How do nonprofits use cash windfalls? Evidence from $5B in unrestricted donations*

Jennifer Walsh†

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Abstract

Donations to 501(c)(3)'s are increasingly given unrestricted due to concerns that restrictions on use unduly constrain nonprofits. I study the effect of such funding on recipients using a $5B sample of MacKenzie Scott's gifts from 2020-2022 to 567 nonprofits. I find that, within two years of receiving the gift, nonprofits received 64% of the average gift in additional contributions and spent the entirety of the average gift compared to similar untreated nonprofits. After giving away 26% of new spending as charitable grants, recipients spent these funds proportionally to their previous activities. To rationalize these findings, I present a model of nonprofits maximizing charitable output subject to donation restrictions. Relative increases in grant giving suggest that nonprofit production has decreasing returns to scale. No change in the relative allocations to indirect costs and saving suggests that recipient nonprofits were not constrained by the "nonprofit starvation cycle." Compensation of the highest paid employee increased by $20.9K (9%), average compensation of the next four highest paid individuals increased by $13.1K (13.6%), and average compensation of non-senior employees increased by $2.7K (5.8%). If the compensation increases were permanent but contribution crowd in was transient, the present value of executive compensation increased by $0.23 for every dollar of the gift and additional contributions.

Keywords: charitable giving, nonprofit operations, capital budgeting

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†Harvard University. jenniferwalsh@g.harvard.edu

Large gifts to U.S. 501(c)(3)'s (nonprofits) are typically given with restrictions on usage, but unrestricted gifts have increased from 30% to 42% of foundation grants to nonprofits from 2016-2022. Unrestricted gifts, as their name suggests, offer recipient nonprofits full discretion over the use of funds across their portfolio of charitable projects and across their direct and indirect costs. This flexibility stands in contrast to traditional, project-based gifts, which earmark funds for direct costs or for particular projects within the nonprofit.

The usage of such gifts can answer two questions about nonprofit operations. First, what are the returns to scale of nonprofit operations? If nonprofits seek to maximize the production of charitable output, the concavity of the production mediates normative conclusions about nonprofit market structure and competition (Castaneda et al., 2008; Lapointe et al., 2018). Second, do nonprofits face a "starvation cycle" that inhibits investment in productivity-increasing indirect costs and saving that unrestricted gifts are intended to prevent? Unrestricted gifts and "trust based philanthropy" have grown in popularity due to a belief that earmarks and spending requirements hamper the ability for nonprofits to allocate funds most effectively (Gregory and Fall, 2009). On the other hand, releasing such earmarks could lead to the redistribution of funds from external to internal stakeholders via a moral hazard problem that the earmarks successfully prevent (Fama and Jensen, 1985). Confirming one of these stories has been challenging to date because donations to nonprofits largely carry restrictions.

In this paper, I show that under a model of a nonprofit agent maximizing charitable output and private benefits subject to constraints, changes in the allocation of spending at nonprofits following an exogenous wealth shock can answer both questions. I test the predictions of this model using a sample of philanthropist MacKenzie Scott's unanticipated unrestricted gifts, which ranged from less than \$1M to \$50M, made to hundreds of nonprofits between 2020-2022. Scott's gifts were unrestricted, unanticipated, and large so the true effect on financial decision making can be easily identified from panel data.

Data on nonprofit outcomes are derived from the population of tax forms filed by filed by 501(c)(3)'s and posted online by the IRS. The Form 990 "Return of Organization Exempt From Income Tax" includes comprehensive financial information at the nonprofit level such as detailed breakdowns of revenue sources (e.g., contributions, program services, investment income) and expenses on a granular level including grants to other organizations, employee compensation, and indirect costs such as office and travel expenses. I limit the sample to recipients reported by Scott's foundation, Yield Giving, who received exactly one gift, whose Form 990's were most likely to cover their entire operations, who received gifts between 2020 and 2022 to see a sufficient post-period, and who were sufficiently reliant on donations that I could interpret results to assess how donation restrictions may change nonprofit behavior.

The resulting sample of 567 gifts were on average \$8.4M in size and on average 97% of the revenue received by recipients in 2019.

In order to identify the average effect of the gift, I match each recipient to four financially comparable nonprofits then use difference-in-differences to compare recipients to the matched population. Nearest neighbor matching on expenses, donations, dollars allocated to grants, and number of employees yields a sample of recipients that evolved in parallel to the matched control between 2012 and receipt of the gift. With the assumption of parallel trends, difference-in-differences identifies the average effect of the gift on recipient nonprofits. This identification relies on the assumption that nothing simultaneous to receiving a gift from Ms. Scott differentially affected treated nonprofits versus untreated nonprofits. The variation in gift years between 2020-2022 and lack of anticipation bolsters the credibility of this identification strategy.

I then present a model formalizing the assumptions under which the allocations of spending to grants, indirect costs, savings, and compensation after a wealth shock can yield insights about the nonprofit production function. The model posits a nonprofit agent allocating wealth and donations optimally to inputs in the production of charity. Proposition 1 shows that the change in the grant spending share after a wealth shock reveals whether nonprofit production is increasing, decreasing, or constant returns to scale. Proposition 2 shows that, by assuming the "nonprofit starvation cycle" takes the form of donations restricted to use on direct costs and that nonprofit production is Cobb-Douglas in inputs, an increase in indirect costs and savings after a wealth shock imply that nonprofits were constrained by donation restrictions. Proposition 3 shows that if senior employee compensation were a reasonable empirical proxy of private benefits for the nonprofit agent, increases in compensation demonstrate the existence of a principal agent conflict between donors and the nonprofit.

Nonprofits received a cumulative 64% of the average gift size in new donations in the two years afterward, giving the nonprofit access to funds totaling 164% of the initial gift. As a result, the average nonprofit grew annual spending by 50% of the average gift size concurrent with receiving additional donations in the following two years. The growth over this time period was equivalent to spending more than the entirety of the gift (106%). Compensation comprised 32% of new spending, grant giving comprised 26%, and remaining other costs comprised the remaining 47%.

Importantly, the allocation meant that nonprofits shifted spending from pre-existing operations toward giving the cash away. Recipients increased grants to individuals and other organizations by as much as 2.5 pp of annual spending, even if they had not given grants prior to the gift, off a baseline of 12%. Grant giving increased at both grantmaking organizations and direct service organizations (DSO's) who did not previously give grants. In the lens of the model, this shift in nonprofit activities suggests that these organizations have decreasing returns to scale in producing charitable output so that, as organizations grew, the marginal value of dispensing grants outweighed marginal production of core charitable activities.

I do not find evidence that restricted donations have worsened a "nonprofit starvation cycle" (NSC). The NSC, as modeled, predicts that if nonprofit donations could not fund an input, a wealth shock via an unrestricted donation would loosen the constraint and so spending on the input could increase. As a result, if production were Cobb-Douglas, finding that the relative allocation to indirect costs or savings increased after the gift would show these constraints bound prior to the gift. Despite the gifts' potentially loosening the restrictiveness of the nonprofit's donations, recipients kept the indirect cost ratio and spending relative to cash reserves constant. Neither indirect costs nor savings, as measured by the percent of expenses saved in liquid assets or total assets, increased. This is true even for nonprofits whose revenue was more restricted prior to Ms. Scott's gift.

Finally, I document increases in employment and employee compensation compared to similar nonprofits. Two years after the gift, nonprofits hired 2.9% more employees. Compensation of the chief executive officer increases by 9%, the wages of the next four highest paid individuals at recipients increased by 13.6%, and employee wages increased by 5.8% two years after the gift. In present value terms, this ongoing wage increase corresponded to spending $0.23 of every dollar of the gift principal and additional contributions on the five highest paid executives, which similar to the most recent estimates for the allocation of tax breaks to executives at for-profit firms. Because senior management has control over use of funds and their wages increased differentially, I interpret these changes as a proxy for misallocation via moral hazard with the caveat that concurrent improvements in productivity or employee retention from higher wages are not investigated in this paper.

From the funder's perspective, this paper does not find evidence that lifting donation restrictions substantially improves the allocation of funds in the way that the "nonprofit starvation cycle" hypothesis would suggest. However, they could be successful in bringing nonprofit wages closer to similar for-profit companies, which could have other unmeasured benefits to charitable output.

Optimal contract structure for donations: The nonprofit starvation cycle, paternalism, and moral hazard. This paper informs a debate amongst funders and academics about the optimal structure for charitable donations and the drivers of this optimal structure. Theories of the nonprofit's objective function classically raise the threat of moral hazard. Indeed, Fama and Jensen (1985) state that "for nonprofits the survival value of such decision systems is due to the assurances they provide that donations are used effectively and not easily appropriated." Hansmann (1996)'s canonical justification of nonprofit status is the "nondistribution constraint" that allows nonprofits to commit to their social cause without appropriating funds, echoed by Bilodeau and Slivinski (1998); Glaeser and Shleifer (2001); Ghatak and Mueller (2011); Easley and O'Hara (1983). This threat implies that nonprofits hold lower than optimal liquid reserves and under-fund anything that could be misconstrued as perquisites to signal their commitment to service (Jensen and Meckling, 1976; Core et al., 2006; Calabrese, 2011; Fisman and Hubbard, 2003, 2005). This theory is supported by empirical evidence that donations are elastic with respect to the percentage diverted to overhead cost (Gneezy et al., 2014; Meer, 2017; Hung et al., 2023; Exley, 2020), which contain many cost items (office, travel, IT) that could be construed as private benefits that do not produce social welfare. Parsa et al. (2022) uses IRS's 2008 roll out of increased nonprofit governance disclosure requirements to show that donations and overhead ratios become less negatively associated after the onset of governance information.

However, an emerging empirical literature suggests that the under-funding of liquid reserves and overhead expenses blunts the nonprofit's efficient production of charitable activities. Nonprofits do not increase spending during economic downturns as much as donors would hope (Exley et al., 2023), and one key determinant of that phenomenon could be their lack of precautionary savings (Fisman and Hubbard, 2005). Altamimi and Liu (2022) shows that for-profits doing similar work to nonprofits have higher reported overhead costs, so the pressure to reduce overhead costs could make nonprofit production inefficient. The welfare impact of increasingly unrestricted giving comes from weighing the threat of moral hazard with the literature that suggests under-funding of liquid reserves and overhead blunts the nonprofit's efficient production of charitable activities. Questions about which stakeholder can more easily assess the social value created by the nonprofit relate to growing behavioral literature on the impacts and drivers of paternalism (Ambuehl et al., 2021).

I find evidence consistent with the earlier theoretical literature. I do not find evidence of the nonprofit starvation cycle, and wage increases concentrated at the most highly paid employees provide evidence that restrictions on donations reduced the likelihood of moral hazard. These estimates of executive wage increases are of the same order of magnitude as estimates at for-profit organizations who receive cash windfalls (Blanchard et al., 1994; Bertrand and Mullainathan, 2001; Howell and Brown, 2023; Ohrn, 2023). That said, with increases off of relatively small baseline wages, it is difficult to conclude with certainty that these wage increases did not also cause unmeasured productivity improvements.

Donation crowd in and the nonprofit production function. This paper also validates a corpus of previous work that shows that fundraising spending and attention drive donations to nonprofits. The theoretical literature has rationalized huge donation crowd in with information (Vesterlund, 2003; Andreoni, 2006) and with nonprofits having increasing returns to scale Andreoni (1998). The empirical backing for the latter is mixed, where seed money increases giving, but higher match rates do not spur higher giving (Karlan and List, 2007; List, 2011). The model shows that these findings can be explained by nonprofits having decreasing returns to scale. A decreasing marginal ability to produce social welfare means that the gift (or matching) not only creates a positive signal but also moves the nonprofit up its production function into lower marginal productivity of additional donations. The decreasing returns to scale of recipients are implied by nonprofits increasing their propensity to give grants.

Large gifts. Lastly, this paper is one of the first studies of the spending out of MacKenzie Scott's gifts and contributes a detailed account and interpretation of how the spending out of unrestricted and unanticipated gifts can shed light on the nonprofit's objective function. Lee et al. (2023) describes the size of the gifts and spatial distribution of Scott's giving around the United States, some facts that I reproduce here for gifts limited to 2020-2022 excluding universities and hospitals. The Center for Effective Philanthropy has performed two surveys of recipients that solicit nonprofits' expectations and plans for how to use their gifts from MacKenzie Scott (Buteau et al., 2021, 2022). Their third report (Arrillaga et al., 2025) also reports revenue, spending, saving, and fundraising by a different sample of recipients alongside the average outcomes for matched untreated nonprofits between 2020-2023. By matching recipients on multiple years of outcomes and separately by cohort then using difference-in-differences, I identify the effect of the gift while mitigating confounding by aggregate time trends. Furthermore, my work quantifies additional spending and relative allocation toward grant giving, direct and indirect costs, and employee compensation and reports heterogeneity between nonprofits of different missions. Mayo (2021) uses bequests to study the effect of large gifts on recipients and their rival charities, but the degree to which funds were restricted for certain uses was unknown. The ability to ascertain that the gifts were unrestricted in this setting allows me to use them as an exogenous wealth shock to test a model of the nonprofit's objective function.[1]

The remainder of the paper proceeds as follows. Section 1 presents the model and implications that guide the empirical results. Section 2 describes MacKenzie Scott's gifts. Section 3 presents the data, variable definitions, and how I construct the sample of unrestricted gifts. Section 4 presents the empirical strategy for identifying the effect of an unrestricted gift of

[1]The marginal propensity to consume out of large cash windfalls has been studied extensively for consumers, reviewed in Golosov et al. (2024) and to a limited extent at firms. Ohrn (2023) reviews literature on for tax-related windfalls, (Blanchard et al., 1994; Bertrand and Mullainathan, 2001) use other positive financial shocks, and only von Beschwitz (2018); Howell and Brown (2023) present empirical designs that involves cash shocks exogenous to investment opportunities.

nonprofit recipients. Section 5 presents the results on contribution crowd in and spending, then Section 6 reports how new spending was allocated to test predictions of the model. Section 7 concludes.

1 Theoretical framework

In this section, I present a model that connects the usage of MacKenzie Scott's gifts with three questions about nonprofit donations and the nonprofit objective function: 1) Do nonprofits have decreasing returns to scale? 2) Do nonprofits face a starvation cycle that constrains saving and indirect cost spending? And 3) do nonprofits face a principal agent problem in the allocation of funds? I first introduce the model then demonstrate how the setup allows Scott's gifts to answer each question.[2]

1.1 Setup

Consider a one-period setting where a nonprofit agent can collect donations and spend donations and wealth on behalf of the organization. The principal can allocate spending across four goods: inputs to the production of charitable output z_i, charitable grants m_i, fundraising f_i, and benefits to the principal p_i.

Charitable output is produced by a K dimensional vector of inputs, z_i via the nonprofit's own Cobb-Douglas production function $Y(z_i) = \prod_k z_{ik}^{\phi_k}$ and grants m_i, which are given directly to individuals in need or other organizations. Nonprofits in the same industry or NTEE code have the same production function but can have a nonprofit-specific productivity parameter A_i. The nonprofit produces charity with grants with the expression $b_i m_i$, where b_i is a nonprofit-specific productivity that transforms grants into charitable output. When b_i is small, the nonprofit maximizes charitable output by producing a specific good or service with spending on inputs z_i. When b_i is relatively large, the nonprofit maximizes charitable output by being a grant giver. The parameterization of charitable output reflects the reality that the value of charity is not *equivalent* to the input spending, but instead produced by it.[3] Donations D_i are increasing in fundraising spending f_i. The parameter governing the principal's weight on charitable output over her private utility is $\theta_i \in [0, 1]$. She has a differentiable, concave utility function $U(p)$.

These assumptions amount to the nonprofit agent choosing z^*, m^*, p^*, and f^* using Equa-

[2]In the appendix, I also show this model can provide interpretations for why donations crowd *in* following Scott's gift.

[3]For instance, internationally, many estimates of the value of a quality-adjusted life year are larger than the public health intervention required to create it.

tion (1):

$$z^*, m^*, p^*, f^* = \arg \max_{z_i, m_i, p_i, f_i \geq 0} \Big\{ (1-\theta_i) \big[A_i Y(z_i) + b_i \, m_i \, \big] \; + \; \theta_i \, U(p_i) \Big\},$$
$$\text{s.t.} \quad W_i + D_i(f_i) - f_i = \sum_{k=1}^{K} z_{ik} + m_i + p_i \tag{1}$$

where $Y(z_i) \equiv \prod_k z_{ik}^{\phi_k}$.[4]

1.2 Economies of scale

Do nonprofits have decreasing returns to scale? Proposition 1 shows that the change in the share of spending allocated to grants can directly answer this question for recipients of a gift from MacKenzie Scott.

Proposition 1. *Let $m^*(W)$ denote the nonprofit's optimal supply of grants at wealth W, and define the grant share of spending:*

$$s_m(W) \equiv \frac{m^*(W)}{z^*(W) + p^*(W) + f^*(W) + m^*(W)}.$$

If grants as a share of spending increased in a positive wealth shock $G > 0$,

$$\Delta s_m \equiv s_m(W + G) - s_m(W) > 0$$

and charitable spending, $\sum_{k=1}^{K} z_{ik}$, was positive prior to the gift, then the production function $Y(.)$ has decreasing returns to scale.

Proposition 1 states that if Scott's recipients had decreasing returns to scale, then the size of their increase in spending would cause them to allocate spending increasingly toward the constant returns to scale charitable output: grant giving. Intuitively, as the nonprofit had declining marginal returns of providing their core good or service, the nonprofit would see higher relative benefits to transferring funds directly to organizations or people where the money would go to better use.

The proof (in Appendix C.1) relies on computing Δs_m under various assumptions for

[4]Propositions 1 and 4 does not rely on $Y(.)$ taking a Cobb-Douglas form, but Propositions 2-3 do. This assumption is motivated by empirical results that input shares for both savings and indirect costs remain constant after the wealth shock. If nonprofits face the constraints in Assumption 1-2 and production were not Cobb-Douglas, those results suggest a wealth-induced change in input shares was exactly cancelled out by any effect of loosened constraints, which is unlikely to hold for multiple outcome variables.

the shape of $Y(.)$. The proof reveals that if the relative input share of grants increases after the gift, it must be through an increase on either (1) the intensive margin or (2) the extensive margin. Case (1) can only materialize if a slack non-negativity condition for m remained slack after the gift because Y is has decreasing returns to scale. Case (2) can only materialize if the non-negativity constraint bound at W but became slack at $W + G$, a phenomenon which again implies that the production of non-grant goods has decreasing returns to scale. In other words, the nonprofit's objective is quasi-linear utility, and there are no wealth effects for inputs z^*, p^*, f^* above a minimum wealth threshold. All incremental wealth after the threshold is devoted to the numeraire, m^*, and so its share of spending on m^* out of wealth increases.

1.3 The nonprofit starvation cycle

The nonprofit starvation cycle (NSC) hypothesis asserts that nonprofits are constrained in their ability to save funds for future use and to spend money on indirect costs because donations are earmarked for immediate use on charitable projects. As a result of this constraint, nonprofits must allocate sub-optimally low funds to indirect cost and have lower charitable output. Donors, seeing that lower productivity of their marginal dollar, give less and the nonprofit produces less charity than what they could otherwise without a constraint. The cycle continues because donations are again lower in future periods, and so the nonprofit remains constrained. Restrictions on savings work similarly. The nonprofit's productivity may vary from year to year based on needs of their target population, and even though maximizing the present value of charity means saving some of current donations, the nonprofit cannot with restricted donations. Without producing enough charity by having the flexibility to move funds between periods, the nonprofit remains constrained.

In this section, I use the model to design the first empirical tests of this hypothesis using relative spending on indirect cost.[5] Specifically, the NSC hypothesis is that donations *constrain the nonprofit's resource allocation* because some donations cannot be used for a given input. The empirical test hinges on finding empirical evidence that this constraint is binding.

Under the framework of my model, restricted donations are equivalent to wealth that is earmarked only for use on input good $z_{j1} \equiv d_i$ termed "direct cost" and not for "indirect costs" $z_{j2} \equiv \iota_i$, fundraising f_i, or private benefits p_i. This restriction in reality takes the form of donations given for specific projects where allocating elsewhere is accompanied by legal or reputational risk. Consequently, the nonprofit starvation cycle hypothesis can be distilled to an additional constraint on the nonprofit objective, Assumption 1.

