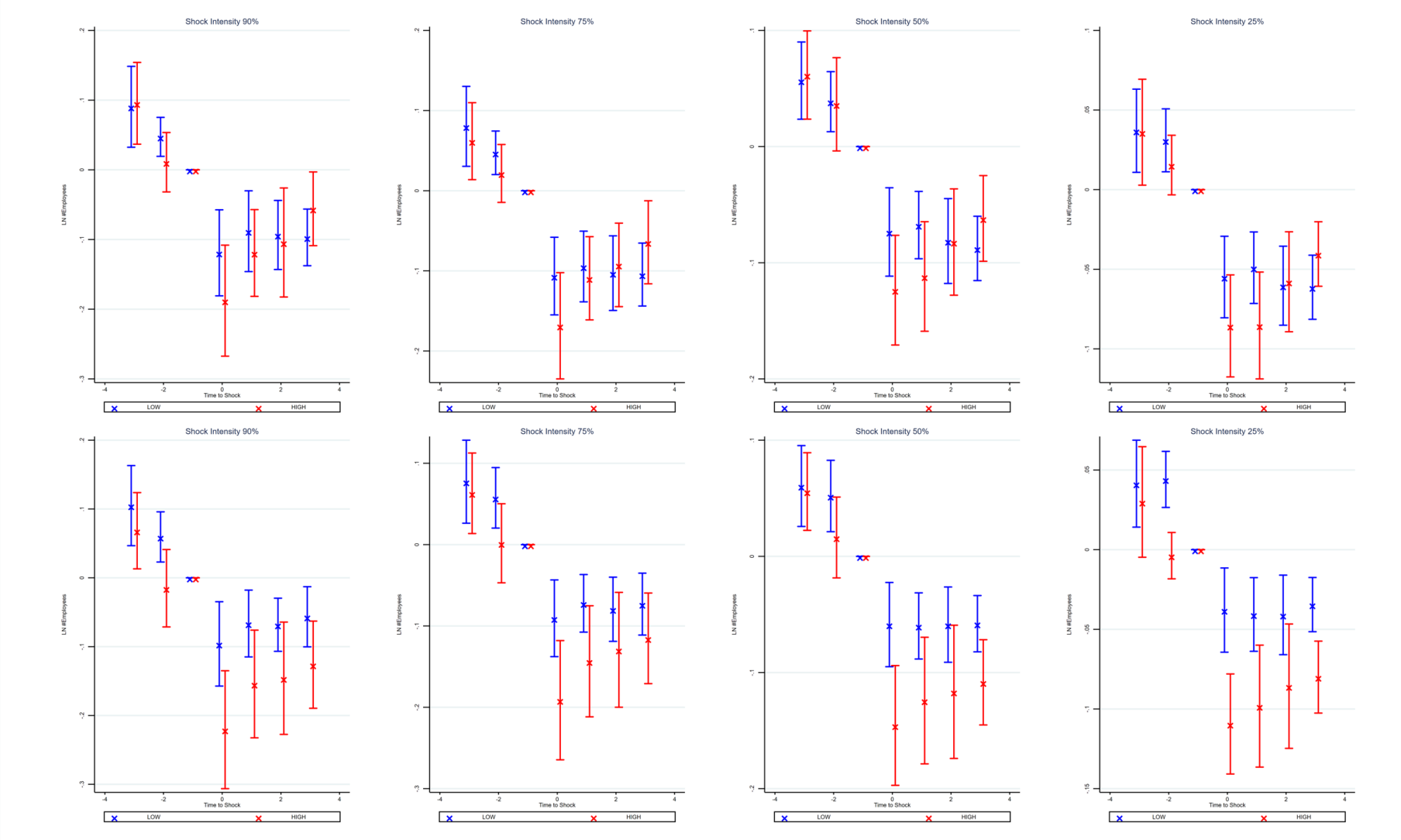


Figure 4 Continued: Response to Government Funding Shocks

Panel C: Logarithm of Number of Employees



Appendix A: Model Details

This appendix lists all objects introduced in Section 2. We define the state vector, control variables, functional forms, and parameter set. Unless otherwise noted, innovations are i.i.d. mean–zero Gaussian, independent across equations.

