"Pennies for Charity": Why Charities Outsource Fundraising*

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(Incomplete draft)

Abstract

Charities frequently rely on high-priced professional solicitors but donors seem unaware. To understand this, we propose an agency-based theory of fundraising. We show that trading off its incentive cost, the charity optimally hires a sufficiently "efficient" solicitor and offers him a high percentage of the donations collected, implying a high price of giving. Thus, if, as required by law, donors made aware of paid solicitations, then the charity would not outsource its fundraising. Outsourced fundraising can be profitable if: donors are unaware; donors have intense "warm-glow" preferences; or the charity is concerned about its watchdog ratings.

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JEL Classification: H00, H30, H50

1 Introduction

Fundraising is essential to most charities – but it is costly. A 25-35% cost-to-donation ratio is considered reasonable by leading experts (Kelly, 1998; Greenfield, 2002) and watchdog groups such as Charity Navigator and CharityWatch. This benchmark is, however, significantly exceeded by those charities that hire for-profit fundraisers. According to the "Pennies for Charity" report of New York Attorney General, charities regularly paid more than half of the solicited donations to telemarketing companies; see Figure 1.[1] Similar statistics

*We thank ... All errors are ours.

[1]The *Pennies* reports are available at <www.charitiesnys.com>. From 1994 to 2011, on average, $200 million was raised annually through 580 telemarketing campaigns on behalf of 438 charities.

have been documented by nine other states including California and North Carolina.[2]

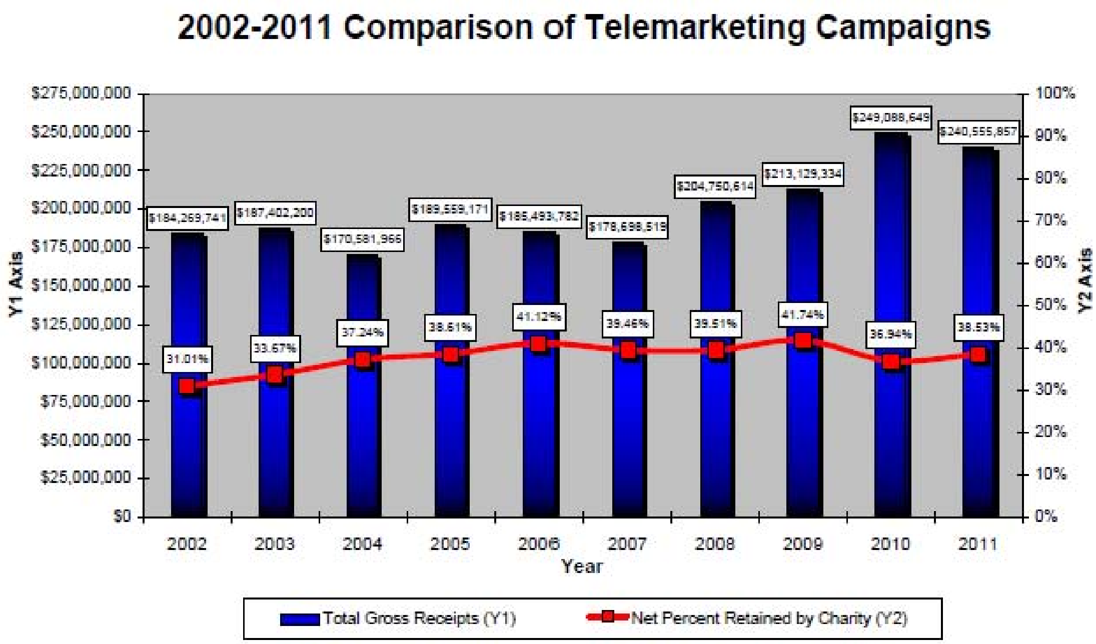

Figure 1: Telemarketing in New York State (Source: 2012 Pennies for Charity)

The high percentages retained by paid solicitors have also attracted media scrutiny. A 2012 story by the *Bloomberg Markets* magazine revealed that from 2007 to 2010, a major telemarketing company kept 52% of $424.5 million raised on behalf of 30 nonprofits, including American Cancer Society and March of Dimes - two of the largest in the U.S.[3] A 2013 investigation by the *Tampa Bay Times* ranked nearly 6000 American charities based on money paid to solicitors in the past decade and showed that the top 50 totalled $970.6 million while allocating less than 4% to the intended causes.[4]

The high cost of paid fundraisers raises legitimate concerns about the governance and accountability of charitable organizations. As such, it has the potential to seriously un-

[2]In 2012 alone, professional fundraisers collected approximately $294.3 million in nationwide campaigns including California residents, of which only 36% was distributed to charities. In the same year, $494 million was raised in campaigns including North Carolina residents and only 46% of this amount was received by charities.