[5] Appendix C.2.2 presents the analogous proof for relative allocation of wealth to saving.

Assumption 1. *Fraction $\eta_i > 0$ of donations D_i cannot be used for indirect costs. In other words, the nonprofit also faces a new constraint in its objective function:*

$$\iota_i \leq W_i + (1 - \eta_i) D_i$$

Proposition 2 then shows the empirical content of the nonprofit starvation cycle hypothesis: that with a large unrestricted gift, a constrained nonprofit should weakly increase its indirect cost spending.

Proposition 2. *Define the indirect cost ratio at a wealth level W as*

$$s_\iota(W) \equiv \frac{\iota^*(W)}{d^*(W) + \iota^*(W)}.$$

When $\theta = 0$, if the change in the indirect cost ratio is zero,

$$\Delta s_\iota \equiv s_\iota(W + G) - s_\iota(W) = 0,$$

the "nonprofit starvation cycle" constraint (Assumption 1) was slack prior to gift G.

The "constrained" nonprofit is one where the donation earmark constraint in Assumption 1 binds. The proof makes clear that, under the situation where this constraint binds prior to the gift, spending will increase if the constraint becomes slack after the gift. If the constraint remains binding, spending on the input can either increase or decrease depending on how restricted the crowded in donations are. For the indirect cost ratio to remain constant, then the NSC constraint must have been slack before and after the gift – in other words, the nonprofit did not have a constraint that is a hallmark of the "nonprofit starvation cycle." The Proposition consequently allows an exogenous unrestricted donation to test directly whether the nonprofit starvation cycle constraint holds for a recipient.

1.4 Principal agent conflicts

Do nonprofit organizations face principal agent conflicts? Unrestricted donations, by design, cede control from donors to internal stakeholders to direct funds. Proposition 3 shows that, if we can measure an empirical proxy of these benefits p^*, then an increase in that proxy after the gift demonstrates the existence of reallocation.

I use base pay of senior executives as my proxy because (i) directors retain some residual control rights to the firm's assets and consequently should receive some of benefits p^* and (ii) the assumption that the marginal product of labor of directors is unaffected by the gift could be more reasonable than the analogous assumption for the CEO.[6] Assumption 2 and 3 formalize these statements.

Assumption 2. *A director's wages is the sum of her marginal product of labor (MPL) and potential private benefits.*

$$(Director\ Wage)_{it} = p_{it} + (Director\ MPL)_{it}$$

Assumption 3. *Scott's gift did not change the marginal product of labor of directors:*

$$(Director\ MPL)_{it}(W_{it}) = (Director MPL)_{it}(W_{it} + G_i), \quad \forall \quad nonprofits\ i. \tag{2}$$

Invoking Assumption 3 for base pay is far more reasonable than invoking it for total compensation, which includes incentive pay that could be confounded by other unobserved variables. In particular, this statement rules out "pay for performance" of directors that is reported through base pay rather than bonuses. While Scott's gift was unexpected, nonprofit managers could have reasonably been rewarded for any fundraising effort that could have been perceived to contribute to their selection as a grantee. Since such rewards are often structured as one-time bonuses, this reward should not appear in base wages, Director Wage_{it}. Assumption 2 is also more compelling for base pay if that firms were financially constrained. Howell and Brown (2023) posits that financially distressed firms borrow short-term from employees then pay back after a cash windfall. Assumption 2 eliminates the possibility that this repayment happens through the base pay of senior employees, as this repayment would more reasonably occur through bonuses.

Proposition 3 then directly follows from the two assumptions and shows principal agent conflicts can be detected in the wake of Scott's gift.[7]

Proposition 3. *Under Assumptions 2 and 3, if director wages increase after a wealth shock, then then $\theta_i > 0$.*

The proof is straightforward and detailed below.

Proof of Proposition 3. Because of Assumption 2, the change in director wages after Ms.

[6]For example, Gabaix and Landier (2008) present a model where CEO pay scales with organization size, which did grow due to Scott's gifts.

[7]The result can also be generalized to a circumstance where the directors' marginal products of labor can be successfully controlled for using observable variables, such as the size or sector of the organization.

Scott's gift can be written as:

$$\text{Director Wage}^*_{it}\left(W_{it}+G_i\right)-\text{Director Wage}^*_{it}\left(W_{jt}\right)=f\left(\theta_i\right)\left[p^*_{it}\left(W_{it}+G_i\right)-p^*_{it}\left(W_{it}\right)\right]$$
$$+\left(1-f\left(\theta_i\right)\right)\left[(\text{Director MPL})_{it}\left(W_{it}+G_i\right)-(\text{Director MPL})_{it}\left(W_{it}\right)\right] \quad (3)$$

Assume $\theta_i = 0$. Then $p^*(W) = p^*(W') = 0$, so the first term is zero. By Assumption 3, the second term is also zero, so the change in director wages with a gift G is zero. This is the contrapositive of what we'd like to prove because the support of θ_i is $[0, 1]$. So, if director wages do change after a wealth shock, then $\theta_i \in (0, 1]$, which means $\theta_i > 0$. ■

2 Setting

The size and unanticipated nature of MacKenzie Scott's gifts to hundreds of nonprofits between 2019-2022 make these gifts an ideal setting in which to study the impact of unrestricted grants. News reports and Ms. Scott's blog posts corroborate that nonprofits were unaware of the gift until shortly before receiving it.

2.1 "Transformative" gifts

Since 2019, philanthropist MacKenzie Scott has given \$16B to 1,900 nonprofits. These gifts were large on an absolute and relative scale. Figure 1 shows the distribution of relative gift sizes for my sample of 2019-2022 gifts. This shows that the average gift received was \$8.4M and 97% of all revenue the recipient had received in 2019. Scott's gifts often referred to as a "game-changer", "significant", and "transformative" for recipients (on Wheels America, 2020; Turtinen, 2022; Nash, 2023; *Hired Receives A Transformative Donation From MacKenzie Scott*, 2024). Appendix Figure A.2 shows that these gifts focused on "Direct Service Organizations" – food, housing, and human services organizations like the YMCA, Communities in Schools, and Meals on Wheels that spend money to provide goods and services directly to individuals in need. 28% of gifts in my final sample were given to funders and philanthropy support or "grant giver" organizations who primarily collect donations then distribute them via grants within particular specialty areas, such as LiftFund, the Hispanic Scholarship Fund, or the Pittsburgh Foundation[8]. For 88% of nonprofits, her gift was the largest unrestricted gift they had ever received (Buteau et al., 2021).

[8] I define these organizations as those that, prior to receiving a gift from MacKenzie Scott, devoted at least 9% of their expenses to grants to organizations and individuals.

2.2 MacKenzie Scott's gifts were unrestricted and unanticipated

MacKenzie Scott's gifts allow us to assess the impact of a large, unrestricted gift on a nonprofit recipient because her gifts were unanticipated and not fundraised for. Ms. Scott has been public about the lack of restrictions associated with her gifts. In announcing one round of gifts, she mirrors the language of the "nonprofit starvation cycle". She states, "not only are non-profits chronically underfunded, they are also chronically diverted from their work by fundraising, and by burdensome reporting requirements that donors often place on them." As a result, "the entire commitment would be paid upfront and left unrestricted in order to provide them with maximum flexibility" (Scott, 2020b). Specifically, the team "welcomed them to spend the funding on whatever they believe best serves their efforts."

Her process between 2019-2022 also left gifts unanticipated. She describes a process of "quiet research" culminating in sharing the gift with the nonprofit leadership "for the first time over the phone", specifically with the goal to "give them an immediate gift for use however they choose." Buteau et al. (2021) reports that only 44% had an interview with Scott's team, and 28% had to provide financial documents. Despite the possibility that half of recipients had some advance notice, news reports emphasize the shock of nonprofit executives because of the short vetting process. Reporting on these gifts include quotations such as:

- *"When I first received an email, it just said, "There's a donor who's potentially interested in giving money to the college. Would you have time to have a conversation with me?" And that's really all it said... So it was kind of, Is this real? Is this fake? What's the deal? But I did have a conversation with somebody doing some research for [Scott]. By the end of the conversation, she basically said that MacKenzie would be giving us $8 million."* (Olmstead, 2021)
- *"In a seemingly random act of kindness, a nonprofit C.E.O. receives an email from one of Scott's aides"* (Schleifer, 2023)

That shock is important to identification because it means that executives had little time and inclination to spend out of the gift before receiving it. Panel data can identify the effect on nonprofits of the gift as long as the date at which they began to act on the gift was simultaneous with the date that MacKenzie Scott reported the gift as being given. Appendix Figure A.3 shows that the time series of key outcome variables for recipients and their matched control nonprofits look similar in the years prior to the gift then experience a noticeable break in trend.

Lastly, unlike most previous documentation of large gifts, the gifts were not fundraised for. The benefit of this lack of fundraising is that spending should not be subject to a flypaper effect. Consequently, resources have no *a priori* reason to flow to fundraisers, and the gift is a windfall whose funds could be directed anywhere in the organization.

The primary limitation of this study's ability to measure the impact of large, unrestricted gifts on 501(c)(3)'s is the endogeneity of the choice of recipients. While precise scoring has been kept opaque to prevent fundraising for her gifts, Ms. Scott describes the diligence process as "data-driven and rigorous." Selected nonprofits have "high potential for sustained positive impact, including stable finances, multi-year track records, measurement and evidence of outcomes, and experienced leadership representative of the community served" (Scott, 2020b). This assignment mechanism had at least two measurable implications. First, the recipients are far larger organizations than the median 501(c)(3) (Table 1). Their size could be a result of higher productivity and could make their responses to a cash windfall non-representative of the full population of charitable organizations. Second, recipient nonprofits skew toward human services and grantmaking (Appendix Figure A.2). Consequently, I match each recipient to an untreated nonprofit and assume the treated nonprofits would have had parallel trends in their outcome variables to the untreated nonprofits to identify their counterfactual path of spending and saving. Details on this approach are left to Section 4.

3 Data

This paper uses MacKenzie Scott's public disclosures on her unrestricted giving on YieldGiving and financial information of U.S. nonprofits from the IRS Form 990 tax returns posted online by the Internal Revenue Service in order to identify the gift recipients and then the impact of the unrestricted grant on their finances.

3.1 Observing the behavior of nonprofits

The Form 990 provides a detailed annual financial record of each nonprofit's activities that will reveal the impact of unrestricted gifts on nonprofit finances. I use two sources of Form 990 filings.

I use the annual Form 990 microdata extracts for the years 2012-2023 on IRS.gov for most financial variables. All firms tax-exempt under Section 501(c)(3) with gross receipts exceeding \$200,000 or assets exceeding \$500,000 during their fiscal year are required to file a Form 990 to the Internal Revenue Service. These extracts report each nonprofit's revenue, expenses, assets, and liabilities by fiscal year. Revenue is broken down by source, including contributions, membership dues, investment income, and program service revenue – revenue generated from providing goods and services for their tax-exempt activity.[9] Contributions are the sum of government grants and donations that come from all other sources, such as grants from foundations and gifts from individuals and corporations. Expenses are broken down by source, including grants provided to individuals, grants provided to organizations and governments domestically and abroad, employee salaries, employee benefits, pension contributions, office expenses, IT expenses, and travel expenses. The breakdown of assets and liabilities has similar detail, including non-interest bearing savings, public and private securities investments, land, building, and equipment capital stock, depreciation, and secured and unsecured loans. Nonprofits also report the number of individuals employed in that year per their W-3.[10] In some cases, I show results separately for grant making organizations and direct service organizations (DSO's). This classification, common in the literature, distinguishes nonprofits who give cash grants to other organizations from nonprofits who provide goods or services directly. I operationalize this classification quantitatively by defining DSO's as nonprofits whose grant funding comprises 9% or less of their annual spending. The remaining recipients are grant makers.

I supplement this panel with the full Form 990 for electronic filers ("EFilers"), whose full tax returns are posted on IRS.gov in full for fiscal years ending from 2016 to June 2024. These are digitally available on IRS.gov only when a nonprofit has filed their tax-return electronically in the year. Filings are added periodically throughout the year as they are received, and the panel includes filings uploaded on or before February 1, 2025. EFiler returns provide additional compensation information, employee counts, and additional detail on the sources of nonprofit revenues, and the allocation of expenses into Program Service, Management and General, and Fundraising. Program Service spending is spending directly related to the tax-exempt "program" of the nonprofit, and one minus the fraction of spending allocated to Program Service will be the nonprofit's "indirect cost ratio", consistent with prior literature on the nonprofit starvation cycle, such as Altamimi and Liu (2022). These full returns provide the compensation of each of their "directors, officers, and key employees."[11] Using this list, I report the compensation of the highest paid employee, who I assume is the CEO. I compute the average director compensation as the average total compensation of the second through fifth highest paid employees on this list. The quotient of the total salaries plus employee benefits and pension contributions, minus the number of individuals

[9] For instance, the Goodwill's program service revenue comes almost entirely from selling clothing in brick and mortar stores.

[10] I do not use these estimates for any nonprofit classified as with NTEE code Q, "International, Foreign Affairs, & National Security", because many of these organizations have multiple locations outside the United States whose employees need not be reported on W-3 forms.

[11] Inclusion in this list of executives is discretionary so the list may not be entirely exhaustive. That said, any executive who is omitted will have her salary added to the line item reporting total salaries.

with positive wages on this list, yields the average compensation per non-senior employee. I define employee compensation as the total compensation for workers at the nonprofit. It is the sum of several reported items on the Form 990: the compensation of "directors, officers, and key employees", "other salaries and wages", "other employee benefits", pension plan accruals and contributions, and payroll taxes. In testing the robustness of compensation increases, I use base and bonus compensation as defined in the Schedule J for nonprofits that provide this detail. When testing predictions of the nonprofit starvation cycle, I compute the expense to asset ratio as the total annual expenses divided by the total assets at the end of the year prior. I compute the expense to liquid asset ratio by limiting assets to the value of non-interest bearing savings, interest bearing savings, and publicly traded securities only. The overhead ratio or "indirect cost ratio" is the amount of spending reported as "Program Service" out of all spending the nonprofit does in the year, where spending could also be considered "Management and General" or "Fundraising" expenses.

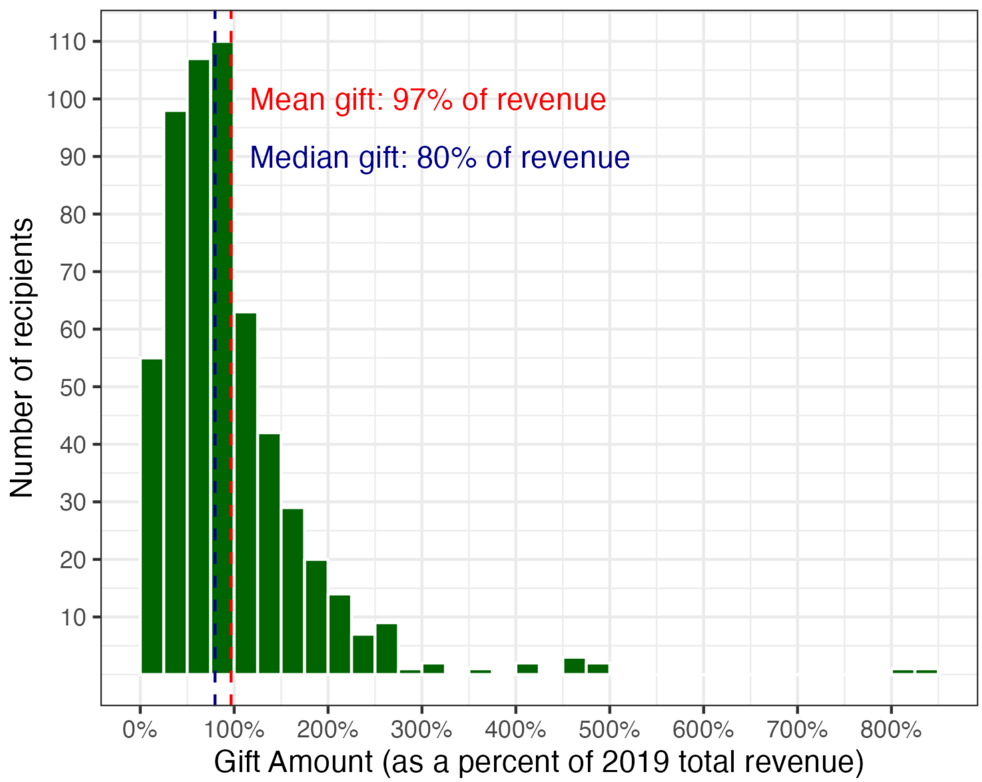
In order to have industry codes for all treated and control nonprofits, I limit my population of 501(c)(3) organizations to organizations that survived through 2022 using the Exempt Organizations Business Master File (EO BMF). The National Center for Charitable Statistics (NCCS) uses the National Taxonomy of Exempt Entities (NTEE) classification system to divide nonprofits into 26 nonprofit groups, similar to a NAICS code for for-profit firms, and the IRS provides this classification publicly only through the routinely updated EO BMF. The resulting dataset of nonprofits is an unbalanced panel of 232K nonprofits and constitutes the Form 990 population to which I merge in unrestricted gift information.

3.2 Identifying unrestricted gifts

My sample of unrestricted gifts is gifts listed on MacKenzie Scott's Yield Giving's website that were directed to the entire organization and disclosed a gift amount between 2019-2022, with a handful of other limitations. Yield Giving's website provides the only comprehensive list of recipient organizations names paired with the year and size of each unrestricted gift and forms my sample. This list of donations provides the name, service area, and URL of the organization alongside the calendar year of donation. 27% of recipients did not list a gift amount and were consequently excluded from the sample.

I further restricted the recipient population to nonprofits who could be matched to my Form 990 population. Using the SOI Tax Stats tool on IRS.gov, I looked up the Employer Identification Number (EIN) for each of MacKenzie Scott's recipients on Yield Giving that allows me to find their Form 990. When these matches were ambiguous, I confirmed the match using URLs listed on Yield Giving with Guidestar Pro, which provides EINs, names, and URLs for this population of 501(c)(3) organizations. I dropped all gifts given to partic-

Figure 1: *Distribution of gift amounts relative to recipient size*



Note: This figure shows the distribution of MacKenzie Scott's gifts as a fraction of the total revenue of recipients in 2019.

ular funds within organizations because these gifts were unlikely to be unrestricted for use across the organization.

Using these NTEE codes, I exclude gifts that MacKenzie Scott gave to churches, hospitals, and universities, since these organizations frequently have multiple subsidiaries that makes tracking the full finances of these organizations challenging. I limit the population of untreated 501(c)(3) organizations used for this analysis to those that were active or not classified by NTEE as of November 2023 using the NCCS's Nonprofit Masterfile so that I limit analysis to nonprofits that survived through the intervention to be comparable to the treated nonprofits.[12] Because my intent is to estimate how restrictedness of donations affect nonprofits, I limit my sample to recipients where donations are at least 20% of their revenue. In order to report effects on employee compensation, I limit the sample to recipients with more than two employees. This focus limits the sample to 567 nonprofits who received funding from MacKenzie Scott between 2020 and 2022.[13] The treated nonprofits were far

[12]Interesting further analysis of these gifts could examine how the gifts changed the survival of other nonprofits, but this is not the focus of this paper.

[13]While Yield Giving lists six gifts given in 2019, none survive the sample restrictions because four do

larger in assets and expenses, more reliant on contributions, and had higher average wages for employees, directors, and CEOs (Table 1, panels 1 and 3).

I validate the timing of the gift using MacKenzie Scott's blog dates, news articles, and gifts of the same size from tax-exempt organizations linked to her. Many nonprofits have fiscal years that end after their calendar year, and this ambiguity prevents the direct match of Yield Giving calendar year dates and the fiscal year that the gifts were realized in Form 990's. I ameliorate this ambiguity in two ways. MacKenzie Scott announced three waves of gifts via blogposts (Scott, 2020a,b, 2022b,a). I use the precise dates of the blog posts to ensure that the gift falls in the correct fiscal year.[14] Next, I use the full universe of grants reported in all Form 990 Schedule I's and Private Foundation returns (Form 990-PF) between 2019-2023 to find gifts that matched Scott's in size. News coverage has cited Scott's transfer of funds through other tax-exempt organizations, such as a DAF through Fidelity Charitable, the Chicago Community Trust, and the National Philanthropic Trust (Schleifer, 2023). Consistent with this reporting, I match the majority of my 567 gifts to a gift from one of these organizations, as well as the Silicon Valley Community Foundation, and use their fiscal date to update treatment timing. As shown in Appendix Figure A.1, the final sample of gifts range in size from less than \$1M to 50M.