A.1 State and control variables

State vector at the beginning of t:

$$s_t = \Big(K_t, E_t, b_t, Y_t^{ps}, R_t, G_t, I_t\Big).$$

K_t is unrestricted cash; E_t is restricted/quasi-restricted assets (endowment); b_t is face value of debt outstanding; Y_t^{ps} is program-service revenue; R_t is donor reputation; G_t is governance quality (slow-moving, may be piecewise constant or exogenous process); $I_t \in \{0,1\}$ is debt-market eligibility (extensive margin).

Controls in t:

$$(m_t, f_t, \chi_t, b_{t+1}),$$

where m_t is program (mission) spending, f_t is fundraising effort, χ_t is appropriation from quasi-restricted assets, and b_{t+1} is next period's debt choice (subject to eligibility).

A.2 Functional forms and processes

Objective:

$$\max_{\{m_t, f_t, \chi_t, b_{t+1}\}_{t\geq 0}} \mathbb{E}_0 \sum_{t\geq 0} \beta^t \, u(m_t), \qquad u(m) = \begin{cases} \dfrac{m^{1-\sigma}-1}{1-\sigma}, & \sigma \neq 1, \\ \log m, & \sigma = 1. \end{cases}$$

Program-service revenue (PSR):

$$Y_{t+1}^{ps} = \mu_{ps} + \rho_{ps} Y_t^{ps} + \sigma_{ps} \, \varepsilon_{t+1}^{ps}, \qquad \varepsilon_{t+1}^{ps} \sim \mathcal{N}(0,1).$$

Visible liquidity and benchmark buffer:

$$c_t \equiv \frac{K_t}{A_t}, \qquad S_t \equiv c_t - \bar{c}(x_t), \qquad x_t = \big(Y_t^{ps}, \sigma_u, \sigma_{ps}, G_t\big).$$

A parametric benchmark for the target level of internal liquidity:

$$\bar{c}(x_t) = c_0 + c_{ps}\sigma_{ps} + c_u \sigma_u - c_\rho \rho_{ps} + c_G G_t.$$

The asset value A_t is set as

$$A_t = \bar{A}_0 + K_t + E_t,$$

where $\bar{A}_0 > 0$ captures other non-cash, non-endowment assets in order to keep A_t observable while avoiding extra capital accounts (e.g., property, plant, equipment, etc.).

Fundraising cost:

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

Expected donations (unrestricted and restricted):

$$U_{t+1} = \theta_u(R_t, G_t)\, f_t^{\alpha} \Big(1 + \eta_N [S_t]_- - \phi_K [S_t]_+\Big) + \sigma_u\, \varepsilon^u_{t+1}, \quad \varepsilon^u_{t+1} \sim \mathcal{N}(0,1), \tag{14}$$

$$Z_{t+1} = \theta_r(R_t, G_t)\, f_t^{\alpha_r} \Big(\bar{s} + \psi_K [S_t]_+\Big) + \sigma_r\, \varepsilon^r_{t+1}, \quad \varepsilon^r_{t+1} \sim \mathcal{N}(0,1), \tag{15}$$

with $0 < \alpha_r \le \alpha < 1$, $[z]_+ = \max\{z, 0\}$ and $[z]_- = \max\{-z, 0\}$.

Fundraising productivity for unrestricted and restricted gifts is given by:

$$\theta_u(R_t, G_t) = \theta_{u0} \exp\big(\xi_u R_t + g_u G_t\big), \qquad \theta_r(R_t, G_t) = \theta_{r0} \exp\big(\xi_r R_t + g_r G_t\big),$$

with separate level and sensitivities for unrestricted vs. restricted channels.