[3]See <www.bloomberg.com/news/2012-09-12/charities-deceive-donors-unaware-money-goes-to-a-telemarketer.html>

[4]See <www.tampabay.com/americas-worst-charities>

dermine public confidence in the nonprofit sector, which constitutes about 2% of GDP in the U.S (GivingUSA, 2012). Nevertheless, before making policy decisions, it is important to understand the market for professional fundraising: why it exists despite being so expensive; what it implies about donor motives; if it is consistent with informed donors (as intended by state regulators); and if and how it should be intervened by authorities. Complicating policy interventions is the fact that a direct regulation of fundraising contracts is prohibited by freedom of speech.[5]

This paper proposes a first model of outsourced fundraising, featuring one charity, one professional fundraiser and many potential donors. Each donor considers giving only if solicited.[6] The charity may conduct these (costly) solicitations on its own or outsource them to the professional by promising him a percentage of the donations collected. We find that the charity would be unlikely to outsource if, as required by law, the professional identified himself to donors.[7] Intuitively, under outsourcing, the charity engages in an agency relationship with the paid solicitor, which creates an "incentive cost" (Holmstrom, 1982). To overcome this cost, the charity outsources if and only if the paid solicitor is sufficiently more "efficient" than itself. Indeed, charities often justify the use of paid solicitors by their own inexperience and poor technology to undertake large-scale campaigns as well as the need to focus on core missions. Consistent with agency theory, the charity optimally offers a high percentage to a hired solicitor, implying a high price of giving. Thus, outsourcing is profitable for the charity only if giving is very price-inelastic, which is strongly refuted by empirical evidence; see Andreoni and Payne (2013) for a review.

In light of this benchmark result, we offer three explanations for outsourced fundraising. First, despite disclosure laws, donors may simply be unaware of paid solicitors or high percentages retained by them; so their donations remain intact. This is consistent with the anecdotal evidence on unaware donors as well as survey evidence indicating largely uninformed giving (Hope Consulting report, 2010) and strong public confidence

[5]On the basis of content-based regulation of protected speech, the U.S. Supreme Court ruled it unconstitutional to regulate percentages paid to professionals and their mandatory disclosures to donors in two landmark cases: *Village of Schaumburg v. Citizens for a Better Environment* (1980) and *Riley v. National Federation of the Blind of North Carolina, Inc.* (1988).

[6]Directly asking donors is viewed as one of the most powerful fundraising techniques. See Andreoni and Payne (2013) for a discussion; and Yoruk (2009), Andreoni and Rao (2011) and Meer and Rosen (2011) for evidence.

[7]In the U.S., 41 states including California and New York have such disclosure laws in place (Fishman and Barrett, 2013). As per freedom of speech, these laws, however, do not mandate the disclosure of fundraising contracts to donors.

in the charitable sector (O'Neill, 2009; Perspectives on Nonprofits, 2010; Edelman Trust-Barometer, 2014). Second, donors may have intense "warm-glow" preference for giving (Andreoni, 1989) and thus they are less sensitive to the increased price of giving from outsourcing. And third, in order to improve their watchdog ratings, some charities may want to shift campaign fixed costs onto paid fundraisers.

A dynamic extension of our model can further shed light on why charities sometimes are willing to incur losses from fundraising campaigns.[8] We show that charities may view paid solicitations as an investment into identifying new donors who can then be approached repeatedly. In another extension, we demonstrate that charities with additional revenues from government grants and/or repeat donors are less likely to use paid solicitors – though not because money from new donors is less valuable to charity but because the incentive cost is higher.