3.3 Calculating exposure to restricted donations

How nonprofits use unrestricted windfall donations depends on how constrained they were prior to the windfall. As a result, I study the dosage effect of restrictions on their revenues by defining a measure of a nonprofit's "restrictedness". I define the nonprofit i's "restrictedness" in a given year t as the dollars of government grants and restricted foundation grants D_{fit} from foundations f that the nonprofit receives divided by its total revenue.

$$R_{it} = \frac{\text{Government Grants}_{it} + \sum_f D_{fit}}{\text{Total Revenue}_{it}} \tag{4}$$

A higher percent of revenue that comes from restricted revenue sources corresponds to more constraints on the nonprofit's ability to fund indirect expenses and save. The Efilers dataset lists contributions coming from government grants for each nonprofit. Because I cannot see government-grant-level information in Form 990 data, I assume that government grants are all restricted funds based on the fact that the typical award requires an application to meet

not list a gift amount and two are given to specific projects within the organization.

[14] I updated the gift date to one fiscal year prior for two nonprofits that did not have sufficient contributions in their assigned fiscal year: YWCA Evanston North Shore (EIN: 362193618) and ICIVICS (EIN: 383796793). Since Scott announced gifts after she had already allocated them to recipients, the announcement is an overestimate of the date that the nonprofit actually received their gift.

a specific request and standardized follow on reporting (*The Grant Lifecycle | Grants.gov*, n.d.). Schedule I lists every grant a nonprofit i received from a filing foundation annually, so each listed grant is a D_{fit}. Using these two pieces of data, I compute restrictedness for every nonprofit.

Table 1: *This table lists the unweighted summary statistics of my sample of nonprofits who received a gift from MacKenzie Scott compared to the full set of 501(c)(3) charities and the matched control nonprofits. The control nonprofits were selected with nearest neighbors matching on expenses, donations, grants given, and number of employees in the four years prior to receiving a gift. Nonprofits targeted by MacKenzie Scott were far larger in employee count and annual expenses, but the matched control is far closer in my outcomes of interest.*

	Treated		**Matched control**				**All Form 990 501(c)(3)'s**			
	Mean	Std. Dev.	Mean	Std. Dev.	Diff in Means	Std. Err.	Mean	Std. Dev.	Diff in Means	Std. Err.
Assets ($M)	34.6	117.1	51.3	321.4	-16.6*	8.4	8.1	128.2	26.6***	4.9
Donations and Grants ($M)	19.1	118.8	16.5	65.9	2.6	5.2	1.9	35.7	17.3***	5.0
Expenses ($M)	22.3	122.5	19.0	60.0	3.3	5.3	3.6	44.2	18.7***	5.1
Employees	196.2	544.5	160.3	325.7	35.8	23.9	48.1	283.1	148.1***	22.9
Avg. Employee Comp. ($K)	46.9	31.7	42.7	31.3	4.2**	1.6	29.8	31.8	17.1***	1.4
Avg. Director Comp. ($K)	96.4	106.7	92.8	121.7	3.6	5.2	27.2	109.7	69.2***	4.6
Highest Comp. ($K)	231.9	194.6	238.3	272.5	-6.4	10.1	100.1	315.9	131.8***	8.3

4 Empirical Strategy

To identify the impact of the gift on each recipient, I match each recipient to four financially comparable nonprofits. The recipient sample and comparable nonprofits move in parallel between 2012-2019. With the assumption of parallel trends in the post-period supported by this pre-period co-movement, I can use difference-in-differences to identify the average effect of the gift on the 567 recipient nonprofits.

4.1 Matching recipients to a comparable nonprofit

Because gifts were not necessarily assigned randomly to recipients, I use a matched sample to estimate all my results. I match each recipient of a gift from MacKenzie Scott to another 501(c)(3) using nearest-neighbors-matching. Using expenses, grants given, donations received annually, and number of employees in the four years prior to the gift, I find four non-recipient nonprofit for every recipient nonprofit. The intent of matching on multiple pre-period years stems from the fact that recipients were faster growing than the average 501(c)(3), and so matched controls have similarly larger growth rates than if matching on a single year of financial data. The resulting matched 501(c)(3) organizations are closer in activity and closer in key variables to the treated nonprofits than to the full population of 501(c)(3) organizations (Table 1, panels 1 and 2). Appendix Figure A.3 shows that the mean outcomes of the matched sample also mirror the pre-period trend in key variables in the years prior to MacKenzie Scott's gifts.

4.2 Identifying the effect of gifts on recipients

Assuming (1) that the treated and control nonprofits would have had parallel trends absent treatment and (2) that gifts were unanticipated as suggested by news reports (Section 2) allows me to use difference-in-differences to identify the average effect on the treated (ATET) nonprofits from the gifts.

I explain the utility of these two assumptions with a potential outcomes framework. Define a financial outcome Y_{it} for nonprofit indexed by i and year indexed by t. Assume a potential outcomes framework as in Abadie and Imbens (2006) such that the binary treatment $D_{it} = \{0, 1\}$ affects Y_{it} via $Y_{it} = D_{it}Y_{it}(1) + (1 - D_{it})Y_{it}(0)$ for every period t. The parameter of interest is the effect of the gift, $D_{it} = 1$, k years after the gift for treated nonprofits occuring in year c, $\theta_k \equiv \mathbb{E}_i[Y_{i,c+k}(1) - Y_{ic+k}(0)|D_{i,c+k} = 1]$. The challenge in identifying this treatment effect is the inability to observe the counterfactual outcome in period t, $\mathbb{E}_i[Y_{i,c+k}(0)|D_{i,c+k} = 1]$.

Assuming parallel trends in the matched control and treated nonprofits solves this identification challenge. The following explanation follows Abadie and Imbens (2006) and Rambachan and Roth (2023) to clarify that parallel trends are sufficient in this case. The parallel trends assumption is written formally as:

$$\mathbb{E}_i[Y_{i,c+k}(0)|D_{i,c+k} = 1] = \\ \mathbb{E}[Y_{i,c+k}(0)|D_{i,c+k} = 0] + (\mathbb{E}_i[Y_{i,c+l}(1)|D_{i,c+l} = 0] - \mathbb{E}_i[Y_{i,c+l}(0)|D_{i,c+l} = 0])\, \forall l \neq k \quad (5)$$

This equation says that the expected counterfactual outcome for the treated group is equal to the expected control outcome plus the pre-period difference between the treated and control groups. This amounts to assuming that the expected path of the treated organizations would have continued to move in parallel to their matched control, absent MacKenzie Scott's gift. This assumption requires time to affect the mean of treated and matched control groups equally, so it is misspecified if time trends affect treated and untreated nonprofits differently. For example, if COVID-19 related shutdowns affected the treated and untreated nonprofits differently, then parallel trends would not hold. Matching is intended to find nonprofits that will most likely have parallel trends in the post-period by creating parallel trends in the pre-period. If nonprofits anticipated the gift, then matching would distort the selection of a control that meets the parallel trends assumption.

With these assumptions, the following regression equation then estimates θ_k:

$$Y_{it}^c = \alpha_i + \delta_t + \sum_{k=k_{\min}, k\neq -1}^{k_{\max}} \theta_k 1(t-c=k, D_i=1) \tag{6}$$

In empirical results that measure the percent of the average gift that outcome Y_{it} comprises, I will make two adjustments to Equation 6. For ease of interpretation, I normalize treatment by the average size of the gift G in each fiscal year cohort c, G^c, in Equation (7) similar to recent work estimating consumers' marginal propensity to consume (such as Golosov et al. (2024)):

$$Y_{it}^c = \alpha_i + \delta_t + \sum_{k=k_{\min}, k\neq -1}^{k_{\max}} \tau_k G^c 1(t-c=k, D_i=1). \tag{7}$$

This can be read as the average marginal propensity to consume in Y_{it} out of the average gift, assuming that the timing of the gift was random. As implied by Table 1, recipients varied greatly in size. Consequently, for regressions with Y_{it} measured in dollars or percent of average gift, I weight regressions by inverse average pre-period revenue of nonprofits to correct for heteroskedasticity to improve the precision of my estimates (Solon et al., 2015). The argument for revenue-related heteroskedasticity based revenue is based stems from the fact that annual spending by nonprofits closely matches annual revenue and that for equivalent percent deviations from year-to-year in revenues, expenses of any category will vary on a dollar basis by significantly more for nonprofits that have more revenue. But, because I do not also weight the average gift size by average pre-period revenue and larger gifts are given to larger nonprofits, this estimation without adjustments would bias down estimates of τ_k. As a result, I estimate Equation (7) by quartiles of nonprofit size in a fully interacted regression, then use the delta method to compute my final τ_k. Appendix B explains this approach in more detail.

4.3 Identifying the differential effect of restricted revenue on recipients

In testing the existing literature's predictions about restricted giving, Section 6.2 tests for larger treatment effects based on how restricted the nonprofit was prior to the receipt of

MacKenzie Scott's unrestricted gift. The specification used for these tests is:

$$Y^c_{it} = \delta_t + \alpha_D 1(D_i = 1) + \alpha_R \bar{R}_i + \beta 1(t \geq c, D_i = 1) + \phi \bar{R}_i 1(t \geq c, D_i = 1) \tag{8}$$

where $\bar{R}_i$ is the average restrictedness of recipients prior to receiving a gift from MacKenzie Scott, calculated as in Section 3.3. A significant ϕ is interpreted as a the additional treatment effect from Scott's gift on restricted nonprofits for nonprofits with 1 percentage point more restrictedness.

5 Adding up the impact of the cash windfall: contribution crowd in and spending

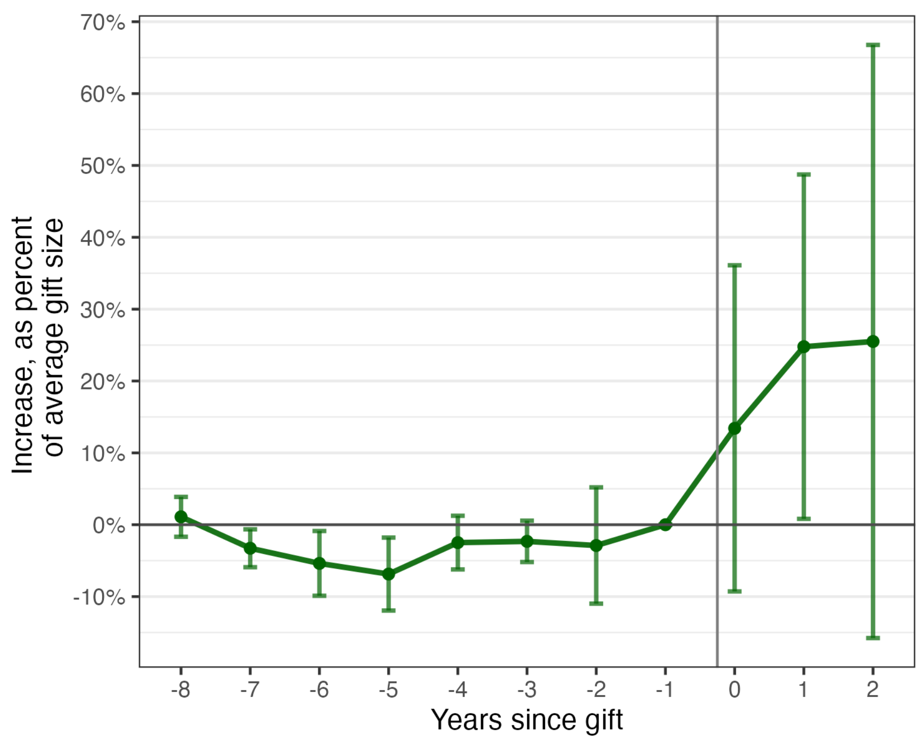
I find that the size of the cash windfall is 164% of the original gift amount because non-profits receive 64% of the average gift amount in additional contributions: donations from foundations, individuals, and corporations and grants from governments. Funded by these additional contributions, nonprofits save the gift then increase their annual expenditures so that they spend the equivalent of the entirety of the gift principal within two years.

5.1 Additional contributions

Nonprofits received 64% of the average gift in additional contributions and grants in the first two years after the gift. I find large heterogeneity between grant givers and direct service organizations (DSO)'s in the types of contributions that crowd in to the recipient. Concurrent increases in fundraising expenses explain only a small portion of the increase.

Figure 2 reports τ_k from Equation (7) for $k = -8$ to $k = 2$ years after receiving a gift from MacKenzie Scott. These results suggest that, in the year of MacKenzie Scott's gift, treated nonprofits received on average of 13% of the average gift ($8.4M) concurrently from the combination of (1) donations from other individuals and organizations and (2) government grants. This rose to 25% of the gift for the next two years, tallying to 64% of the original gift. Appendix Figure A.4 shows that these contributions derivevd from both government grants and new donations from other sources. The breakdown differed for grantmakers and direct service organizations. Appendix Figure A.5 shows the effect on these organizations separately. Grantmakers received 41% of the average gift in donations within two years. For grantmakers, crowd in initially came from new donations, but two years after the gift, these donations had been replaced by an in-kind increase in government grants. Two years after receiving the gift, grantmakers who received a gift from Ms. Scott actually had $0.20 fewer incremental donations per dollar of the average gift received. The transience of donation crowd in at grantmakers supports an interpretation that the gift was a supply shock – a positive signal to donors – but as attention faded, so did the benefits of the gift. Donations are typically preferred to government grants, which are typically restricted for specific uses and administratively taxing. This dynamic could even imply that the grantmakers had to seek the funding to support the expansion they had made in the first 24 months. For direct service organizations, this crowd in was larger – 91% of the gift in total over the following two years – and almost entirely due to non-government donations. There was a smaller concurrent increase in government grants.

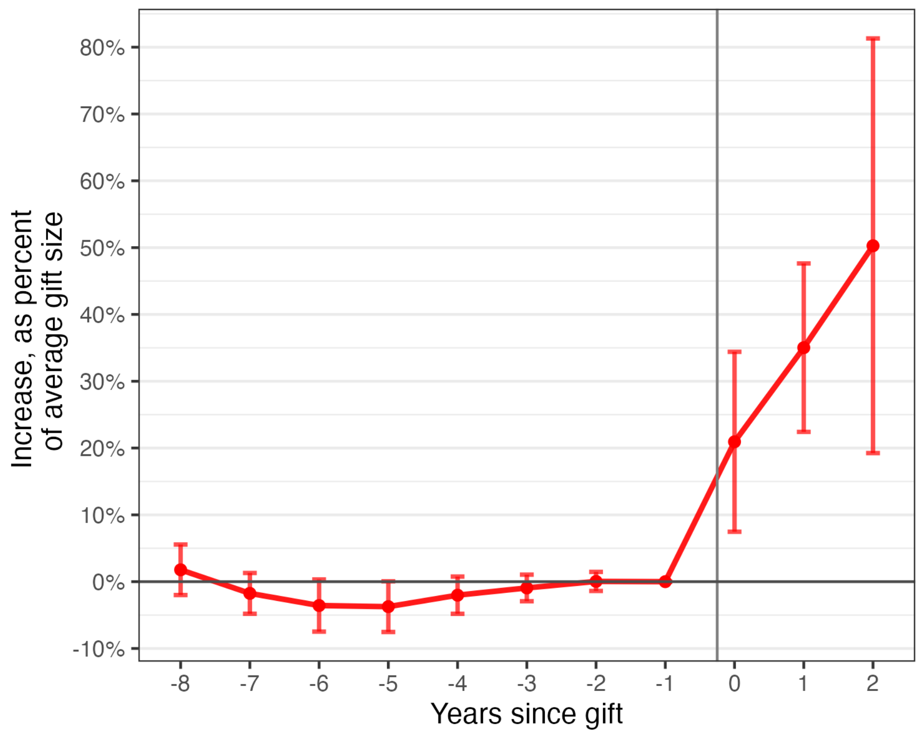
Figure 2: *Additional contributions to targeted nonprofits*



Note: Contribution crowd in at nonprofits who received gifts from MacKenzie Scott. The y-axis shows the estimate of τ_k from Equation (7) for total contributions reported in addition to MacKenzie Scott's gift, measured as a percent of the average gift ($8.4M), with 95% confidence intervals. The x-axis tracks years k since the gift was received. Ms. Scott's gift coincided with a $1.1M increase in donations and grants from other individuals and organizations, rising to $2.1M in the following two years.

Changes in fundraising corroborate the hypothesis that the gift was primarily a donation supply shock. Appendix Figure A.6 shows the percent change in contributions versus the percent change in reported fundraising expenses. Each observation is a nonprofit's percent increase compared to its four matched controls. Observations have been grouped into 18 equally sized bins. While the best fit line is positive, the correlation between the change in fundraising and contributions is only 0.16. In other words, if fundraising is the input good

Figure 3: *Increase in dollars spent*



Note: Total spending out of the gift, as a fraction of average gift size. The X-axis tracks years k since the gift was received. The Y-axis shows the estimate of τ_k from Equation (7) for expenses relative to gift year, with 95% confidence intervals. The point estimates imply that the gift coincided with an increase in expenses equivalent to \$0.21 per dollar of the average gift, rising to \$0.35, \$0.50 after the gift. In other words, two years after the gift, recipients had spent the entirety of their gift, on average.

to "producing" donations, exogenous changes in the marginal donations collected per dollar of fundraising seemed to have explained crowd in more than increases in the input good did. I conclude that while fundraising also contributed to the contribution crowd in, it did not fully explain it.

5.2 Total spending

Concurrent with additional donations, nonprofits increased up spending in the two years after the gift and spent the entirety of the gift in the first two years. Figure 3 plots the fraction of the average gift by which nonprofits increased annual expenditures. I find that annual spending increased steadily starting in the year of the gift from 21% in the year of receipt to 35% and 50% one and two years after the gift. The cumulative effect of this spending is equivalent to spending 106% of the gift within two years. These estimates are larger than the contribution crowd in for each year meaning that a continuing gap would cause the nonprofit ultimately to spend down the entirety of new contributions and the gift in future years.

To investigate whether the growth in spending was associated with the donation crowd in, I plot the relationship between growth in donations and in total expenses for recipients from before the gift to the average of the three years inclusive of receiving the gift in Appendix Figure A.6. I find that percent increases in spending were highly correlated with crowd in, with a linear trend having a correlation of 0.77. The strong correlation in growth (unlike the relationship between fundraising and donations) suggests that nonprofits chose how much they expanded based on the crowd in they received. The one-time gift was a starting point, but contribution crowd in played a role in the resulting size of the nonprofit.

The estimates imply that nonprofits not only spent the principal of the gift but also will deplete the contribution crowd in within five years if crowd in does not grow further. Consider a hypothetical where new contributions and spending are permanent. In this hypothetical, recipients would continue to collect \$0.26 and spend \$0.50 per dollar of the average gift every year. Projecting this forward, recipients would deplete the average gift by five years after receipt and would have to reduce annual expenses. If contributions future years then the contraction would happen even sooner.