Restricted assets / Endowment:

The endowment accumulation, payouts, and appropriations are given by

$$E_{t+1} = (1 + r_E) E_t + Z_{t+1} - \pi E_t - \chi_t, \qquad 0 \le \chi_t \le \bar{\chi}(G_t)\, E_t,$$

with payout rate $\pi \in (0,1)$ and appropriation capacity

$$\bar{\chi}(G_t) = \min\big\{\bar{\chi}_{\max},\, \bar{\chi}_0 + \bar{\chi}_1 G_t\big\}, \qquad 0 < \bar{\chi}_{\max} \le 1.$$

Debt markets with an extensive margin:

$$I_t = \mathbf{1}\{\psi_1 Y_t^{ps} + \psi_2 E_t + \psi_3 G_t \ge \bar{\Psi}\}, \qquad b_{t+1} \in [0,\ \bar{B}_t I_t],$$

$$r_d(I_t) = \begin{cases} r^{ex}, & I_t = 1, \\ r^{tax}, & I_t = 0, \end{cases} \qquad \bar{B}_t = \kappa_B \big(Y_t^{ps} + \kappa_E \pi E_t\big).$$

Cash recursion and survival:

$$K_{t+1} = K_t + Y_t^{ps} + U_t + \pi E_t + \chi_t - m_t - o_t - c_f(f_t) + b_{t+1} - (1 + r_d(I_t))\, b_t, \qquad K_{t+1} \ge \underline{K}.$$

Overhead expenses are given by $o_t = \omega_0 + \omega_1 m_t$.

Reputation dynamics:

$$R_{t+1} = (1-\lambda)R_t + \lambda\left(\eta_1 \frac{m_t}{m_t + o_t} - \eta_2 c_t\right) + \sigma_R \varepsilon^R_{t+1}, \qquad \varepsilon^R_{t+1} \sim \mathcal{N}(0,1),$$

with persistence $\lambda \in (0,1)$.

A.3 Timing

At the start of period t, the state s_t is observed. The manager chooses $(m_t, f_t, \chi_t, b_{t+1})$ subject to eligibility I_t and appropriation cap $\bar{\chi}(G_t)$. Revenues Y_t^{ps} and gifts U_t, Z_t materialize according to (14)–(15). Cash evolves via the budget constraint; survival requires $K_{t+1} \geq \underline{K}$. Reputation updates and the exogenous processes draw shocks. The new state s_{t+1} is then formed. Given a parameter vector, policy functions are computed by value function iteration; simulation proceeds by feeding shocks and enforcing the Kuhn-Tucker bounds on χ_t and b_{t+1}.

Appendix B: Variable definitions

Variable	Definition
Revenues ($000s)	Total revenues reported in IRS Form 990 (thousands of U.S. dollars).
Assets ($000s)	Total assets reported in Form 990 (thousands of U.S. dollars).
Employees	Number of employees reported in Form 990, including full- and part-time staff.
Cash Ratio (CR)	Cash divided by total assets.
Cash+STI Ratio (CSTIR)	Cash plus short-term investments divided by total assets.
Has Tax-Exempt Debt	Indicator equal to one if the organization reports the issuance or outstanding balance of tax-exempt bonds.
Has Unsecured Loan	Indicator equal to one if the organization reports an unsecured loan, line of credit, or other short-term borrowing facility.
Has Endowment	Indicator equal to one if the organization reports an endowment fund.
Program-Service Revenue Ratio	Program-service revenues divided by total revenues.
Contribution Ratio	Total contribution revenues divided by total revenues.
Donation Ratio	Private donations, including gifts and individual or corporate grants, divided by total revenues.
Government Grant Ratio	Government grants divided by total revenues.
Program-Service Expense Ratio	Program-service expenses divided by total revenues.
Fundraising Expense Ratio	Fundraising expenses divided by total revenues.
Management Expense Ratio	Management and general expenses divided by total revenues.
Wage Expense Ratio	Wage and salary expenses divided by total revenues; may overlap with other expense categories.
Travel Expense Ratio	Travel expenses divided by total revenues.
Board Members	Number of directors or trustees serving on the organization's governing board.
Majority-Independent Board	Indicator equal to one if more than 50% of board members are independent.
Fully Independent Board	Indicator equal to one if all board members are independent.
Audited or Reviewed	Indicator equal to one if the organization's financial statements are externally audited or reviewed.
Receives Government Grant	Indicator equal to one if the organization receives any government grants.
Exit	Indicator equal to one if the organization ceases filing Form 990 (organizational exit).