In addition to papers mentioned above, our paper relates to a growing theoretical literature on strategic fund-raising by means of: providing prestige and status to donors (Glazer and Konrad, 1996; Harbaugh 1998; Romano and Yildirim 2001; Barbieri and Malueg, Forthcoming); coordinating donations under non-convex production (Andreoni, 1998; Marx and Matthews, 2000); facilitating informed giving (Vesterlund, 2003; Andreoni 2006b; Krasteva and Yildirim, 2013); and organizing lotteries (Morgan, 2000). These papers, however, do not model fundraising as an endogenous, costly undertaking. In this vein, our paper is more closely related to Rose-Ackerman (1982), Andreoni and Payne (2003), and Name-Correa and Yildirim (2013). Rose-Ackerman constructs a first model of costly fund-raising in which donors, as in ours, are unaware of a charity unless solicited. She, however, does not derive donor behavior from an equilibrium play. Andreoni and Payne (2003) and Name-Correa and Yildirim (2013) endogenize both the charity and donors' behaviors, but they essentially assume "in-house" fundraising; so outsourcing, which is at the heart of our investigation, is nonissue. We should note that there is also an extensive empirical literature on charitable giving, to which we will refer below; see the reviews by List (2011) and Andreoni and Payne (2013).

The remainder of the paper is organized as follows. In the next section, we set up the basic model. In Section 3, we characterize the benchmark of in-house fundraising. In Section 4, we determine an optimality condition for outsourced fundraising and argue that it would be difficult to satisfy empirically if donors were aware of this practice. In Section

[8] The *Pennies* report reveals that about 10% of campaigns results in a loss for charities.

5, we offer three possible explanations for outsourcing, followed by extensions to dynamic fundraising as well as to government grants and repeat donors in Section 6. Section 7 concludes. The proofs of all the formal results appear in the appendix.

2 Basic model

The economy consists of one charity, one professional fundraiser and many identical donors. Each donor considers giving and enters a voluntary contribution game only if solicited – perhaps she is uninformed of the current fund-drive or simply procrastinates.[9] The charity can fundraise in-house or outsource its fundraising to the professional by offering him a share s of the donations collected.[10] Since it is not required by law, s is not disclosed to donors at the time of solicitation, though they can hold rational expectations about it. We assume that the fundraising technology is represented by a convex, iso-elastic cost function:

$$C(n;\alpha) = \frac{n^{1+1/\alpha}}{1+1/\alpha}, \tag{1}$$

where $\alpha > 0$ is the "ability" parameter and n is the number of (successful) solicitations.[11] In particular, treating n as a continuous variable, the marginal cost is $C_n(n;\alpha) = n^{1/\alpha}$, where subscripts refer to partial derivatives throughout. Note that marginal cost is decreasing in α; so we say that the fundraising technology is more efficient, the higher α is. Donors cannot monitor the choice of n and in case of outsourcing, neither can the charity.

On the donor side of the nonprofit market, we follow the standard model of giving (Bergstrom et al. 1986). Each contacted person allocates her income m between a private good consumption $x_i \geq 0$ and a gift to the charity $g_i \geq 0$ without observing others. Units are normalized so that $x_i + g_i = m$. Let $G = \sum_i^n g_i$ be the total donation. Then, the charity's net revenue is $G - C$ for the in-house and $(1-s)G$ for the outsourced fundraising. The charity can provide the public good only if its net revenue is positive. In particular, the

[9]Our model easily generalizes to the possibility of repeat donors who do not require solicitations; see Section 6.2. Also see Yoruk (2009), Andreoni and Rao (2011) and Meer and Rosen (2011) for evidence on "the power of asking" in fundraising.

[10]Greenlee and Gordon (1998) found that 63.3% of fundraising contracts between 1991 and 1996 in Pennsylvania were percentage based. Our own inspection of telemarketing data for New York and North Carolina also indicate a majority use of percentage contracts.

[11]For simplicity, each solicitation is assumed successful in that it convinces the donor to consider giving (see Footnote 6). Also fixed costs of fundraising are ignored in the analysis and briefly discussed in Section 5.3.

public good is provided at the levels: $\overline{G} = \max\{G - C, 0\}$ and $\overline{G} = (1-s)G$ for the in-house and outsourced fundraising, respectively. Person i's preferences are convex, and represented by an increasing utility function:

$$u_i = u(x_i, \overline{G}).$$

Let $f(m,p)$ be individual demand for the public good whose relative price is p. We assume that both public and private goods are normal so that $0 < pf_m < 1$. Below, we will frequently refer to price and income elasticities of demand: $\varepsilon^p = \frac{p \times f_p}{f}$ and $\varepsilon^m = \frac{m \times f_m}{f}$.

We begin our investigation by in-house fundraising and then turn to outsourcing.