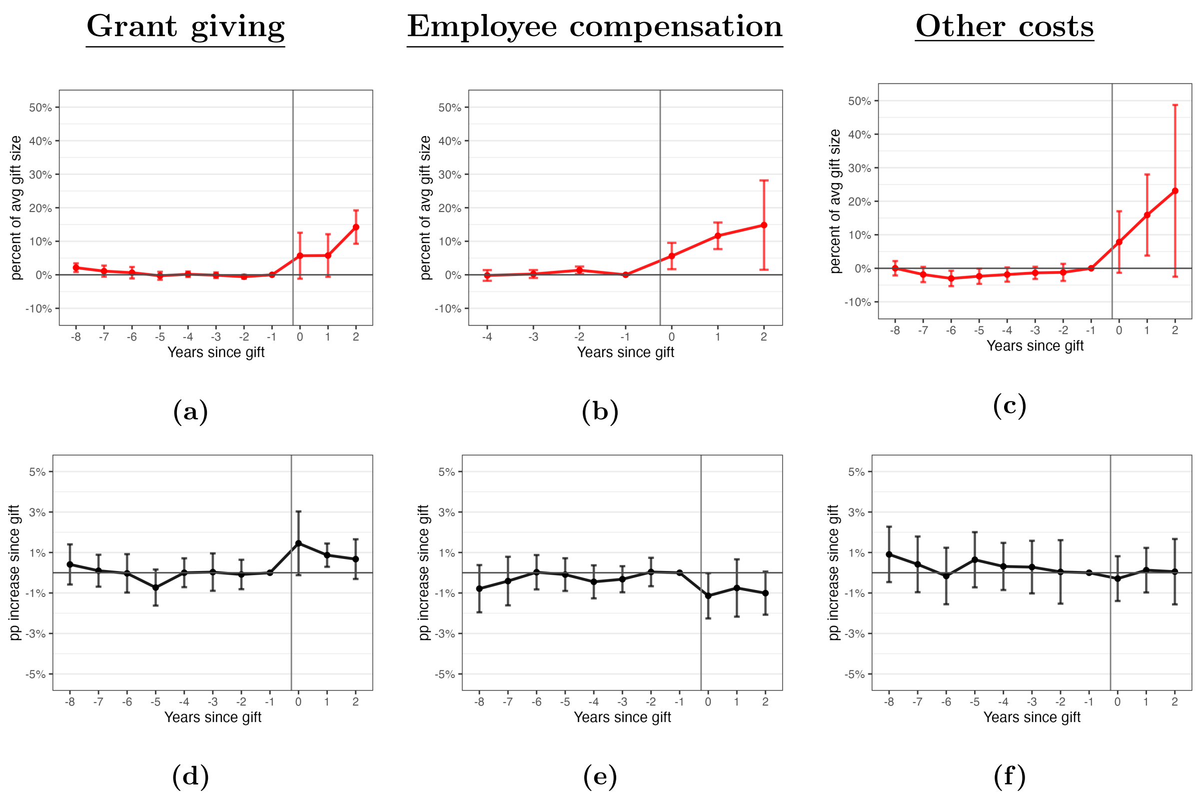
6 Allocation of spending

By two years after the gift, 26% of the average gift was spent on grants to individuals and other organizations, 32% was spent on compensation, and 47% was spent on other costs. In relative terms, while grant giving comprised more of spending than prior to the gift, other spending remained closely in line with pre-existing allocations. I discuss how the results square with empirical tests suggested by the model in Section 1.

6.1 Grant giving

Figure 4, shows the allocation of spending to grant giving by nonprofits in two ways. In panel (a), grant giving comprises \$0.06, \$0.06, and \$0.14 per dollar of the average gift, reporting τ_k from Equation (7). Panel (d) shows that this increase was more than proportional to the spending that recipients had on grant giving prior to Ms. Scott's gift. It reports the binary treatment effect of the gift, θ_k from Equation (6), on the percent of annual spending given as grants to other organizations – 501(c)(3)'s or others – and individuals. Examples from this set of recipients include a food bank transferring funds to churches, school districts, and other food banks. In the years after receiving the gift, nonprofits allocated 1 pp more of spending toward giving grants. This measure is the total dollar amount given in grants and

Figure 4: *Allocation of spending*



Note: (a, b, c) As treated nonprofits increased their annual spending, they spent more money on grants, compensation, and all other costs. (d, e, f) Grants became 1.5 pp (at 90% significance level), 0.9 pp (at 95% significance level), and 0.7 pp (insignificant) more of total spending in years after the gift. Compensation reduced commensurately, and other expenses remained proportional to their previous amounts. The y-axis range is the smallest interquartile range of these three fractions (percent of grants).

does not include any supporting costs of selecting grantees and administering the grant. In other words, this spending is the dollars of cash given directly in the tax-exempt purpose either to related organizations or to the population to whom the nonprofit typically provides goods and services.

Appendix Figure A.8 shows this change in allocation is observable only in DSO's. Two years after the gift, 2.5 pp more of DSO spending went to grants (panel (a)), which more than doubles the percent of annual spending devoted to grants prior to the gift. In contrast, the relative allocation toward grants remained constant for grantmakers, who were already spending more than 9% of annual expenses on grants. This change in allocation pairs with the high marginal propensity to consume out of the gift. Applying Proposition 1, the results imply that DSO recipients on average had decreasing returns to scale in charitable production.

Table 2: *This table shows the outcome of Equation (8) for overhead ratio, expense to asset ratio, and expense to liquid asset ratio (columns (I), (III), (V)). If recipients had suboptimal overhead ratios or too large expense to asset ratios due to donation restrictions, then a large unrestricted gift should change their level. No coefficients in those specifications are significant. This friction should affect nonprofits with higher restricted donations more, and so columns (II), (IV), and (VI) interact receiving a gift with the fraction of prior revenues that were restricted. This coefficient on this new term is also not significant.*

	Overhead ratio		Expense to liquid asset ratio		Expense to asset ratio	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Post	0.00753	0.00841	-2.03	-1.52	0.0226	0.0678
	(0.00572)	(0.00738)	(1.56)	(2.60)	(0.1360)	(0.1346)
Post x (Percent of revenue restricted)		-0.00312		-1.81		-0.171
		(0.00931)		(5.60)		(0.312)
Num.Obs.	17636	17636	17925	17925	25967	25967
R2	0.663	0.663	0.251	0.251	0.552	0.552

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Testing predictions about unrestricted giving: Indirect costs and saving

In this section, I use Propositions 2 and C.2 to test for the presence of the nonprofit starvation cycle in recipients of gifts from MacKenzie Scott. I find that recipients do not increase relative indirect costs after the gift and do not increase their relative asset reserves.

Indirect cost ratio. Table 2 shows that the indirect cost ratio at recipient nonprofits neither increased nor responded differentially based on the percent of revenue that was restricted prior to the gift. In column (I), when applying Equation (8) for nonprofit's indirect cost ratio without the α_R and ϕ terms, the coefficient β is insignificant, so nonprofits did not increase their indirect spending after receiving Scott's gift as a fraction of all spending. Next, increasing the amount of restricted revenue for the nonprofit had prior to receipt did not differentially increase indirect spending. Column (II) shows all terms in (8). The term with an interaction between being treated and the percent of revenue restricted shows the higher treatment effect that restricted recipients could have had prior to the gift. The coefficient ϕ is insignificant, suggesting that a higher prior exposure to restrictions – a possible hallmark of underfunding – makes them no more likely to fund indirects. The lack of increase, consistent with Proposition 2, suggests that recipients were not constrained in their allocation to indirect costs prior to the gift. Importantly, if the aggregate test masks heterogeneity wherein some recipients increased overhead ratios and others decreased, then the hypothesis of Proposition 2 fails to hold and the test cannot disprove that recipient nonprofits were constrained prior to the gift.

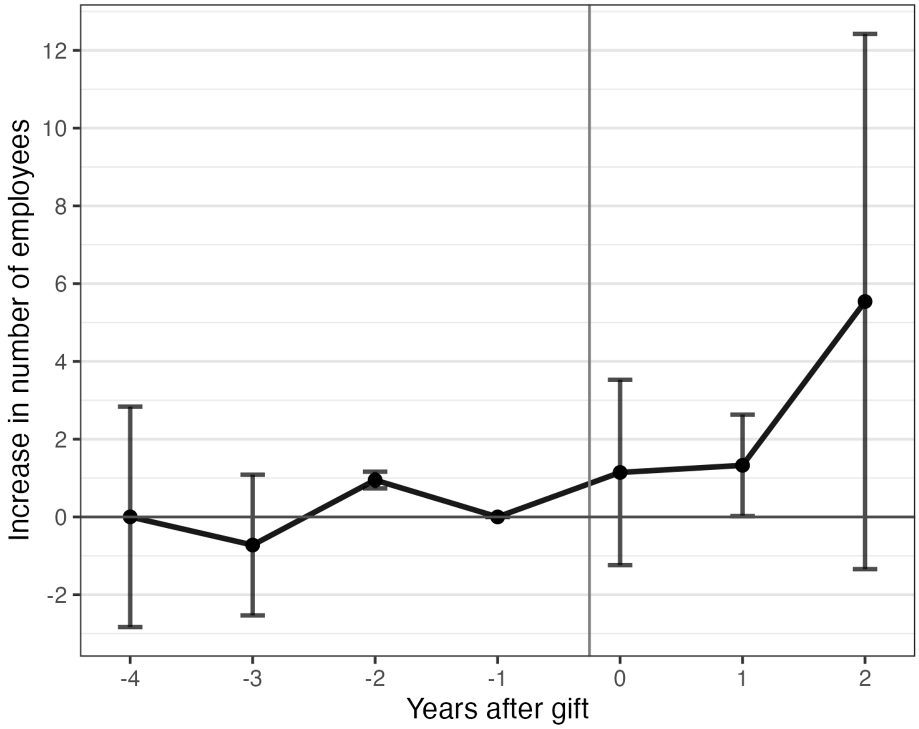
Expense to liquid asset ratio. Nonprofits, like consumers and firms, hold a reserve of liquid assets for emergencies or large changes in investment opportunities. The starvation cycle literature states that donors' elasticity to the percentage of their gift used directly on charitable activities could drive suboptimal liquid savings. A large unrestricted donation should reduce that constraint and allow nonprofits to hold more buffer stock. I test relative spending out of total wealth and out of liquid wealth to create marginal propensity to consume (MPC) estimates analogous to estimates in Kaplan and Violante (2022). Table 2 shows that the gift did not change the average amount of buffer stock relative to annual spending for treated nonprofits by either definition. In column (III), the coefficient is insignificant on treatment for the expense to liquid asset ratio, defined as the sum of non interest bearing and interest bearing savings and investments on public markets. In column (IV), the interaction with percentage of revenue previously restricted did not create any differential effect. The lack of change implies recipients did not seem to have dire liquidity constraints prior to the gift. This is robust to treating the nonprofit's buffer stock as their full asset balance, as shown in columns (V) and (VI). The resulting lack of evidence for liquidity constraint contrasts the prevailing hypothesis that nonprofits close to financial distress from restricted donations and that, according to Proposition C.2, saving should increase if constrained. That said, the regression results describe only the average effect on the treated nonprofits, so as with the indirect cost ratio, heterogeneity between nonprofits is possible and would threaten the hypothesis of Proposition C.2.

6.3 Employee compensation

Panels (b) and (e) of Figure 4 show the analogous exercise to document the level and relative allocation of compensation of workers at recipient nonprofits. Panel (b) shows the estimate of τ_k from Equation (7) for total employee compensation. This estimate is the total wage bill at the nonprofit, including salaries and wages of non-senior and senior employees, plus other employee benefits, pension contributions and accruals, and payroll taxes. Recipients spent an increasing amount on compensation after receiving a gift: \$0.06 per dollar of the average gift in the gift year, then \$0.12 and \$0.15 annually, comprising 32% of the gift principal two years later. Panel (e) shows the estimate of θ_k from Equation (6) for percent of spending allocated to employee compensation. Relative spending on compensation declined slightly as a counterweight to increased grant giving.

The increase in compensation stemmed from hiring and from higher pay for existing workers. Figure 5 shows the estimate of θ_k from Equation (6) weighted by inverse pre-period revenue. Nonprofits hired 5.5 more employees two years after the gift – a 2.9% increase. The remaining increase in compensation accrued through increasing compensation

Figure 5: *Employees*



Note: This figure shows the increase in employees at recipients of Ms. Scott's gift. The y-axis shows the estimate of τ_k for number of employees, with 95% confidence intervals, from Equation (6), weighted by inverse pre-period revenue for the number of employees reported. The x-axis tracks years k since the gift was received. Two years after the gift, the average nonprofit has 5.5 additional employees.

of workers. Figure 6 shows the increase in wages using θ_k from Equation (6) for three types of employees: the highest paid employee (my proxy for the chief executive officer), directors (the average wage of the second through fifth highest paid workers), and the average non-senior employee. This figure shows that compensation of the highest paid employee increased \$20.9K two years after the gift. The compensation increase for directors and for employees were a smaller \$13.1K and \$2.7K respectively. These estimates are increases off of different baselines – highest compensation increased 9% from the average 2019 value, versus 13.6% for directors and 5.8% for the average non-senior employee. Appendix Figure A.9 shows that the aggregate annual incidence of director compensation of annual spending peaks at \$0.017 per dollar of the average gift two years after receipt. The increase in compensation for executives comes almost entirely from increases in base pay. Appendix Figure A.10 shows the same event study as Figure 6 but only for base pay from recipients and control nonprofits whose Form 990 included Schedule J. Increases in base pay in this population are of almost identical magnitude to increases in total compensation.

Figure 6: *Wage increases by worker seniority*

Note: This figure shows the increase in wages at recipients for three types of employees: the chief executive officer, the average director, and the average non-senior employee. In red, the compensation of the chief executive (proxied by the highest paid employee at the nonprofit) increases to \$20.9K compared to matched controls two years after receiving a gift from Ms. Scott. In blue, the compensation of average director (proxied by the average compensation of the second through fifth highest paid individuals) increases \$13.1K. In green, the average compensation of a non-senior employee increases by \$2.7K.

Appendix Table A.1 shows that there were no significant differential increases in compensation based on the restrictedness of the targets nonprofits. Appendix Figure A.11 shows these estimates weighted by the inverse of nonprofit size – the weighting used for all other outcome variables in the paper up to this point. Unweighted is my preferred specification because employee wages and do not exhibit the same size-related heteroskedasticity that the other spending-related outcomes do as discussed in more detail in Section 4.2. Results for the highest paid employees is quantitively similar, but the estimated wage increase for non-senior employees is more modest than in the unweighted specification.

6.3.1 Comparing incidence with for-profits using present value

The most intuitive way to understand the estimates for senior wage increases are in terms of the present value of cash flows. Unlike most other choices of input spending, wages exhibit downward nominal rigidity – in other words, nominal wages rise but rarely fall. As a result, the one-time increase in wages is more likely to be permanent than the increases in other spending categories such as grant giving or indirect costs. Compensation for the five highest paid employees accounted for \$0.017 of every dollar of the average gift. The translation of this estimate to the present value of those costs requires an assumption for the nonprofit's discount rate r, as shown here:

$$PV_{\tau} = \tau_0 + \frac{\tau_1}{1+r} + \sum_{s=2}^{\infty} \frac{\tau_2}{(1+r)^s} \tag{9}$$

As a result with an assumption of the prevailing interest rate $r = 4.5\%$, the gift arriving one-time with once-and-for-all wage increases means that the top five executive wage increase actually comprised \$0.37 of every dollar of the average gift. Using the interest rate at the onset of Scott's gift giving in 2020, $r = 0.10\%$, this estimate is far larger, exceeding the size of the gift. Because the wage profile continued to grow over the two years after the gift, a more conservative estimate also takes into account the contribution crowd in as part of funds off of which nonprofits increased wages. Dividing the present value of wage increases by the present value of the gift and additional contributions (\$1.605) yields an estimate of \$0.23 per dollar or windfall was allocated to wage increases for the top five executives.

Ohrn (2023) provides a prominent recent estimate of spending out of cash windfalls for for-profit, publicly traded firms. His analysis of two tax changes suggests that \$0.17-0.25 of every windfall dollar is allocated toward the pay of the five highest paid employees. My analogous estimate, \$0.37, is larger but in the same range (\$0.23) when adding contribution crowd in to the denominator. In sum, the windfall-related senior compensation increases at recipient nonprofits are quite similar to estimates seen at for-profit publicly traded firms.

6.3.2 Mechanisms

The increase in senior wages has three potential mechanisms: implicit compensation contracts, pay for performance, or, as Proposition 3 suggests, agency frictions. Interpreting the primary mechanism by which wages increased requires evaluating how feasible the model's assumptions are in this setting and evidence for and against alternative mechanisms.

Wage increases due to an implicit employer-employee contract would take the form of employees temporarily lending funds to the firm on the condition of receiving bonuses in liquid times. Howell and Brown (2023) presents evidence of this mechanism for implicit equity financing for liquidity constrained firms in describing the wage increases at for-profit firms receiving research grants. Liquidity constrained firms, by definition, have a borrowing limit because of imperfect capital markets. As a result in this mechanism, firms find it easier to borrow from their employees. In that context, wage increases are not a function of effort but simply a contracted bonus written for firms with pre-existing liquidity constraints. The phenomenon predicts wage increases to scale with tenure at the firm, which is related to the seniority I find. Without seeing these contracts explicitly, I cannot rule out this mechanism from consideration – Assumption 2 simply rules it out. However, this mechanism necessitates pre-existing liquidity constraints at recipients and the gift relieving those constraints. In Section 6.2, I find scant evidence from relative choices to spend and save that recipients were liquidity constrained prior to the gift. Furthermore, if this mechanism were responsible, I would expect to see wage increases come primarily in the form of temporary bonuses in the year of the gift then diminish in the subsequent years. Instead, wages increase consistently starting in the year of the gift.

Another explanation of the wage increases is pay for performance: that the raises fairly rewarded the increase in worker's marginal product of labor. Production permanently and dramatically increased at nonprofits who received a gift. With the sizable increase in nonprofit spending, the marginal product per worker increased dramatically and workers could have rightfully been paid more. Furthermore, spending does not equate to the total social output of the nonprofit, so the ratio does not have a portable interpretation as an "marginal product" as this ratio does at for-profit firms (Gabaix and Landier, 2008). Consequently, this relative increase would have to be explained by recipients seeing the gift as a reward for past effort. Although the gift was unexpected, recipient nonprofits could have seen Ms. Scott's attention as a reward for the past strong performance of the organization. Under this hypothesis, the marginal benefit of the efforts expended by directors and the CEO was larger than by employees. The differential benefits could have been due to the primary role executives play in fundraising Pagnoni (2023), something I could validate in future work by investigating the job titles that experienced wage increases. However, pay for performance still does not address why compensation increases were concentrated in base pay.

The remaining potential explanation is that the differential increase in senior wages was due to agency frictions on the part of internal nonprofit stakeholders. This interpretation requires invoking both Assumptions 2 and 3. It is supported by the differential increase to senior employees and aligns with empirical research of for-profit firms. This phenomenon is also central to arguments for restricted giving, which could be an indicator that it is a realistic concern.

7 Conclusion

MacKenzie Scott's gifts were massive – in the initial gift size and in the ability for nonprofits to raise additional funds in the years following the gift. Nonprofits received 64% of the average gift in additional contributions and spent the 106% of the gift within two years. While a large body of work has demonstrated such announcements of support can influence the additional funding nonprofits receive, much less is known about the ways that nonprofits would allocate these funds.

A model of nonprofits maximizing charitable output subject to donation restrictions guides the interpretation of this allocation. I document that the gift altered the allocation of recipient spending. In particular, nonprofits more in relative and absolute terms giving grants to other organizations and individuals. While in tax documents, the social value of charitable output created is unobservable, under the assumption that nonprofit recipients spend optimally, the change in allocation provided new insights on the charitable production function. In particular, charitable production for recipients seemed to exhibit decreasing returns to scale. The lack of changes in indirect cost spending and saving of liquid and illiquid assets suggests that recipients were not constrained in this spending prior to the gift.