Appendix C: Summary Statistics by State

This table reports summary statistics for all U.S. nonprofit organizations by state. For each state, the table presents the number of organizations and observations, as well as the average assets and revenues (in thousands of dollars), average number of employees, and average ratios of cash-to-assets and cash plus short-term investments-to-assets.

State	#Orgs	#Obs	Assets $000s	Revenues $000s	#Employees	Cash Ratio	Cash+STI Ratio
AK	1118	1118	12539.21	5671.24	40.79	28.86%	44.97%
AL	3319	3319	13351.33	4544.03	81.65	31.82%	47.24%
AR	2159	2159	12061.62	8000.28	66.9	29.61%	41.72%
AZ	3439	3439	17711.26	11076.97	81.34	33.05%	48.28%
CA	29923	29923	23682.06	13040.68	67.54	36.71%	52.52%
CO	5641	5641	16642.63	6817.08	50.88	32.80%	49.28%
CT	4245	4245	33900.45	10766.61	79.32	23.89%	38.22%
DC	4540	4540	23481.97	12991.05	56.9	35.12%	51.60%
DE	940	940	18064.86	8371.24	78.48	27.68%	41.85%
FL	12054	12054	19528.31	8944.65	71.29	34.40%	47.61%
GA	6331	6331	22927.41	11247.07	70.87	36.01%	48.57%
HI	1331	1331	19958.97	6794.67	50.85	30.18%	44.96%
IA	3586	3586	15694.23	6289.35	65.21	20.17%	37.41%
ID	1227	1227	14252.95	6233.16	50.01	30.11%	47.09%
IL	10072	10072	30178.91	12162.12	107.43	28.08%	43.13%
IN	5631	5631	22825.24	9715.17	79.41	25.57%	40.12%
KS	2775	2775	12479.44	5520.62	62.06	23.32%	40.56%
KY	3067	3067	17452.76	9957.79	75.74	29.17%	42.45%
LA	3156	3156	14024.17	7334.87	65.17	32.76%	45.13%
MA	8525	8525	43304.67	15099.84	95.85	26.39%	41.17%
MD	5651	5651	24820.81	11233.56	82.34	28.85%	43.38%
ME	1851	1851	13839.7	8114.9	68.35	18.76%	33.20%
MI	7713	7713	31609.88	11431.64	78.19	27.84%	42.40%
MN	6927	6927	34778.79	13002.94	89.89	27.11%	44.66%
MO	5463	5463	26990.83	11960.68	90.86	26.01%	41.64%
MS	1927	1927	10291.75	4815.55	38.85	28.74%	41.80%
MT	1619	1619	10493.27	5495.61	46.8	23.03%	39.44%
NC	7314	7314	23916.14	8662.58	69.76	29.30%	43.10%
ND	1041	1041	14802.97	6382.5	61.04	22.60%	41.08%
NE	2152	2152	23580.1	7848.98	69.7	22.90%	40.23%
NH	1494	1494	24580.24	9154.38	85.13	23.12%	37.20%
NJ	7599	7599	15991.38	7564.02	71.52	33.03%	48.56%
NM	1694	1694	10230.97	4292.77	51.97	30.98%	44.04%
NV	1361	1361	11790.53	4969.66	36.24	36.37%	52.28%
NY	22490	22490	21541.27	13360.89	104.43	29.93%	43.72%
OH	10560	10560	21942.38	12432.14	97.89	24.82%	39.00%
OK	2607	2607	14812.29	5826.66	49.45	31.49%	44.75%
OR	3961	3961	14969.8	7049.69	54.96	29.19%	46.48%
PA	14088	14088	23832.93	11439.69	91.42	22.14%	37.12%
RI	1369	1369	20741.4	9685.58	81.85	23.51%	36.63%
SC	3134	3134	13338.63	7740.33	57.02	33.74%	45.21%
SD	1158	1158	16922.35	10633.88	110.94	18.85%	36.57%
TN	4702	4702	19212.29	8820.55	75.46	31.31%	44.81%
TX	16121	16121	20297.78	8048.65	52.74	34.93%	49.17%
UT	1706	1706	15950.61	9767.91	68.63	33.60%	49.33%
VA	8067	8067	23281.37	9145.43	65.95	28.49%	43.81%
VT	1240	1240	10007.08	5680.52	59.44	21.44%	35.87%
WA	6108	6108	26521.94	12524.02	80.43	30.60%	47.31%
WI	5542	5542	24730.51	10201.96	78.98	20.98%	38.67%
WV	1660	1660	10239.08	7326.78	67.05	23.56%	37.77%
WY	813	813	6471.76	2609.86	24.31	26.17%	43.75%