3 In-house fundraising

Suppose that the charity fundraises itself and that this is commonly known by donors. Anticipating a (unique) gift g^I from each solicitation, the charity chooses the number of solicitations to maximize net revenues:

$$\overline{G}^I = \max_n [ng^I - C(n; \alpha_I)]. \tag{IF}$$

The first-order condition requires that $g^I = C_n(n; \alpha_I)$. That is, the optimal number of solicitations equates the marginal revenue, which is the last donation, to its marginal cost. Employing Eq.(1), this condition reduces to:

$$n = \left(g^I\right)^{\alpha_I}. \tag{2}$$

All else equal, the charity reaches out to more people, the larger the expected gift and/or the more efficient its technology is. In equilibrium, both the donors and charity correctly conjecture strategies; hence $n = n^I$ and $g^I = g(n^I)$. Our first result characterizes in-house fundraising.

Proposition 1 *Under in-house fundraising, there is a unique and symmetric equilibrium. In equilibrium, as the fundraising technology becomes more efficient, namely α_I gets larger, the number of solicitations, n^I; the total cost, C^I; the gross donations, G^I; and the net revenues, $\overline{G}^I$ all increase whereas the individual gift g^I decreases.*

As expected, a more efficient charity contacts more individuals and incurs a higher total cost as a result. Since free-riding intensifies in a larger population, each contacted individual gives less; but this reduction is not enough to diminish gross or net donations. The latter highlights a donor incentive to partially cover the fundraising cost.[12]

The cost-to-donation ratio for the charity can also be readily determined. From Eqs. (1) and (2), note that the equilibrium total donation is: $G^I = (1 + 1/\alpha_I)C^I$, which reveals

$$r^I \equiv \frac{C^I}{G^I} = \frac{\alpha_I}{1+\alpha_I}. \tag{3}$$

Evidently, r^I is increasing in α_I. That is, a more efficient charity, while raising more funds, has a higher cost-to-donation ratio! Most starkly, the ratio is close to 1 for the most efficient charity. The intuition is that an optimizing charity solicits until its cost-to-donation ratio for the last donor is 1. Since a more efficient charity has a flatter marginal cost curve, its (average) ratio ends up higher. This finding has two important implications.

First, though simple and often utilized by watchdogs such as CharityNavigator and CharityWatch, the cost-to-donation ratio is an unreliable measure for ranking charities. As such, our finding theoretically supports the critics of this measure (Steinberg, 1991; Karlan, 2011). Nevertheless, there is some evidence that donors care about cost-to-donation ratios and best practice standards promoted by industry experts and watchdogs (Cnaan et al. 2011; Gordon et al. 2009). Thus, second, our finding might also explain why some charities fall short of maximizing net-revenues and instead behave as "satisficers" who set revenue goals (Khanna et al. 1995; Okten and Weisbrod 2000; and Andreoni and Payne, 2011). The following corollary, which directly obtains from Eq.(3), shows that a goal-setting charity is likely to be more efficient.

Corollary 1 *Suppose that the industry standard for the cost-to-donation ratio is set at $\bar{r} < 1$. Then, a charity with $\alpha_I > \frac{\bar{r}}{1-\bar{r}}$ falls short of maximizing net revenues by soliciting too few donors whereas a charity with $\alpha_I \leq \frac{\bar{r}}{1-\bar{r}}$ maximizes net revenues.*

Corollary 1 predicts that more charities that are relatively efficient will turn satisficers as the industry standard grows more stringent. For a charity that is inefficient in fundraising, a viable alternative is to outsource it to a more experienced, better-equipped solicitor such as a telemarketing firm. Such efficiency-based outsourcing is, however, difficult to rationalize if donors are made aware of the practice, as we formalize next.

[12]Given the total cost $C > 0$, there can be a zero-contribution equilibrium among donors much like in Andreoni (1998); but it is never reached in our setting since C is endogenous to fundraising.

4 Outsourcing with aware donors: near impossibility

Suppose that the charity contracts out its fundraising to a professional solicitor whose efficiency parameter is α_o. Also suppose that the professional complies with the states' disclosure laws, and identifies himself as well as the sponsoring charity to donors at the point of solicitation. The charity cannot directly monitor the number of solicitations conducted by the professional. To motivate, the charity offers him a percentage s of the funds raised. Donors observe neither the percentage nor the number of solicitations (see Footnotes 5 and 7)

Upon accepting the contract and expecting a (unique) gift g^o from each solicitation, the professional solicits n donors to maximize his profit:

$$n \in \arg\max_{\widehat{n}} [s\widehat{n}g^o - C(\widehat{n}; \alpha_o)]. \tag{IC}$$