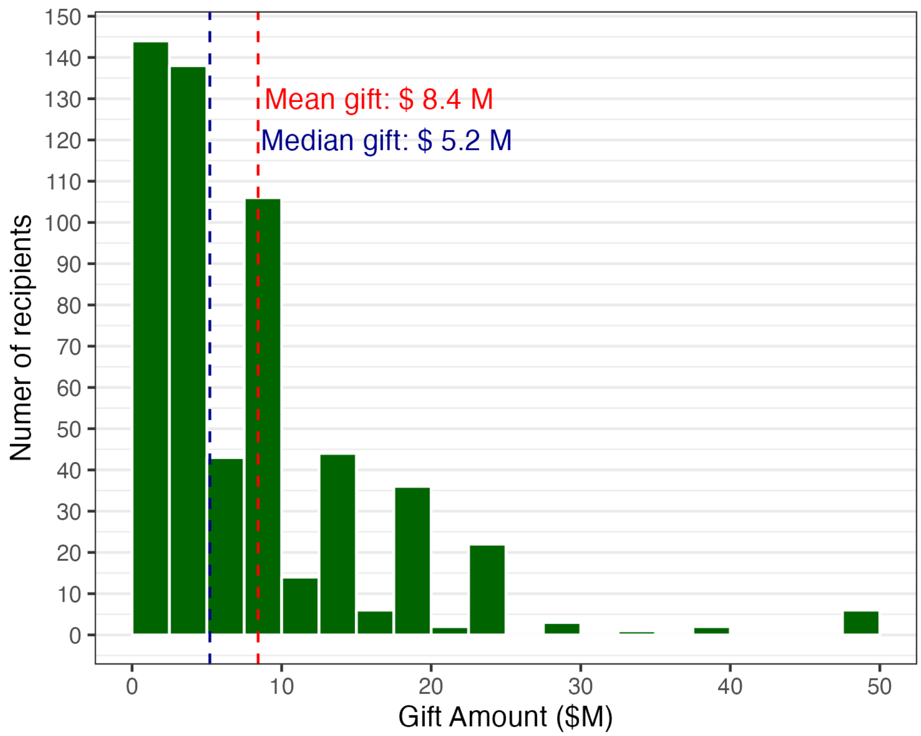
One potential interpretation of these findings is that internal stakeholders did receive additional funds. CEO compensation, typically used as a bellwether of this reallocation (Blanchard et al., 1994; Bertrand and Mullainathan, 2001; Ohrn, 2023), increases, and so do employee wages as in Howell and Brown (2023). As a percentage of the windfall, the estimates are similar in magnitude than estimates at for-profit firms but could suggest that agency frictions present at for-profits persist at nonprofits. Importantly however, wage growth could have also been a result of pay-for-performance and still occurred off of a low baseline (where annual total compensation is just $232K for executives, $99K for directors, and $47K for non-senior employees).

Regardless of its mechanism, wage increases have the potential to accrue in size in the long-run. This concern is heighted in a context where nonprofit spending surges are often temporary when caused by exogenous swings in the popularity of particular causes (Greenstone, 2020; Dervishi, 2023). The observed contribution crowd in could be subject to similar concerns, and large wage adjustment costs would prevent wages from decreasing if additional contributions were to fade.

A Appendix Tables and Figures

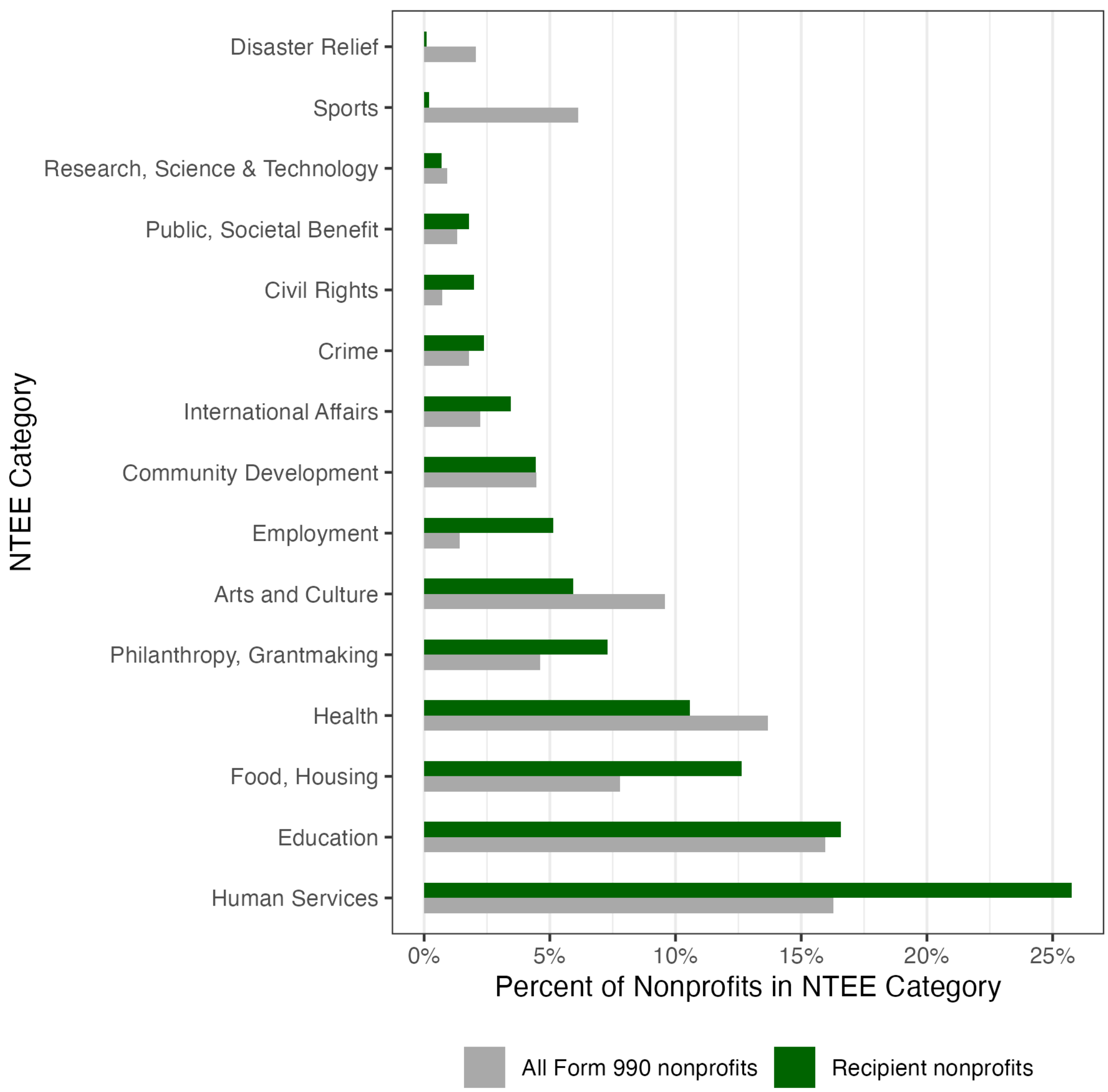
A.1 MacKenzie Scott's gifts: additional details

Figure A.1: *Distribution of gift amounts*



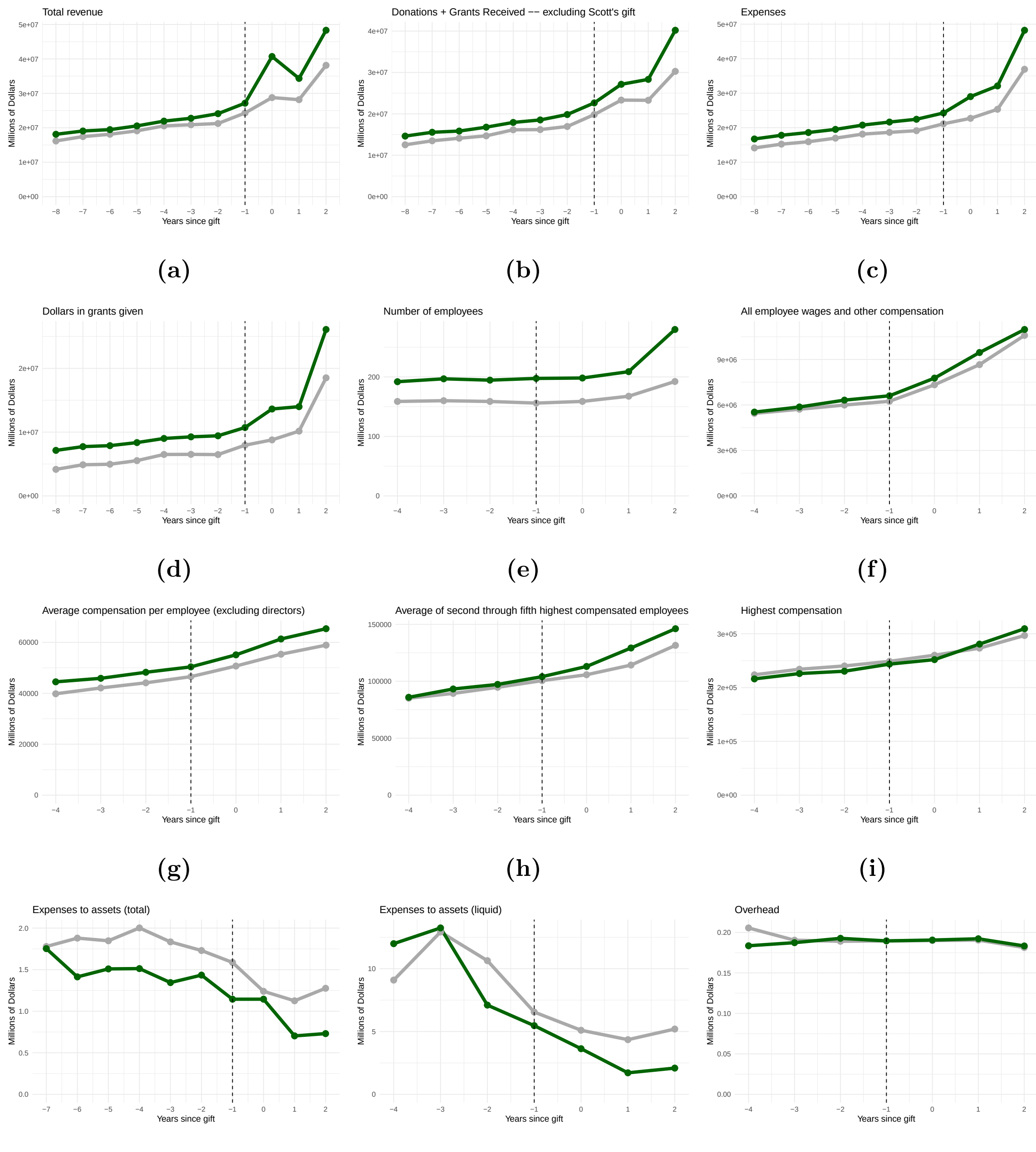
Note: This figure shows the distribution of MacKenzie Scott's gift amounts in millions of dollars.

Figure A.2: *Sectoral distribution of gifts*



Note: This figure shows the sectoral distribution of recipient nonprofits versus the full population of nonprofits who filed a Form 990 in 2019. On the y-axis is the NTEE category: the first letter of the NTEE code for the organization. The x-axis plots the percent of nonprofits in each category for two populations: all nonprofits filing a Form 990 and nonprofits in my sample of gift recipients.

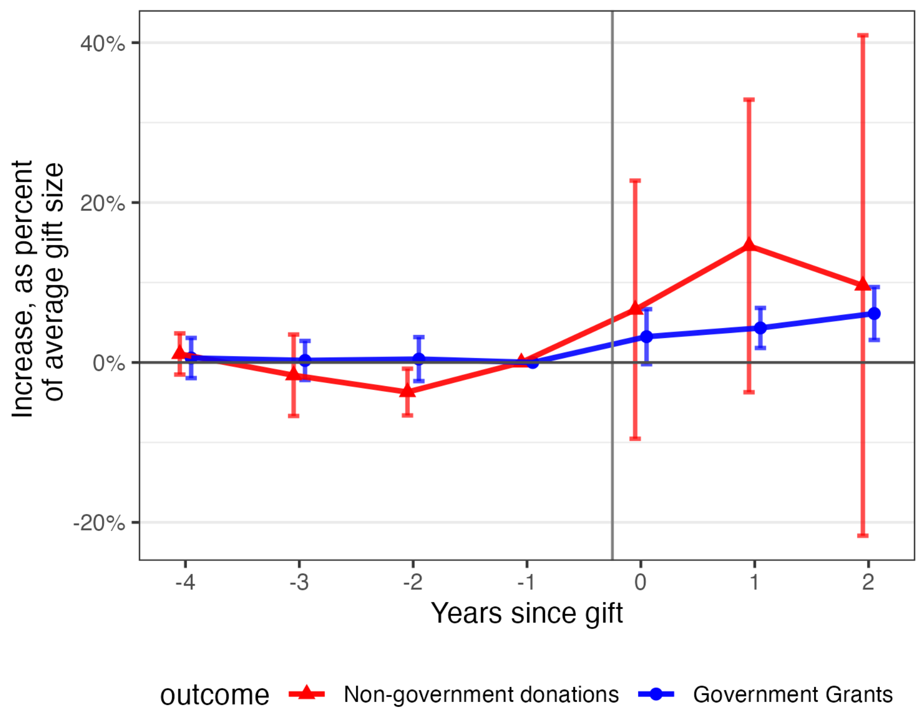
Figure A.3: *Trends in key outcome variables for recipients and matched control nonprofits*



Note: These panels plot the time series of annual mean outcomes for nonprofits who received an unrestricted gift from MacKenzie Scott (green) and nonprofits in the matched control (gray), relative to the gift year. (a) reports the dollars of revenue that the nonprofit received. (b) reports the dollars of donations and grants that the nonprofit received, in excess of MacKenzie Scott's gift, if treated, or total for the matched control. (c) plots the total expenses the nonprofit reported. (d) reports the dollars of grants given to other organizations and to individuals by the recipient nonprofit or control nonprofit. (e) plots the average number of employees reported on the nonprofit's W-3, (f) plots dollars allocated to compensation of employees. Compensation equals the sum of all salaries, benefits, and pension contributions of the nonprofit. (g)-(i) plot average compensation for all non-director employees, director employees and the highest paid employee. (j) reports the average expense to lagged asset ratio. (k) reports this ratio limiting to liquid assets only. (l) reports the percent of total annual spending devoted to "indirect cost" or "overhead" cost.

A.2 Contribution crowd in

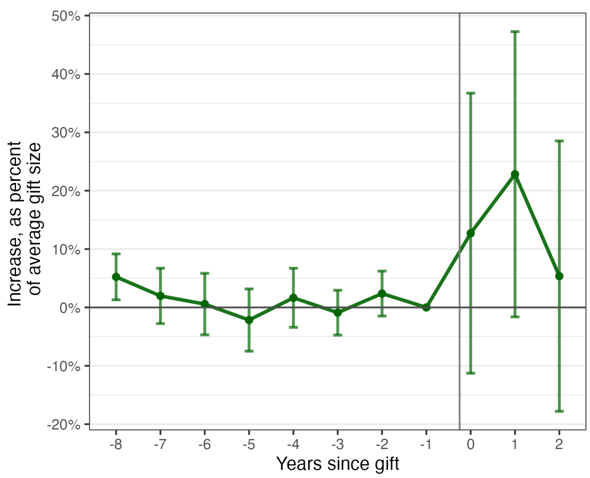
Figure A.4: *Contribution crowd in, by source*



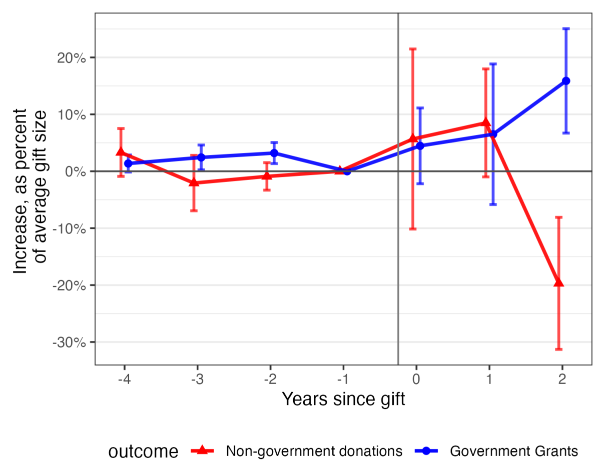
Note: This figure shows the breakdown of contribution crowd in, by the source of the contribution. The Y-axis shows the estimate of τ_k from Equation (7) for two outcomes: donations and government grants reported in addition to MacKenzie Scott's gift, measured as a fraction of the average gift, with 95% confidence intervals. The x-axis tracks years k since the gift was received. Estimates for the crowd in of government grants are precise and positive while crowd in of additional donations is insignificant at the 95% confidence level.

Figure A.5: *Crowd in by organization type*

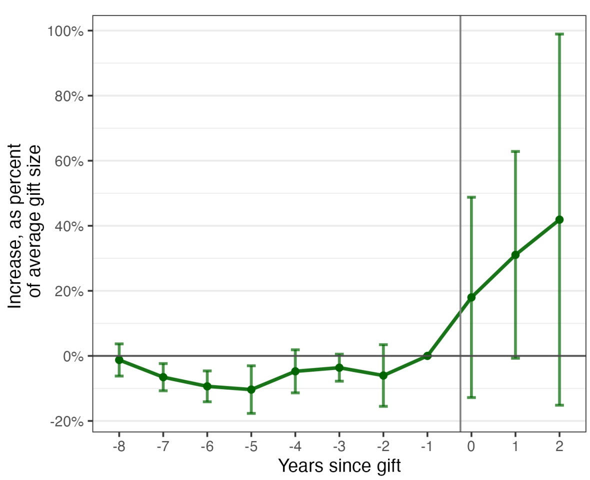
(a) *Additional contributions*



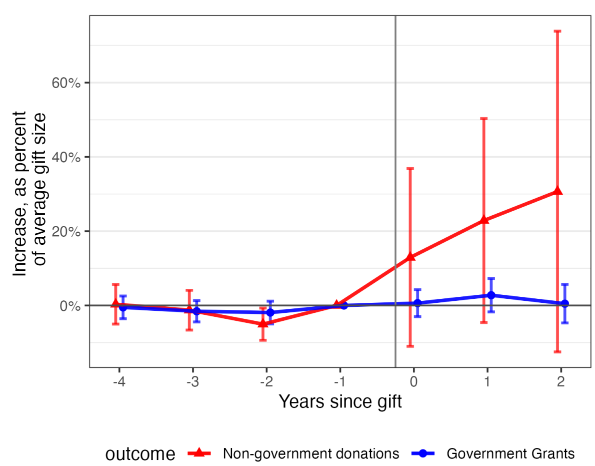
(b) *Contribution crowd in, by source*



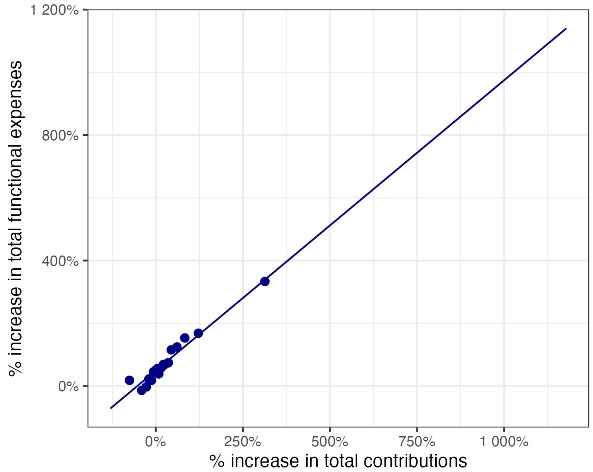
(c) *Additional contributions*



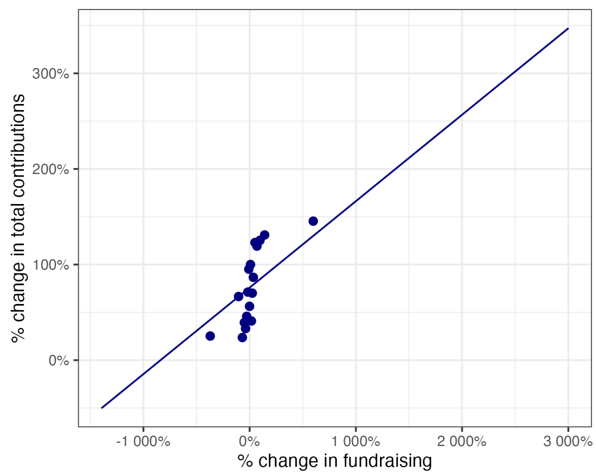
(d) *Contribution crowd in, by source*



Note: Crowd in at grant makers (a, b) and direct service organizations (DSO's) (c, d) who received donations from MacKenzie Scott. Grant makers are defined as any recipient whose grants totaled more than 10% of their charitable expenses in 2019. Y-axis shows the estimate of τ_k from Equation (7) for total contributions (donations plus government grants) reported in addition to MacKenzie Scott's gift, measured as a fraction of the average gift, with 95% confidence intervals. The x-axis tracks years k since the gift was received. Crowd in at DSO's was far larger than at grantmakers. DSO's had small and insignificant crowd in of government grants two years after the gift, with large and noisy estimates of donation crowd in. In contrast, grantmakers experienced a crowd out of donations amounting to \$0.20 of the gift two years after receipt.