Appendix D: Comparison to For-Profits

This appendix presents summary statistics (Panel A) and time-series dynamics (Panels B and C) of the cash plus short-term investments–to–assets ratio (Cash+STI Ratio) for nonprofit organizations and Compustat for-profit firms. Nonprofits are matched with replacement to for-profit firms each year based on total assets, retaining the closest match and excluding pairs with an absolute log-distance in total assets greater than 1%.

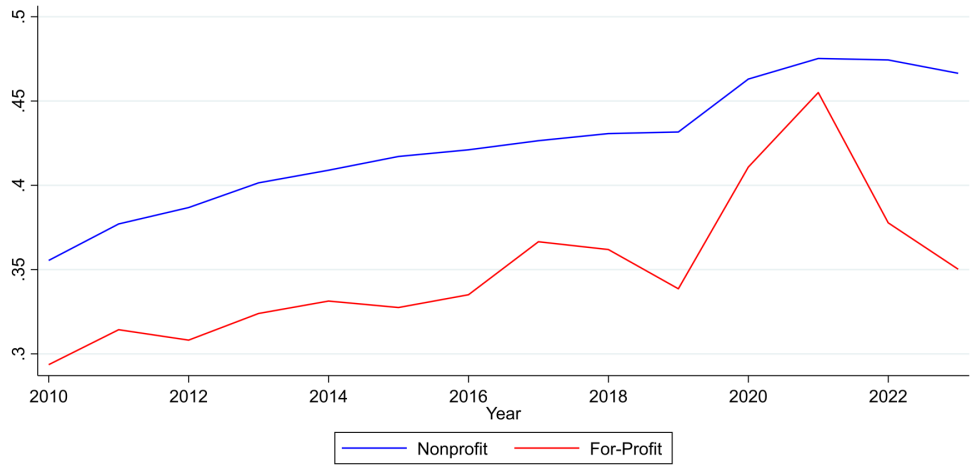
For nonprofits, the Cash+STI Ratio equals cash plus short-term investments divided by total assets, winsorized at the 1st and 99th percentiles. For for-profit firms, the Cash+STI Ratio equals the Compustat variable *che* (cash and short-term investments) divided by *at* (total assets), also winsorized at the 1st and 99th percentiles.

Panel A reports t-tests for differences in means between the two samples; ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Panel B plots the time series of mean Cash+STI Ratios for nonprofits (blue) and for-profits (red), while Panel C shows the 25th, 50th, and 75th percentiles over time.

Panel A. Comparison of Matched Nonprofits and Compustat Firms.

Variable	Nonprofit	For-profit	Difference
LN(Size variable)	13.81	13.81	0
Mean Cash+STI Ratio	43.40%	35.91%	7.49%***
P25 Cash+STI Ratio	9.41%	6.78%	2.63%***
P50 Cash+STI Ratio	32.48%	25.66%	6.81%***
P75 Cash+STI Ratio	81.10%	62.43%	18.67%***

Panel B: Mean Cash + Short-Term Investments-to-Assets Ratio for Nonprofit and For-profit Firms.



Panel C: Median, P25 and P75 of Cash+STI Ratio for Nonprofits and Compustat Firms Matched on Assets.