The professional accepts the contract if it yields a nonnegative profit:

$$\Pi = sng^o - C(n; \alpha_o) \geq 0. \tag{IR}$$

Taking these incentive and individual rationality constraints into account, the charity sets the percentage s to maximize its net proceeds:

$$\overline{G}^o = \max_{s,n} (1-s)ng^o \tag{OF}$$
$$\text{s.to (IC) and (IR).}$$

Note that the (IR) constraint is trivially satisfied because the professional can ensure a zero profit by soliciting no individual. Thus, in equilibrium the professional must receive a positive profit, namely $\Pi^o > 0$. This is an "incentive cost" to the charity. The first-order condition from (IC) requires that $sg^o = C_n(n; \alpha_o)$. As with in-house fundraising, the professional solicits until his marginal revenue, which is the agreed percentage of the last donation, equals his marginal cost. Using Eq.(1), the professional's strategy simplifies to:

$$n = (sg^o)^{\alpha_o}. \tag{4}$$

Not surprisingly, the solicitation effort intensifies with a higher percentage retained and a larger expected gift. Inserting Eq.(4) into (OF), the charity's objective becomes

$$\overline{G}^o = \max_{s} (1-s) \, (sg^o)^{\alpha_o} \, g^o, \tag{5}$$

whose unique solution is:

$$s^o = \frac{\alpha_o}{1+\alpha_o}. \tag{6}$$

Three properties of the optimal contract, s^o are worth noting. First, s^o is increasing in α_o: a more efficient solicitor is offered a larger share of the donations. The trade-off is easily seen from (5): a larger share reduces the charity's return but motivates the solicitor; and motivating a more efficient solicitor is less costly.[13] Second, the share offered to the professional can be quite high. For instance, the solicitor with a quadratic cost, $\alpha_o = 1$, is paid half of the total donation. This observation may rationalize the empirical evidence that telemarketing companies specializing in fundraising often retain more than half of the donations and the charities agree to it. This does not, however, mean that the charity receives little. From Eqs.(1) and (4), it is readily found that $\overline{G}^o = (1 + 1/\alpha_o) \times \Pi^o$; that is, the charity's net revenues actually exceed the fundraiser's profit by a fraction of $1/\alpha_o$. Third, because donors cannot observe or verify the contract at the time of solicitation and adjust their gifts, the contract depends only on the solicitor's technology – not on donors' preferences. This dichotomy will prove useful when we discuss voluntary contract disclosure in Proposition 3.

For the charity to outsource, the professional must be significantly more efficient than the charity itself to overcome the incentive cost mentioned above. In particular, the charity's net revenue must grow with fundraiser efficiency. There is, however, a price effect countering such revenue growth. Note that the (relative) price of giving under outcourcing is:

$$p^o \equiv \frac{1}{1-s^o} = 1 + \alpha_o,$$

which exceeds 1 and rises with the professional's efficiency owing to a larger percentage paid to him. By definition, the impact of a price change on donations will depend on the price elasticity of giving. Intuitively, if giving is very inelastic, then donations should be affected little from outsourcing and in turn, the charity may benefit from hiring a professional. By the same token, if giving is very elastic, then the charity is unlikely to gain from outsourcing. The following result confirms this intuition. In its statement, recall that ε^p denotes the price elasticity of demand for the public good.

Proposition 2 *Under outsourcing, there is a unique and symmetric equilibrium. In equilibrium,*

[13] This comparative static is consistent with that for a standard principal-agent relationship: the agent is promised a larger fraction of the profit as his effort cost becomes less convex (Holmstrom, 1982).

the charity's net revenue is increasing in fundraiser efficiency, i.e., $\frac{d}{d\alpha_o}\overline{G}^o > 0$, *if and only if* $|\varepsilon^p| < pf_m \times (1 + \frac{\ln n}{\alpha_o n})$, *where* $p = p^o$ *and* $n = n^o$.

To understand Proposition 2, note that the ratio $\frac{\ln n}{n}$ is less than $\frac{1}{e} \approx .37$ and is likely to be much smaller for mass solicitations.[14] Given this, the condition in Proposition 2 essentially becomes: $|\varepsilon^p| \leq pf_m$. Since $pf_m < 1$ by the normality, this means that outsourcing based on fundraiser efficiency can be justified only if giving is sufficiently price-inelastic, as the intuition suggested. In our two-good economy, this is equivalent to private good being a gross complement to the public good.[15] Thus, for an efficiency-based outsourcing, some complementarity between the goods is also necessary.