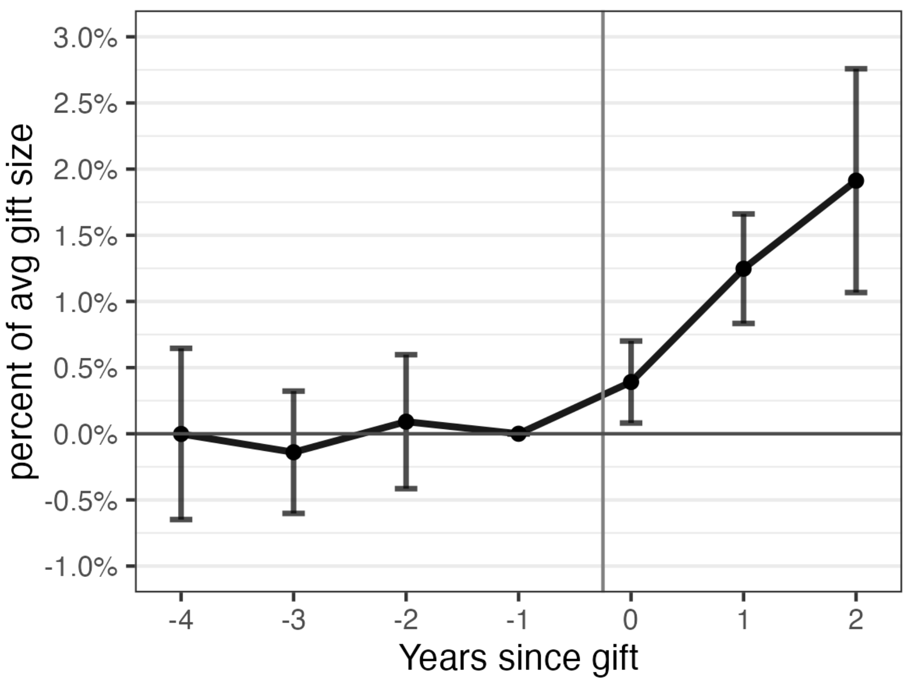
(a)



(b)

Figure A.6: *(a) This panel shows the percent change in total expenses versus percent change in donation and government grants incremental to Ms. Scott's gift. There is a strong relationship between the growth in spending of recipients and their growth in contributions (correlation = 0.73). (b) This did not seem to be due to fundraising alone, as the relationship between growth in contributions and growth in fundraising is quite weak (correlation = 0.16).*

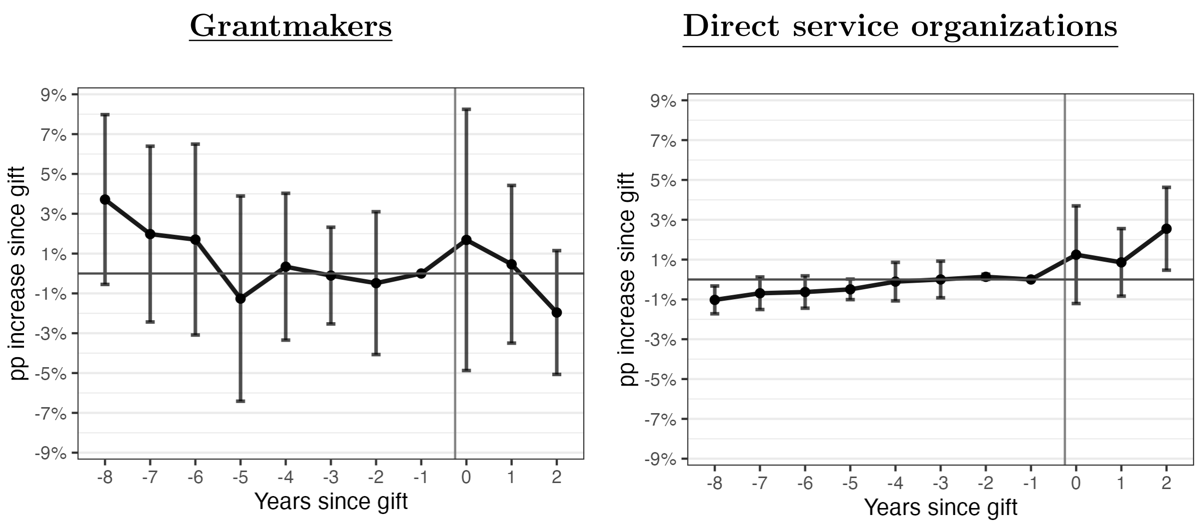
Figure A.7: *Fundraising expenses*



Note: This figure shows the increase in total fundraising expenses at recipient nonprofits compared to treated nonprofits. Fundraising spending increased steadily to peak at 2% of the average gift size two years after the gift.

A.3 Allocation of spending

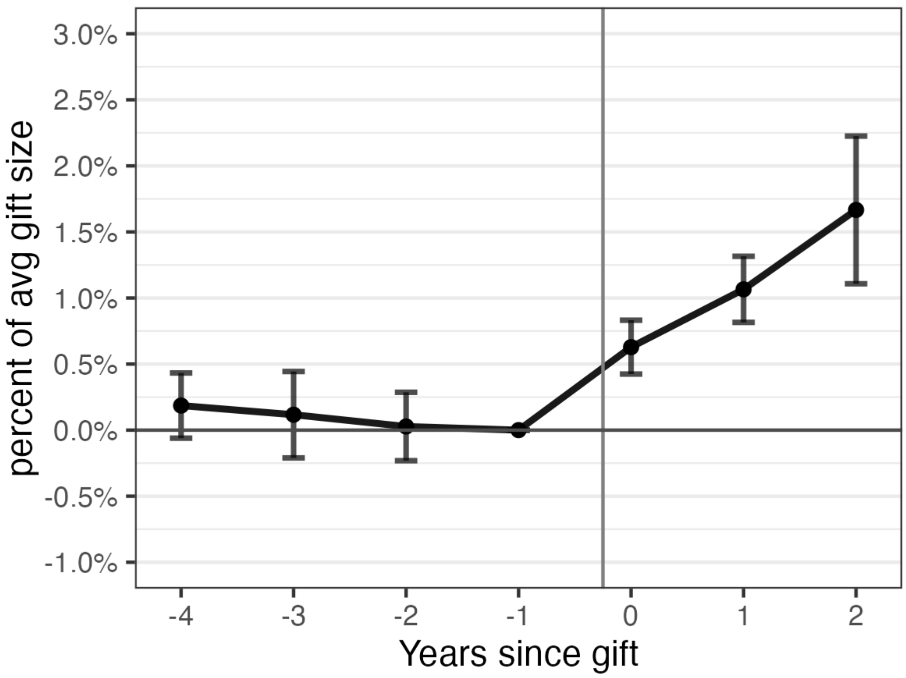
Figure A.8: *Grant giving by organization type*



(a) **(b)**

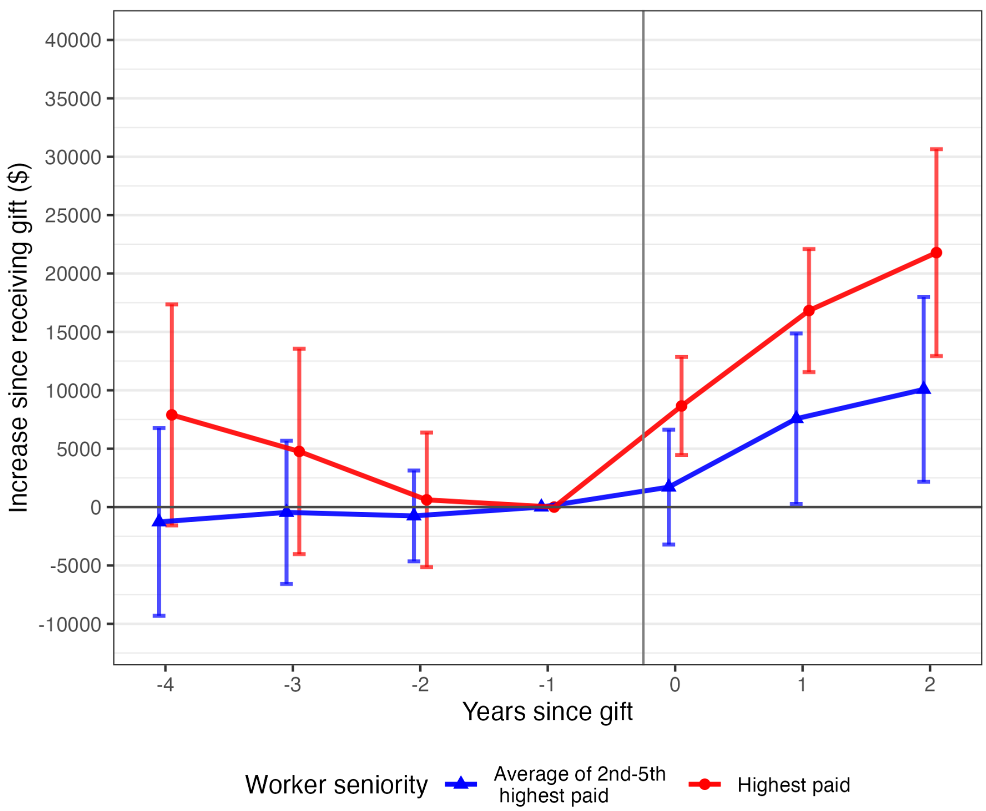
Note: (a) This figure shows the result of Equation (6) for percent of total expenses comprised of grants to other organizations. Grant givers did not change the percent of their annual expenses devoted to these grants at the 95% significance level. In the year prior to the gift, grants comprised 45% of annual spending. (b) In contrast, DSO's increased the percent of their expenses devoted to grants by 1 pp in the year of and year after Ms. Scott's gift (insignificant at the 95% confidence level), then 2.5 pp two years afterward. In the year prior to the gift, grants comprised 2% of annual spending.

Figure A.9: *Compensation of the five highest paid individuals*



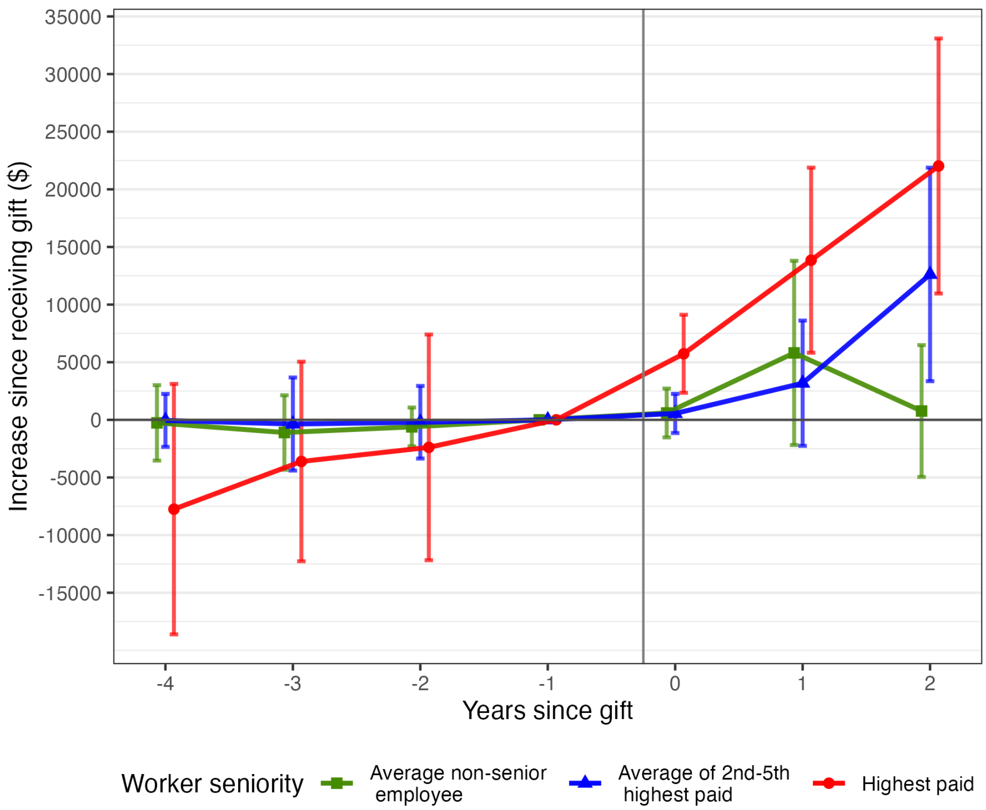
Note: This figure shows the increase in the sum of total compensation for the five highest paid at recipients, as a fraction of the average gift size.

Figure A.10: *Base pay increases by worker seniority*



Note: This figure shows the increase in base at recipients for two types of employees: the chief executive officer and the average director. In red, the compensation of the chief executive (proxied by the highest paid employee at the nonprofit) increases to \$21.8K two years compared to matched controls two years after receiving a gift from Ms. Scott. In blue, the compensation of average director (proxied by the average compensation of the second through fifth highest paid individuals) increases \$10.1K. The underlying data derive from the Schedule J of the Form 990 and provide only partial coverage of the full analysis sample.

Figure A.11: *Wage increases by worker seniority (weighted)*



Note: This figure shows the increase in wages at recipients for three types of employees: the chief executive officer, the average director, and the average non-senior employee. In red, the compensation of the chief executive (proxied by the highest paid employee at the nonprofit) increases to $22K two years compared to matched controls two years after receiving a gift from Ms. Scott. In blue, the compensation of average director (proxied by the average compensation of the second through fifth highest paid individuals) increases $12.6K. In green, the average compensation of a non-senior employee increases by $0.8K. Observations are weighted by inverse of pre-period nonprofit size.

Appendix Table A.1: *This table shows the outcome of Equation (8) for number of employees and the average compensation of non-director employees, director employees, and the highest paid employee, where the treatment effect is pooled over 0-2 years after receiving the gift. First, recipients have four more employees (insignificant at the 95% significance level), more so if they were more restricted prior to receiving a gift (columns (I) and (II)). Average employee compensation at the treated nonprofits increased at the 90% significance level (column (III)) without a significant impact of restrictedness (column (IV)). Director compensation at entirely unrestricted nonprofits increased by $11.2K, but the differential effect of restrictedness is negative and insignificant. CEO compensation increases by on average $10.4K after the gift at the 90% significance level, and $13.8K for the completely unrestricted recipients (columns (VII) and (VIII)).*

	Number of employees		Employee compensation		Director compensation		CEO compensation	
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Post	3.94	1.17	1877+	2319	8773**	12112*	10400+	13832*
	(5.98)	(11.75)	(836)	(1400)	(2392)	(3912)	(4545)	(5878)
Post x (Perc. of rev restricted)		9.92		-1607		-11840		-12165
		(21.77)		(2849)		(7978)		(11585)
Num.Obs.	17536	17536	15017	15017	17540	17540	17546	17546
R2	0.967	0.967	0.891	0.891	0.951	0.951	0.919	0.919

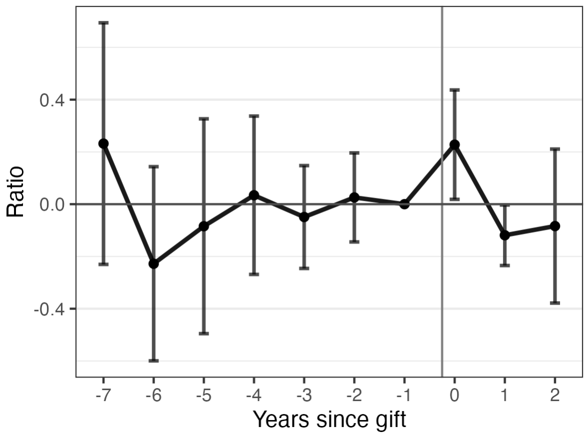
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix Table A.2: *This table shows the outcome of Equation (8), with observations weighted by inverse of pre-period revenue, for number of employees and the average compensation of non-director employees, director employees, and the highest paid employee, where the treatment effect is pooled over 0-2 years after receiving the gift. First, recipients increased employees by 1.6, but this estimate is extremely noisy based on restrictedness (columns (I) and (II)). Average employee compensation at the treated nonprofits did not increase at the 90% significance level (column (III) and (IV)). Director compensation increased at the 90% significance level by \$3K, and the effect was significantly smaller for more restricted nonprofits (column (VI)). CEO compensation increases by on average \$12.9K after the gift, and \$27.2K for the completely unrestricted recipients, with a significant negative effect of having more restricted revenues prior to the gift (columns (VII) and (VIII)).*

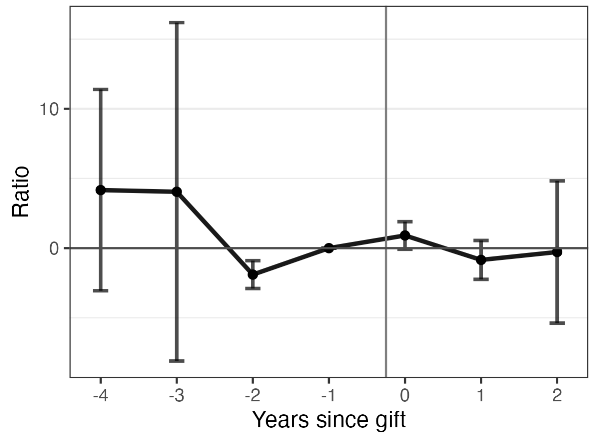
	Number of employees		Employee compensation		Director compensation		CEO compensation	
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Post	1.57	2.85	2969	2482	2791+	7113*	12868*	27243**
	(1.12)	(2.54)	(1647)	(2979)	(1250)	(2921)	(3983)	(7525)
Post x (Perc. of rev restricted)		-3.86		1473		-12633+		-41970*
		(6.03)		(5170)		(6356)		(16896)
Num.Obs.	17536	17536	15017	15017	17540	17540	17546	17546
R2	0.922	0.922	0.842	0.842	0.819	0.819	0.821	0.822

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

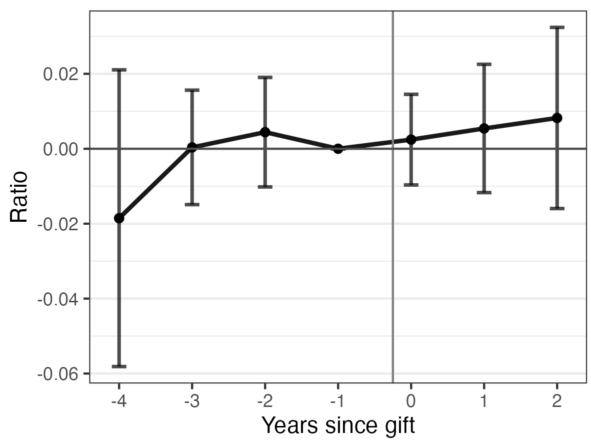
Figure A.12: *Indirect cost and saving*



(a)



(b)



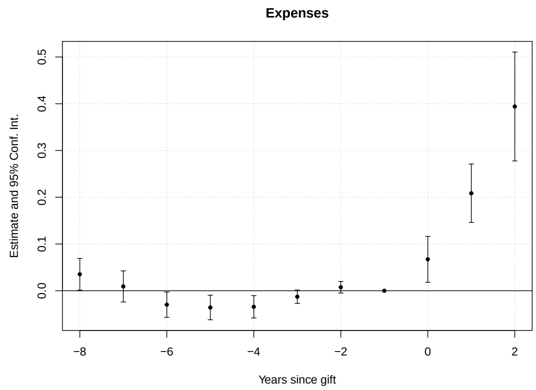
(c)

Note: This figure shows the estimates of θ_k from Equation (6) for three variables relevant to the nonprofit starvation cycle hypothesis. Panel (a) plots the estimate for the ratio of annual expenses as a fraction of the recipient's lagged total assets. Panel (b) plots the same estimate using liquid assets only: defined as assets in checking accounts, savings accounts, and publicly traded securities. Panel (c) plots the estimate for the indirect cost ratio.