The evidence, however, does not support outsourcing. For one, there is wide empirical consensus that charitable giving is price elastic, namely $|\varepsilon^p| > 1$.[16] Second, notice the term pf_m can be written: $\frac{pf}{m} \times \varepsilon^m$, where $\frac{pf}{m}$ is the fraction of income spent on charity and ε^m is the income elasticity of donation. The fraction of personal income allocated to charity hovers around 2 percent in the U.S. (Giving USA, 2012). Furthermore, most studies estimate the income elasticity to be less than 1 – around .7 (Auten et al., 2002; Bakija and Heim, 2011). Hence, a reasonable estimate for pf_m is roughly .014, which is far below the price elasticity, $|\varepsilon^p|$.[17]

Additional and equally strong evidence against outsourcing comes from lab data on individual preferences for giving. Both Andreoni and Miller (2002), and Fisman et al. (2007) experimentally find that most subjects exhibit a much higher degree of substitution between giving self and giving to others than Leontief. To see what this implies in our context, consider first Leontief preferences: $u_i = \min\{x_i, \overline{G}\}$, for which demand for the public good is: $f(m, p) = \frac{m}{1+p}$, implying that $|\varepsilon^p| = pf_m = \frac{p}{1+p}$. Thus, with Leontief, efficiency-based outsourcing can indeed be rationalized – but barely. That is, our outsourcing crite-

[14] In particular, $\frac{\ln n}{n}$ converges to 0 at the rate of $\frac{1}{n}$. For instance, $\frac{\ln n}{n} = .046, .012, .006$ for $n = 100, 500, 1000$. Moreover, recall from Eq.(6), a solicitor who receives at least half of donations must have efficiency $\alpha_o \geq 1$.

[15] This conclusion directly follows from the budget constraint: $x(m, p) + pf(m, p) = m$. Differentiating with respect to p, we obtain

$$\frac{\partial}{\partial p} x(.) =^{sign} |\varepsilon^p| - 1.$$

[16] See, for instance, Clotfelter (1985), Randolph (1995), Auten et al. (2002), Eckel and Grossman (2003), Bakija and Heim (2011), and Huck and Rasul (2011). Andreoni and Payne (2013) briefly summarizes the literature.

[17] To be sure, recent empirical studies have distinguished between transitory and persistent elasticities of giving depending on the periods of tax laws. It seems natural to assume that the effects of outsourcing are temporary. In this respect, Randolph (1995) estimates $|\varepsilon^p| = 1.55$ and $\varepsilon^m = .58$ whereas Auten et al (2002) estimate $|\varepsilon^p| = .4$ and $\varepsilon^m = .29$. Despite the mixed evidence, our outsourcing condition is violated.

rion in Proposition 2 is unlikely to hold for less than perfect complements observed in lab data, as we demonstrate next.

Example 1 (CES utility) *Suppose*

$$u_i = (a x_i^\rho + (1-a)\overline{G}^\rho)^{\frac{1}{\rho}},$$

where $\rho \in (-\infty, 1)$. *Letting* $r = \frac{\rho}{\rho - 1}$ *and* $A = (a/(1-a))^{1-r}$, *demand for the public good is:* $f(m; p) = \frac{1}{Ap^{1-r} + p} m$; *hence*

$$p f_m = \frac{p^r}{A + p^r} \text{ and } |\varepsilon^p| = 1 - r \frac{A}{A + p^r}.$$

Note that since $\frac{\ln n}{n} \le \frac{1}{e}$, *Proposition 2 reveals that*

$$\frac{d}{d\alpha_o} \overline{G}^o < 0 \text{ if } |\varepsilon^p| \ge p f_m \times (1 + \frac{1}{e \times \alpha_o}).$$

Setting $p = 1 + \alpha_o$, *it follows that* $\frac{d}{d\alpha_o}\overline{G}^o < 0$ *if* $eA(1-r)\alpha_o - (1+\alpha_o)^r \ge 0$, *or equivalently if*

$$e(a/(1-a))^{1/(1-\rho)} \alpha_o - (1-\rho)(1+\alpha_o)^{-\rho/(1-\rho)} \ge 0.$$

The left-hand side of this inequality is increasing in α_o; *and it becomes negative for* $\alpha_o \to 0$ *and positive for* $\alpha_o \to \infty$. *Thus, there is a unique threshold* $\underline{\alpha}(\rho, a) > 0$ *such that* $\frac{d}{d\alpha_o}\overline{G}^o < 0$ *if* $\alpha_o \ge \underline{\alpha}(\rho, a)$. *Moreover,* $\underline{\alpha}(\rho, a)$ *is decreasing in both* ρ *and* a, *with* $\underline{\alpha}(\rho, .5) = .03, .32, .37, .42,$ *and* $.96$ *for* $\rho = .9, .1, 0, -.1,$ *and* $-.9$, *respectively.*

Example 1 says that an outsourcing charity actually becomes worse off by hiring a more efficient fundraiser if individual preferences display enough selfishness (i.e., a high a) and/or enough substitution between private good and charity. This makes sense because, as alluded to above, a more efficient fundraiser is promised a greater percentage of donations, raising the price of giving. With enough selfishness and/or substitution, this causes donors to significantly cutback on their gifts, diminishing net revenue for the charity. Estimating CES preferences, Andreoni and Miller report that only 25 out of 173 subjects exhibit Leontieff preferences, namely $\rho = -\infty$, while the rest (86%) has $a \ge .5$ and $\rho \ge -.36$. Using a similar method, Fisman et al. (2007) uncover that only 2 out of 65 subjects can be rationalized by Leontief preferences while the remaining (97%) has $a \ge .5$ and $\rho \ge -.9$. Example 1 thus implies that for most individuals in these two experiments,

$\underline{\alpha}(\rho, a) \leq .96$. Since a professional solicitor who keeps at least half of donations (as suggested by the telemarketing evidence) refers to $\alpha_o \geq 1$ by Eq.(6), Example 1 also implies that the charity's net revenue is decreasing in fundraiser efficiency, making outsourcing unprofitable.

In sum, based on rich data on charitable giving, we cannot rationalize outsourced fundraising if donors are aware of this practice. The apparent reluctance of professional solicitors to inform donors of their (actual) fundraising contracts at the point of solicitation reinforces this conclusion.[18] To see why, suppose that giving is price-elastic as suggested by the data. If the fundraising contract were to be disclosed to donors, then the charity would optimally lower the fundraiser's percentage to both control the price effect and (implicitly) commit to the number of solicitations. While, compared to nondisclosure, a lower percentage would benefit the charity, it would hurt the fundraiser. We formalize this intuition in,

Proposition 3 *Suppose that the charity outsources and the fundraiser verifiably discloses its contract to donors at the point of solicitation. If giving is price-elastic, $|\varepsilon^p| \geq 1$, then the fundraiser receives a lower percentage and is worse off than nondisclosing its contract. The charity is, on the other hand, better off by contract disclosure. Formally, $s^{o,d} < s^o$; $\Pi^{o,d} < \Pi^o$; and $\overline{G}^{o,d} > \overline{G}^o$.*

Proposition 3 confirms our modeling assumption that the fundraiser does not voluntarily disclose his contract to donors. It also explains states' efforts to inform donors of percentages retained by professional fundraisers. Note that Proposition 3 holds even when $|\varepsilon^p| = 1$; hence, by continuity, it also holds for $|\varepsilon^p|$ is less than but close to 1 – consistent with experimental data that shows some complementarity between public and private goods. The reason is that even if the price effect is not too severe, the charity still wants to lower the fundraiser's percentage to discourage excessive solicitations. The obvious question, however, remains:

5 Why do charities outsource fundraising?

In this section, we offer three possible answers. First, donors are simply unaware of professional solicitations. Second, donors are also "warm-glow" or joy givers and therefore

[18] As previously mentioned, although state laws require that professional solicitors identify themselves to donors, the laws do not require the disclosure of fundraising contracts to donors.

less sensitive to the price of giving. And third, for fundraising campaigns that involve significant fixed costs, charities shift these costs onto fundraisers in order to improve their watchdog ratings.

5.1 Unaware donors

Common to the media accounts alluded to in the Introduction is the fact that the interviewed donors often did not know about paid solicitations or high percentages retained by the solicitors. For instance, in the *Bloomberg* story, upon learning that all the proceeds from a $5.3 million campaign for the American Cancer Society went to the telemarketing company, a 30-year fundraiser of New York University reportedly said:

> "I didn't know about it. It's deceitful...And I am in the field. So how can you expect donors to know that?"

When asked about such losing campaigns, a senior manager at the Atlanta-based Cancer Society responded:

> "If we came into it and said, 'Geez, I'm not going to make a dime on this,' do you think we would have anyone who would give us money?"