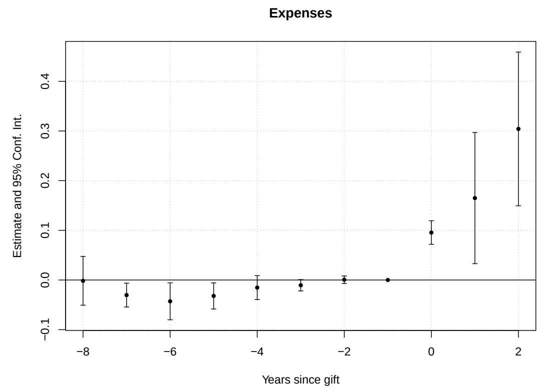
B Estimating percent of average gift consumed

As discussed in Section 4.2, weighting while adding the average gift G_c into Equation (7) biases estimates of the percent of average gift consumed on outcome Y. Intuitively, the regression is weighted and G_c is not, and so G_c is "too large" due to larger nonprofits receiving larger gifts and the right skew of the gift size distribution. As as a result, I perform this regression separately for each revenue quartile of nonprofit. Figure A.13 shows this regression estimated by quartile for total spending by nonprofits. Without this procedure, Equation (7) produces Figure A.14 – estimates that are outside of the range of the four quartiles. Instead, estimating each quartile as a separate interaction term and computing their average using the delta method produces the convex combination of the four estimates that is shown in Figure 3.

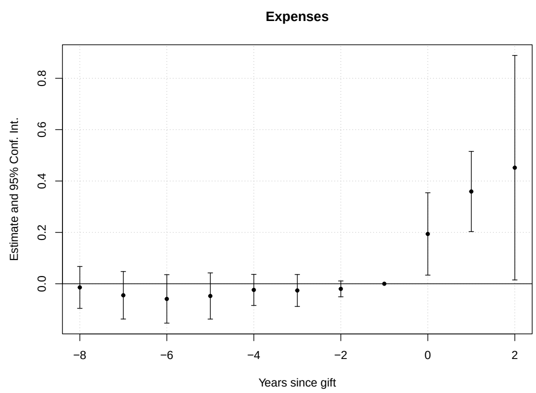
Figure A.13: *Spending by pre-period revenue quartile*



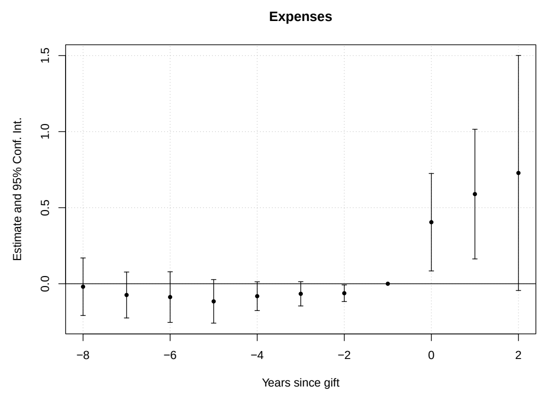
(a) *Quartile 1*



(b) *Quartile 2*



(c) *Quartile 3*



(d) *Quartile 4*

Note: This figure shows the estimate for the increase in expenses at recipient nonprofits, τ_k from Equation (7), as a fraction of average gift size, estimated separately for four quartiles of recipients by average pre-period revenue. Taking the average of these four estimates (by running a fully interacted regression and using the delta method) yields a more realistic answer than A.14, which evaluate Equation (7) for the entire population simultaneously. Because of the right skewed distribution of gift amounts, the normalization by average gift amount is in essence “too large”.

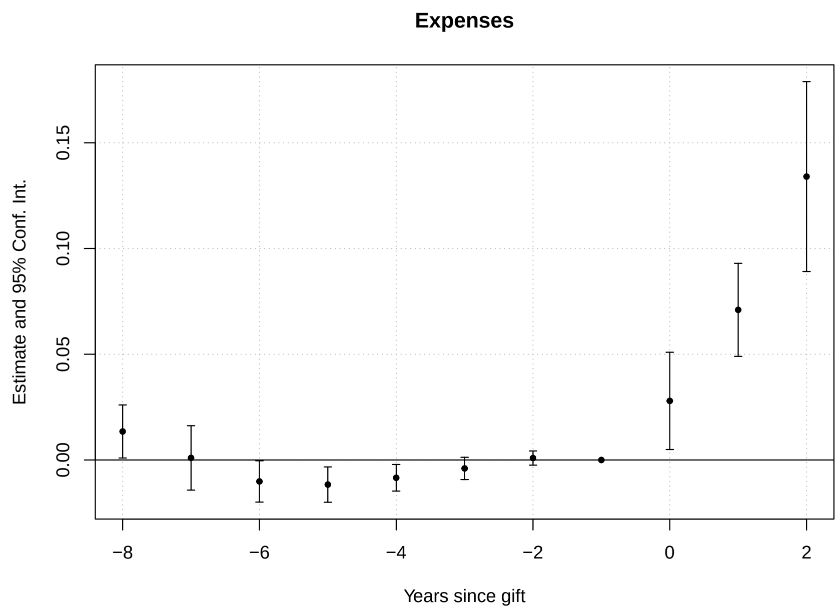


Figure A.14: *This figure shows Equation (7) for the entire population simultaneously. Because of the right skewed distribution of gift amounts, the normalization is in essence "too large".*

C Proofs and additional model results

C.1 Proofs of Propositions

Proof of Proposition 1. This proof proceeds by enumerating how the non-negativity constraint μ for m could change from W to $W+G$ for every shape of $Y(.)$. Define $W' \equiv W+G$.

1. Case 1: $Y(x)$ has decreasing returns to scale. Then we will invoke the results from Lemma 1 to compute Δs for any possible $W \to W+G$.

   For ease of notation, define the value function of donations, $\bar{\mathcal{D}}(W) \equiv \mathcal{D}(f^*(W), B(z^*(W))$.

   (a) $\mu(W) = \mu(W') = 0$. The gift moves the nonprofit from wealth W to wealth W'. By Lemma 1, this is a case where $W, W' \geq e_0$.

   In this region, the change in the share of grant giving is

   $$\Delta s = \frac{W' + \bar{\mathcal{D}}(W') - e_0}{W' + \mathcal{D}(W')} - \frac{W + \bar{\mathcal{D}}(W) - e_0}{W + \bar{\mathcal{D}}(W)} = \frac{-e_0}{W' + \bar{\mathcal{D}}(W')} - \frac{-e_0}{W + \bar{\mathcal{D}}(W)} > 0,$$

   so long as $e_0 > 0$ and Condition 1 holds.

   - In words, the non-negativity condition for m is slack before and after the gift, and $m^*(W) > 0$.

   (b) $\mu(W), \mu(W') > 0$.

   - The non-negativity constraint for m^* is binding before and after the gift, $m(W) = m(W') = 0$.
   - So, $s(W) = s(W') = 0$ and $\Delta s = 0$.

   (c) $\mu(W) > 0$, $\mu(W') = 0$.

   - The non-negativity constraint is binding before the gift but slack afterward. This means that $m^*(W) = 0, m^*(W') = W' + \bar{\mathcal{D}}(W') - e_0$
   - So, $s(W) = 0, s(W') > 0$, and $\Delta s > 0$.

   (d) $\mu(W) = 0$, $\mu(W') > 0$. This case is ruled out because $W' > W$.

2. Case 2: $Y(.)$ has increasing returns to scale. The proof proceeds analogously to part 1 by invoking Lemma 2.

   First, notice that for charitable production spending prior to the gift to be positive, as required in the proof assumption, $W \in [e_Z, \infty)$. That means that $W' \in (e_Z, \infty)$ as well. In this region, $m^*(W)$ for a given wealth W. As a result, $m^*(W) = m^*(W') = 0$ and so $\Delta s = 0$.

3. Case 3: $Y(.)$ has constant returns to scale.

   Note that for CRS to be true, $\lambda Y(z) = Y(\lambda z)$. Then if we define $x \equiv \sum_k z^{(k)}$, then $Y(z) = Y(x\xi) = xY(\xi)$ where ξ is a vector where $\xi^{(k)} \equiv z^{(k)}/x$. So choosing the optimal ξ is choosing the optimal allocation of z's into Y.

   (a) If $Y(.)$ is such that $Y(\xi) < \text{b}$, then an additional dollar spent on z's is less valuable than an additional dollar. The non-negativity constraints on grants is slack and the shares will remain the same after the gift. $m(W) = W$, so $\Delta s = 1 - 1 = 0$.

   (b) If $Y(.)$ is such that $Y(\xi) > b$, then the additional dollar spent on z's is more valuable, so $\Delta s = 0 - 0 = 0$.

   These choices are independent of the wealth of the nonprofit. They are functions of the production function and so the share of m doesn't change with the gift.

Putting these together, we conclude if $Y(.)$ has non-decreasing returns to scale, then $\Delta s \leq 0$. This is the contrapositive of what we would like to prove. ■

Proof of Proposition 2.

We wish to compute

$$\Delta s_\iota(W) = s_\iota(W') - s_\iota(W)$$

where

$$s_\iota \equiv \frac{\iota^*(W)}{d^*(W) + \iota^*(W)}.$$

The principal's objective is:

$$\begin{aligned} p^*, d^*, \iota^*, m^*, f^* = \underset{p_i,d_i,\iota_i,m_i,f_i \geq 0}{\arg\max} \;\; & \theta_i U(p) + (1-\theta) A_i d_i^{\alpha} \iota_t^{\beta_i} + (1-\theta_i) b_i m_i \\ \text{such that} \quad & d_i + \iota_i + p_i + m_i + f_i, \leq W_i + \mathcal{D}(f_i) \quad \text{[Budget constraint]} \\ \text{such that} \quad & \iota_i + f_i \leq W_i + (1-\eta_i)\mathcal{D}(f_i) \quad \text{[Nonprofit starvation cycle (NSC) constraint]} \end{aligned} \tag{10}$$

Notice that fundraising can be solved offline and $D_i(f_i) - f_i$ can be replaced with an indirect donations function of optimal fundraising, defined as $\bar{D}_i$.

The new objective is:

$$\begin{aligned} p^*, d^*, \iota^*, m^* = \underset{p_i,d_i,\iota_i,m_i \geq 0}{\arg\max} \;\; & \theta_i U(p_i) + (1-\theta) A_i d_i^{\alpha} \iota_i^{\beta_i} + (1-\theta) b_i m_i \\ \text{such that} \quad & d_i + \iota_i + p_i + m_i \leq W_i + \bar{D}_i \quad \text{[Budget constraint]} \\ \text{such that} \quad & \iota_i \leq W_i + (1-\eta_i)\bar{D}_i \quad \text{[Nonprofit starvation cycle (NSC) constraint]} \end{aligned} \tag{11}$$

Both the budget and NSC constraint distort the optimal choice. Note that the optimal choice of ι will be a typical Cobb-Douglas result if the NSC condition is slack.

- When the NSC constraint is slack,

$$s_\iota = \frac{\alpha}{\alpha + \beta}. \tag{12}$$

  because the optimal choice of indirect and direct costs will satisfy $\iota^* = \frac{\beta}{\alpha} d^*$.

- The constraint binding implies

$$s_\iota < \frac{\alpha}{\alpha + \beta} \tag{13}$$

because the objective is increasing in ι.

To prove the implication, consider the effect of the gift G on s_ι by enumerating all possible cases of the bindingness of the NSC constraint before and after the gift. I omit i subscripts for clarity.

1. The NSC constraint is slack at W, $W+G$.

   - $\Delta s_\iota = \frac{\alpha}{\alpha+\beta} - \frac{\alpha}{\alpha+\beta} = 0$.

2. The NSC constraint is binding at W and slack at $W+G$:

   - Then $\Delta s_\iota > 0$. When the condition is slack at $W+G$, then $s_\iota(W+G) = \frac{\alpha}{\alpha+\beta}$, and since the objective is increasing in ι, that means that $s_\iota(W) < \frac{\alpha}{\alpha+\beta}$.

3. The NSC constraint is binding at W and $W+G$.

   - Then $\Delta s_\iota \neq 0$ unless there is a knife-edge parameter restriction for η, α, β. I will show this assuming $\theta = 0$ then solving for Δs_ι explicitly to limit the complexity of the problem.
   - There are two subcases, whether the non-negativity constraint on grants binds or not, that I will go through separately.

   (a) Non-negativity constraint for grants binds.

   - Then the optimal choice of d^*, ι^* are:

$$\iota^* = W + (1-\eta)\bar{D} \tag{14}$$
$$d^* = \eta\bar{D} \tag{15}$$

   - And so

$$s_\iota = \frac{W + (1-\eta)\bar{D}}{W + \bar{D}} = 1 - \eta\frac{\bar{D}}{W + \bar{D}} \tag{16}$$

   - I will evaluate Δs_ι as a derivative $\frac{ds_\iota}{dG}$ in this case because the solution for s_ι

will be differentiable in this region.

$$\frac{ds_\iota}{dG} = -\eta \frac{d}{dG}\left(\frac{\bar{D}}{W+\bar{D}}\right) \tag{17}$$

$$= \eta \frac{1}{W+\bar{D}}\left(\frac{\bar{D}}{W+\bar{D}} - \frac{W}{W+\bar{D}}\frac{d\bar{D}}{dG}\right) \tag{18}$$

Excluding a knife-edge parameter restriction $\frac{\bar{D}}{W+\bar{D}} = \frac{W}{W+\bar{D}}\frac{d\bar{D}}{dG}$, this expression will not equal zero for $\eta \in (0,1]$.

(b) Non-negativity constraint for grants is slack.

- To solve for d^* explicitly, it means that

$$\iota^* = W + (1-\eta)\bar{D} \tag{19}$$

$$d^* + m^* = \eta\bar{D} \tag{20}$$

Then using the first order condition that pins down m^*, we can solve for d^* explicitly:

$$b = A\alpha d^{\alpha-1}\iota^\beta \tag{21}$$

$$\Leftrightarrow b = A\alpha(d^*)^{\alpha-1}(W + (1-\eta)\bar{D})^\beta \tag{22}$$

$$\Leftrightarrow (d^*)^{1-\alpha} = A\alpha b^{-1}(W + (1-\eta)\bar{D})^\beta \tag{23}$$

$$\Leftrightarrow d^* = \left[A\alpha b^{-1}(W + (1-\eta)\bar{D})^\beta\right]^{\frac{1}{1-\alpha}} \tag{24}$$

- This implies that the share devoted to overhead is:

$$s_\iota = \frac{W + (1-\eta)\bar{D}}{W + d^*} = \frac{W + (1-\eta)\bar{D}}{W + \left[A\alpha(W + (1-\eta)\bar{D})^\beta\right]^{\frac{1}{1-\alpha}}} \tag{25}$$

- So the change in this share from a gift is:

$$\frac{ds_\iota}{dG} = \frac{d}{dG}\frac{W + (1-\eta)\bar{D}}{K(G)} \tag{26}$$

$$\equiv \frac{E'(G)K(G) - E(G)K'(G)}{K^2(G)} \tag{27}$$

- Where

$$K(G) \equiv W + (A\alpha)^{1/1-\alpha} E(G)^{\frac{\beta}{1-\alpha}} \tag{28}$$

$$K'(G) \equiv 1 + (A\alpha)^{1/1-\alpha} \frac{\beta}{1-\alpha} E(G)^{\frac{\beta}{1-\alpha}-1} E'(G) \tag{29}$$

$$E(G) \equiv W + (1-\eta)\bar{D} \tag{30}$$

$$E'(G) \equiv 1 + (1-\eta)\frac{d\bar{D}}{dG} \tag{31}$$

So

$$\propto E'(G)K(G) - E(G) - (A\alpha)^{1/1-\alpha} \frac{\beta}{1-\alpha} E(G)^{\beta/1-\alpha} E'(G) \tag{32}$$

$$\propto -E(G) + E'(G) \left[K(G) - (A\alpha)^{1/1-\alpha} \frac{\beta}{1-\alpha} E(G)^{\beta/1-\alpha} \right] \tag{33}$$

$$\propto E'(G) \left[W + d^* - \frac{\beta}{1-\alpha} d^* \right] - (W + (1-\eta)\bar{D}) \tag{34}$$

$$\propto (1 - (1-\eta))\frac{d\bar{D}}{dG}) \left[W + d^* \frac{1-\alpha-\beta}{1-\alpha} \right] - \iota^* \tag{35}$$

where d^*, ι^* are functions of exogenous variables and written above.

- In general, the expression could be positive or negative, but it will be zero only in the event of a knife-edge parameter restriction. Two intuitive cases mean $\frac{ds_\iota}{dG} > 0$:
  - $\eta = 1$: All donations are restricted, and indirect cost funding can happen only from the nonprofit's existing endowment.
  - $\frac{d\bar{D}}{dG} = 0$: Donation crowd in is zero, so the gift does not cause an increase in unrestricted donations that allows the indirect cost ratio to increase.

Taken together, the solutions show that, with the exception of knife-edge parameter restrictions when the NSC constraint was binding before and after the gift, $\Delta s_\iota = 0$ implies that the NSC constraint was slack prior to the gift.

■

C.2 Additional results

C.2.1 Donation crowd in

How do donations respond after a wealth shock that coincided with an announcement of support? In order to distinguish factors that affect the donor's supply of donations from fundraising f_i, I introduce a parameterization for latent donor interest as marginal benefit of the donation, in order to distinguish factors that affect donor's supply of donations from fundraising f_i. The explicit separation enables the inspection of mechanisms that could yield either crowd in or crowd out after a large public gift. For simplicity of notation, consider the case of a single charitable input ($K = 1$).

Assumption 4. *Nonprofit i at time t collects donations as a function of contemporaneous fundraising spending f_i and the donor's perception of the marginal charitable impact of funds B_i:*

$$D_i = \mathcal{D}(f_i, B_i)$$

where

$$B_i \equiv \mathbb{E}_{donor}[A_i \frac{\partial Y(z_i)}{\partial z_i}] \tag{36}$$

and $\mathcal{D}(.)$ is differentiable and concave in both of its arguments.

Armed with this assumption, the total derivative of donations D_i with respect to a gift from MacKenzie Scott is the sum of three terms:

$$\frac{dD_i}{dG_i} = \frac{\partial \mathcal{D}}{\partial f_i}\frac{df_i}{dG_i} + \frac{\partial \mathcal{D}}{\partial B_i}\left(\frac{d\mathbb{E}[A_i]}{dG_i}\frac{\partial Y(z_i)}{\partial z_i} + \mathbb{E}[A_i]\frac{\partial^2 Y(z_i)}{\partial z_i^2}\frac{dz_i}{dG_i}\right) \tag{37}$$

Equation (37) shows that donation crowd in captures a few effect simultaneously. First, the gift could increase fundraising spending. Second, the gift could increase the donor's perception of the marginal charitable impact of her own donation. Within this margin, the gift could either be a positive signal on the productivity of the nonprofit or could move the nonprofit up its production function either to increasing or decreasing returns to scale. While the empirical importance of the last two effects has been tested independently, the relative magnitudes have not. In the case that $\frac{dD_i}{dG_i} > 0$, rearranging and simplifying this expression yields PropositionC.1.

Proposition C.1. *Under Assumptions 15, donation crowd in* $\frac{dD_i}{dG_i}$ *is positive if and only if*

$$\underbrace{-\frac{d\log\frac{\partial Y(z_i)}{\partial z_i}}{dG_i}}_{\substack{\text{decline in perceived value}\\ \text{of marginal spending}}} < \underbrace{\frac{d\log\mathbb{E}_d[A_i]}{dG_i}}_{\substack{\text{increase in}\\ \text{perceived quality}}} + \underbrace{\varepsilon_f/\varepsilon_B}_{\substack{\text{relative fundraising}\\ \text{vs. impact elasticity}}} \underbrace{\frac{d\log f_i}{dG_i}}_{\substack{\text{fundraising}\\ \text{response}}}$$

$$\varepsilon_f \equiv \left(\frac{f_i}{D_i}\frac{\partial D_i}{\partial f_i}\right) \quad \varepsilon_B \equiv \left(\frac{B_i}{D_i}\frac{\partial D_i}{\partial B_i}\right)$$

As Proposition C.1 shows, donation crowd in becomes a test of the relative magnitude of donors concerns about decreasing returns to scale and the positive signal that Scott's gift provided. In particular, donation crowd in implies that increased donations from fundraising and the increase in perceived productivity exceeded potential declining scale economies.

C.2.2 Saving

A dynamic nonprofit objective function must be used to examine the effect of constraints on the nonprofit's intertemporal saving problem, but the prior sections have assumed a one-period objective for simplicity. Assumption 5 provides the most incremental generalization required for analyzing savings behavior by allowing the nonprofit to allocate funds to charitable spending, grant giving, and fundraising over two periods.

Assumption 5 (The nonprofit starvation cycle hypothesis: savings)**.**

The nonprofit agent chooses inputs z_{it} *and* z_{it+1}*, grants* m_{it} *and* m_{it+1}*, private benefits* p_{it} *and* p_{it+1}*, fundraising* f_i*, and saving* a_{it+1} *to solve:*

$$z^*, z^*_{t+1}, m^*, m^*_{t+1}, p^*, p^*_{t+1}, f^* = \underset{z_{it}, z_{t+1}, m_i, m_{it+1}, p_{it}, p_{it+1}, f_i, \geq 0}{\arg\max} \Big\{(1-\theta_i)\big[A_i Y(z_i) + b_i\, m_i\,\big] \;+\; \theta_i\, U(p_i)$$
$$+\,\beta(1-\theta)\big[A_i Y(z_{it+1}) + b_i\, m_{it+1}\,\big] \;+\; \beta\theta_i\, U(p_{it+1})\Big\},$$
$$s.t. \quad W_i + D_i(f_{it}) - f_{it} = \sum_k z^{(k)}_{it} + m_{it} + p_{it} + a_{it+1} \quad \textit{[Budget constraint 1]}$$
$$s.t. \quad Ra_{it+1} = \sum_k z^{(k)}_{it+1} + m_{it+1} + p_{it+1} \quad \textit{[Budget constraint 2]}$$
$$and \quad a_{it+1} \leq W_{it} + (1-\eta_i)D_i(f_i) \quad \textit{[Nonprofit Starvation Cycle constraint]}$$

for fraction $\eta_i > 0$ *of donations that cannot be used for saving,* $Y(z_i) \equiv A_i \sum_{k=1}^{K} z_{ik}^{\phi_k}$*, discount rate* β*, rate of return on savings* R*, and* $\beta R < 1$*.*

Proposition C.2. *Define the spending share,*

$$s_a(W) \equiv \frac{W + D(f^*(W)) - a^*_{t+1}(W)}{a^*_{t+1}(W)}.$$

Under Assumption 5, $\theta = 0$, and no grant giving at either W or $W + G$ ($m^*(W) = m^*(W + G) = 0$), then if the change in the spending share after the gift,

$$\Delta s_a \equiv s_a(W + G) - s_a(W) = 0,$$

then "nonprofit starvation cycle" constraint was slack prior to the gift.

The proof is similar to that of Proposition 2, but the constraint now affects the choice of saving from the first and second period, a_{it+1}. When the NSC constraint is slack and under a general form of $Y(.)$, the spending share will vary with wealth. A change in the savings share reveals either that the recipient faced a binding NSC constraint or that the recipient had a slack NSC constraint but not Cobb-Douglas preferences.

Proof of Proposition C.2. The logic follows Proposition 2. We will again omit i subscripts for clarity. The main difference is that this proposition builds off a dynamic model. Because $\beta R < 1$, a nonprofit choosing to allocate spending toward grants will only do so in the first period, not the second. Also, this Proposition further requires being in the regime where grant giving is not optimal, namely $m^*(W) = m^*(W + G) = 0$. Following Proposition 2, compute $d^*, \iota^*, d^*_{t+1}, \iota^*_{t+1}$, and therefore s_a, based on whether the NSC constraint is slack or binding. Again, choice $f^*(W)$ can be solved offline, and $D_i(f^*(W)) - f^*(W)$ can be replaced with $\bar{D}_i$. The vector of inputs is direct and indirect costs, $z_i = [d_i, \iota_i]$ but this can be generalized.

- Not binding NSC:

  The first order conditions are:

$$\theta U'(p^*) = \lambda \tag{38}$$

$$\theta \beta R U'(p^*_{t+1}) = \lambda \tag{39}$$

$$a^*_{t+1} + d^* + \iota^* + p^* = W + \bar{D} \tag{40}$$

$$R a^*_{t+1} = d^*_{t+1} + \iota^*_{t+1} + p^*_{t+1} \tag{41}$$

  Then the first order conditions for d^*, ι^* imply that they are in constant ratios with each other and across periods:

$$(\iota_t^*)^\beta (d_t^*)^{\alpha-1} = \beta R \iota_{t+1}^\beta (d_{t+1}^*)^{\alpha-1} \tag{42}$$

$$\Rightarrow (\frac{d_{t+1}^*}{d^*})^{1-\alpha} = (R\beta)(\frac{\iota_{t+1}^*}{\iota^*})^\beta \tag{43}$$

$$\Rightarrow (\frac{d_{t+1}^*}{d^*})^{1-\alpha} = (R\beta)(\frac{d_{t+1}^*}{d^*})^\beta \tag{44}$$

$$\Rightarrow (\frac{d_{t+1}^*}{d^*})^{1-\alpha-\beta} = (R\beta) \tag{45}$$

$$\Rightarrow \frac{d_{t+1}^*}{d^*} = \frac{\iota_{t+1}^*}{\iota^*} = (R\beta)^{\frac{1}{1-\alpha-\beta}} \tag{46}$$

$$s_a \equiv \frac{d^* + \iota^* + p^*}{a_{t+1}^*} = \frac{d^* + \iota^* + p^*}{\beta^{\frac{1}{1-\alpha-\beta}} R^{\frac{1}{1-\alpha-\beta}-1}(d^* + \iota^*) + p_{t+1}^*} \tag{47}$$

Notice that the derivative of the spending share with respect to the gift is non-zero when it is slack. But, one case where it is zero is when $\theta = 0$, so $p_t^* = p_{t+1}^* = 0$ and so the ratio is constant as a function of wealth.

- Binding NSC:

$$a_{t+1}^* + \iota_t^* = W + (1-\eta)\bar{D} \tag{48}$$

$$d^* + \iota^* = \eta \bar{D} \Rightarrow \frac{1+\beta}{\alpha}\iota^* = \eta D \tag{49}$$

Then

$$\frac{d^* + \iota^* + p^*}{a_{t+1}^*} = \frac{\eta \bar{D}}{W + (1-\eta)\bar{D} - \frac{\eta\alpha}{1+\beta}\bar{D}} \tag{50}$$

$$= \frac{\eta \bar{D}}{W + (1-\eta(1+\frac{\alpha}{1+\beta}))\bar{D}} \tag{51}$$

With this established, a wealth shock W to $W + G$ can be examined by enumerating the possible cases.

1. When the NSC constraint is slack at $W, W+G$ then $\Delta s_a \neq 0$. $\Delta s_a = 0$ under $\theta = 0$.
2. When the NSC constraint is binding at W and slack at $W + G$, then $\Delta s_a > 0$ as an implication of the constraint operating as a maximum value of a_{t+1}.
3. When the NSC constraint is binding at W and $W + G$, then $\Delta s_a \neq 0$.

- Notice that

$$\frac{d}{dG}\frac{d^* + \iota^* + p^*}{a^*_{t+1}} = \eta \frac{d}{dG}\frac{\bar{D}}{W + (1 - \eta(1 + \frac{\alpha}{1+\beta}))\bar{D}} \tag{52}$$

- Which in general is not equal to zero.

As a result, $\Delta s_a = 0$ implies that the NSC constraint was slack prior to and after the gift G.

■

C.3 Lemmas

Lemma 1. *Define*

$$e_0 \equiv \tilde{f} + \tilde{p} + c(\tilde{z})$$

where the choice variables are the solution to

$$\tilde{f}, \tilde{p}, \tilde{z}, \tilde{m} \equiv \arg \max_{it \geq 0, p_i \geq 0, f_i \geq 0, m_i} \Big\{ (1-\theta_i) \big[A_i Y(z_i) + b_i \, m_i \, \big] \; + \; \theta_i \, U(p_i) \Big\},$$
$$s.t. \quad W + \mathcal{D}(f_i, B(z_i)) - f_i = c(z_i) + m_i + p_i. \tag{53}$$

where $\tilde{z}$ is a vector of inputs to Y and $c(\tilde{z}) \equiv \sum_{k=1}^{K} z_k$.

Define $m^*(W)$ as the value m^* solving the maximization:

$$f^*, p^*, z^*, m^* \equiv \arg \max_{z_{it} \geq 0, p_i \geq 0, f_i \geq 0, m_i \geq 0} \Big\{ (1-\theta_i) \big[A_i Y(z_i) + b_i \, m_i \, \big] \; + \; \theta_i \, U(p_i) \Big\},$$
$$s.t. \quad W + \mathcal{D}(f_i, B(z_i)) - f_i = c(z_i) + m_i + p_i \tag{54}$$

Let $\mu(W)$ be the Lagrange multiplier in the complementary slackness condition for the choice of $m^*(W)$.

Then for $Y(z)$ with decreasing returns to scale:

$$m^*(W) = \begin{cases} 0 & W - \mathcal{D}(\tilde{f}, B(\tilde{z})) \leq e_0 \\ W + \mathcal{D}(\tilde{f}, B(\tilde{z})) - e_0 & W - \mathcal{D}(\tilde{f}, B(\tilde{z})) > e_0 \end{cases} \tag{55}$$

$$\mu(W) = \begin{cases} \mu' \in \mathbb{R}_{\geq 0} & W - \mathcal{D}(\tilde{f}, B(\tilde{z})) \leq e_0 \\ 0 & W - \mathcal{D}(\tilde{f}, B(\tilde{z})) > e_0 \end{cases} \tag{56}$$

(57)

[15]

Proof. Equation (53) is identical to Equation (54) except that it does not impose the non-negativity constraint for grants m.

[15] Both Lemma 1 and Lemma 2 use the augmented definition of the donation production function introduced in Assumption . Using $D_i = D(f_i)$ or $D_i = \mathcal{D}(f_i, B_i)$ does not change the result.

In Equation (53), the FOC's are

$$1 = \mathcal{D}_f(\tilde{f}, B(\tilde{x})) \tag{58}$$

$$\lambda(W) + \frac{\partial B}{\partial z_i}\mathcal{D}_B(\tilde{f}, B(\tilde{z})) = (1-\theta)A_i Y_{z_k}(\tilde{z}) \quad \forall k \tag{59}$$

$$\lambda(W) = \theta U'(\tilde{p}) \tag{60}$$

$$\lambda(W) = (1-\theta)b \tag{61}$$

$$\tilde{m} = W + \mathcal{D}(\tilde{f}, B(\tilde{z})) - (\tilde{f} + \tilde{x} + \tilde{p}) \quad \Leftrightarrow \tilde{m} = W + \mathcal{D}(\tilde{f}, B(\tilde{z})) - e_0 \tag{62}$$

I represent the Lagrange multipliers as functions of W, $\lambda(W)$, to clarify how their values change with the exogenous state variable W that will change with Scott's gift.

The FOC's for each choice variable in (54) are:

$$1 = \mathcal{D}_f(f^*, B(z^*)) \tag{63}$$

$$\lambda(W) + \frac{\partial B}{\partial z_k}\mathcal{D}_B(\tilde{f}, B(\tilde{z})) = (1-\theta)A_i Y_{z_k}(z^*) \quad \forall k \tag{64}$$

$$\lambda(W) = \theta U'(p^*) \tag{65}$$

$$\lambda(W) - \mu(W) = (1-\theta)b \tag{66}$$

$$m^* = W + \mathcal{D}(f^*, B(z^*)) - (f^* + c(z^*) + p^*) \tag{67}$$

In Equation (54) with a non-negativity constraint for grants m, there is also a complementary slackness condition,

$$\mu(W) \cdot m^* \geq 0. \tag{68}$$

This condition means that for a given exogenous wealth W, $\mu(W) = 0$ iff $m^* > 0$ and $\mu > 0$ iff $m^* = 0$.

Notice that if the non-negativity condition for m is slack ($\mu(W) = 0$), then the two sets of first order conditions are identical. In this region:

$$\tilde{f} = f^*$$
$$\tilde{p} = p^*$$
$$c(\tilde{z}) = c(z^*)$$

Because of (61), both e_0 and $\mathcal{D}(\tilde{f}, B(\tilde{z}))$ are invariant to wealth. The choice variables are pinned down with a Lagrange multiplier $\lambda(W)$ that remains equal to $(1-\theta)b$ regardless of the nonprofit's endowment W. So, using the complementary slackness condition for the first row and Equation (67) for the second, m^* has the following form:

$$m^*(W) = \begin{cases} 0 & \mu(W) > 0 \\ W + \mathcal{D}(\tilde{f}, B(\tilde{z})) - e_0 & \mu(W) = 0 \end{cases} \tag{69}$$

The goal, however, is to show $m^*(W)$ in cases explicitly as a function of W. Using the if and only if logic in the complementary slackness condition again,

$$m^*(W) = \begin{cases} 0 & W \leq e_0 - \mathcal{D}(\tilde{f}, B(\tilde{z})) \\ W + \mathcal{D}(\tilde{f}, B(\tilde{z})) - e_0 & W > e_0 - \mathcal{D}(\tilde{f}, B(\tilde{z})) \end{cases} \tag{70}$$

This proves the lemma. Intuitively, there is a threshold after which the marginal value of grant giving outweighs the marginal value of charitable production using inputs z, fundraising, and private benefits. Before wealth plus donations reaches that threshold, $m^*(W) = 0$. After reaching this threshold, the remaining funds will go to grant giving.

■

Lemma 2. *Suppose $Y(z)$ has increasing returns to scale, in the maximization problem (1). Define*

$$\tilde{f} \equiv \{f | 1 = \mathcal{D}_f(f, B(0))\} \tag{71}$$

$$\tilde{p} \equiv \{p | \theta U'(p) = (1-\theta)b\} \tag{72}$$

$$e_P \equiv \tilde{f} + \tilde{p} \tag{73}$$

$$e_Z \equiv \{\hat{f} + c(\hat{z}) | b + \frac{\mathcal{D}_B(f, B(z))}{1-\theta} = A_i Y_{z_k} z \quad \forall k, \quad 1 = \mathcal{D}_f(f, B(z))\} \tag{74}$$

Then for every $W \geq 0$, the optimal $m^*(W)$ is given as follows:

1. ***If** $\exists k$ **s.t.** $b < A_i Y_{z_k}(0)$.*

$$m^*(W) = 0, \quad \mu(W), \quad \forall W > 0$$

2. ***If** $b \geq A_i Y_{z_k}(0) \forall k$.*

When $\theta U'(0) < b(1-\theta)$ *or* $e_P > e_Z$

$$m^*(W) = \begin{cases} W + \mathcal{D}(\tilde{f}, B(0)) - \tilde{f} & W \in [0, e_Z) \\ 0, & W \in [e_Z, \infty) \end{cases} \tag{75}$$

When $\theta U'(0) \geq b(1-\theta)$ *and* $e_P < e_Z$

$$m^*(W) = \begin{cases} 0, & W \in [0, e_P) \\ W + \mathcal{D}(\tilde{f}, B(0)) - e_P, & W \in [e_P, e_Z) \\ 0, & W \in [e_Z, \infty) \end{cases} \tag{76}$$

Proof. We split into two primary cases based on the comparison of b and $A_i Y_{z_k}(0)$.

1. Case 1: $\exists k \quad \text{s.t.} \quad b < A_i Y_{z_k}(0) \quad \forall k \Leftrightarrow$ grants are never given.

   In words, even at $x = 0$ the marginal payoff $A_i Y_{z_k}(0)$ exceeds b.

   From here, since $Y(z)$ has increasing returns to scale, the objective will grow without bound.

   This means that in this region, $m = 0$ because funds will be allocated to z.

   Hence

   $$m^*(W) = 0, \quad \text{for all } W$$

2. Case 2: $b \geq A_i Y_{z_k}(0) \forall z_k \Leftrightarrow$ grant giving is valuable at low levels of wealth.

   First, define $\tilde{f}$ as the principal's choice of fundraising expenditure when charitable production is zero. I.e., $\tilde{f}$ where $1 = \mathcal{D}_f(\tilde{f}, B(0)))$.

   (a) **Condition** $\theta U'(0) < (1-\theta)b$

   Define hat versions of the choice variables as:

   $$b = A_i Y_{z_k}(\hat{z}) \quad \forall k. \tag{77}$$

   and the fundraising first order condition holds

   $$1 = \mathcal{D}_f(\hat{f}, B(\hat{z})). \tag{78}$$

   Then define $e_Z \equiv \hat{f} + \hat{p} + c(\hat{z})$.

At this wealth + donations level, $\hat{p} = 0$ because $\theta U'(0) < (1-\theta)b$ and $U'(p)$ is decreasing in p because $U(p)$ is a concave function. e_Z is independent of wealth because $\hat{z}$ is chosen as $b(1-\theta) = A_i Y_{z_i}(z)$ and hence independent of wealth. This implies $\tilde{f}$ is independent of wealth.

i. **Domain** $W < e_Z$ Because Y has increasing returns to scale, the optimal choice of z is zero.

   This leaves the remaining wealth to be allocated to f^* and m^* according to the first order conditions:

$$1 = \mathcal{D}_f(\tilde{f}(W), B(0)) \tag{79}$$

$$m^*(W) = W + \mathcal{D}(\tilde{f}(W), B(0)) - \tilde{f} - 0 - 0 \tag{80}$$

   As a result, the principal chooses the optimal f keeping in mind zero spending on x and then can only allocate the remaining $W + \mathcal{D}(\tilde{f}, B(0))$ to m.

ii. **Domain** $W > e_Z$. Then $m^* = 0$ as marginal benefit loads on z^*.

The result is:

$$m(W) = \begin{cases} W + \mathcal{D}(\tilde{f}, B(0)) - \tilde{f} & [0, e_Z) \\ 0 & [e_Z, \infty) \end{cases} \tag{81}$$

(b) **Condition** $\theta U'(0) > (1-\theta)b$. With this parameter assumption, there is a region where wealth is allocated to private benefits until the marginal utility of private benefits equals the marginal utility of grants, but the derivation is otherwise analogous.

   i. **Domain** $W < e_Z$ In this domain, because $Y_{z_i}(z)$ is non-decreasing, the optimal choice of z^* is zero.

   Fundraising f, like in (a), will be set to $\tilde{f}$. This will not vary with wealth because the second argument $B(0)$ is constant until a large enough wealth when B changes.

   Since both $U(.)$ is strictly concave functions and $\theta U'(0) > b(1-\theta)$, e_P will be a unique threshold/single crossing.

Define $e_P \equiv \tilde{f} + \tilde{p}$ as the wealth + donations level where the marginal value of grant private benefits satisfy their first order conditions while $z = 0$:

$$\tilde{p} \equiv \{p | (1-\theta)b = U'(p)\}, \quad \text{and} \quad \tilde{f} = \{f | 1 = \mathcal{D}_f(\tilde{f}, B(0))\}$$

However, allocating to p will only be optimal if the marginal benefit of allocating a marginal dollar to x are not higher. In other words, if wealth is in the domain less than e_Z. So, there are two cases:

A. Case A: $e_P \in [0, e_Z)$.
If $e_P < e_Z$, then as wealth increases, it will reach the point where $U'(p)$ has declined to equate $\theta U'(p) = (1-\theta)b$, which we have defined as $\tilde{p}$. At that point, $m^*(W) = W - \tilde{f} - \tilde{p}$.
Then

$$m^*(W) = \begin{cases} 0 & W + \mathcal{D}_f(\tilde{f}, B(0)) \in [0, e_P) \\ W + \mathcal{D}(\tilde{f}, B(0)) - e_P & W + \mathcal{D}_f(\tilde{f}, B(0)) \in [e_P, e_Z] \end{cases} \tag{82}$$

B. Case B: If $e_P > e_Z$, then as wealth increases, it will pass through e_Z before e_P. So, no wealth be allocated to private benefits for the entirety of the domain $[0, e_Z]$. Then

$$m^*(W) = \begin{cases} 0 & W + \mathcal{D}_f(\tilde{f}, B(0)) \in [0, e_Z] \end{cases} \tag{83}$$

ii. **Domain** $W \geq e_Z$ Then $m^*(W) = 0$ as marginal benefit loads on z^*.

Combining both cases yields the stated piecewise form of $m^*(W)$.

■

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