These accounts are consistent with the efforts of state regulators to inform donors about telemarketing activities as well as with the survey evidence pointing to uninformed giving (Hope Consulting, 2010) and strong public confidence in the charitable sector (O'Neill, 2009; Perspectives on Nonprofits, 2010; Edelman TrustBarometer, 2014).[19] Proposition 3 shows that unlike with aware donors, the charity might optimally hire a paid solicitor if donors are unaware.

Proposition 4 *Suppose that donors are unaware of paid solicitations and continue to make their in-house gifts, namely $g^I = g^o = g$. Then, a charity with technology α_I hires a paid solicitor with technology α_o if and only if $\alpha_o > \underline{\alpha}(g, \alpha_I)$ where $\underline{\alpha}(.) > \alpha_I$ is a unique cutoff. Moreover, $\underline{\alpha}(.)$ is decreasing in g and increasing in α_I; that is, the charity is more likely to outsource its fundraising (1) the higher its expected in-house gift is or (2) the less efficient its own solicitation technology is.*

[19] In these studies, survey evidence shows that people trust nonprofits more than they trust government or businesses to address pressing social problems.

The intuition behind outsourcing is that unaware donors do not respond to the increase in the price of giving due to outsourcing. Interestingly, the charity is more likely to outsource its fundraising when donors are more generous toward its cause. While a generous gift raises the charity's net revenues regardless of the mode of fundraising, a generous gift further raises net revenues from outsourcing by motivating the solicitor (see Eq.(4)) and in turn lowering the incentive cost for the charity. The same logic explains why a more efficient charity is less likely to outsource: by soliciting a larger set of donors, a more efficient charity receives a less generous (in-house) gift from each donor, which de-motivates the solicitor and raises the incentive cost for the charity.

Proposition 3 implies that with unaware donors, charitable motives that increase gifts should also increase the likelihood of outsourcing. Most significantly, Proposition 3 predicts that charitable causes that carry intense warm-glow preference should be the prime candidates for paid solicitations. This prediction appears compatible with a leading telemarketing firm's strategy:

> "Telephone purchases and donations are made on impulse. These are dictated not by reason or logic but by feelings of emotion. We are very familiar with the emotions of fundraising: sympathy, fear, anger, guilt, etc." (*Bloomberg Markets*, 2012)[20]

To fully understand this business strategy, and thus the charity's incentive to outsource, we also need to understand whether outsourcing would continue to be profitable for the charity if, as required by law, warm-glow donors were made aware of paid solicitations. As we show next, this is the case if donors are (almost) pure warm-glow givers.

5.2 Aware warm-glow donors

As in Section 4, suppose that the charity outsources its fundraising to a professional with efficiency α_o and that the professional discloses this fact to donors at the point of solicitation. Donors, however, now possess an added motive of warm-glow a la Andreoni (1989). Specifically, when the fundraiser retains a percentage s of the funds collected, donor i's utility is given by:

$$u_i = u(x_i, \overline{G}, \overline{g}_i), \tag{7}$$

[20] Small et al. (2007) experimentally supports this fundraising strategy: people give much more to the causes they identify with than they reason.

where $\overline{G} = (1-s)G$ and $\overline{g}_i = (1-s)g_i$. As before the donor receives utility from private consumption x_i and public good production $\overline{G}$, but he now also receives a warm-glow utility from the fraction of his donation that goes toward the public good, $\overline{g}_i$.[21]

Conjecturing s and others' total contribution G_{-i}, donor i maximizes his utility in (7) subject to budget constraint: $x_i + g_i = m$. Denoting by $p = \frac{1}{1-s}$ the price of giving and $\overline{G}_{-i} = (1-s)G_{-i}$ others' net contribution, i's program can be re-stated:

$$\begin{aligned} &\max_{x_i,\overline{G}} u(x_i, \overline{G}, \overline{G} - \overline{G}_{-i}) \\ &\text{s.to } x_i + p\overline{G} = M \\ &\overline{G} \geq \overline{G}_{-i}, \end{aligned} \tag{WG}$$

where $M \equiv m + p\overline{G}_{-i}$ is the "social income". This formulation reduces to Andreoni's for $s = 0$. Ignoring the second constraint (which holds in equilibrium), let $\overline{G} = \overline{f}(m + p\overline{G}_{-i}, \overline{G}_{-i}; p)$ be the solution to (WG) where $\overline{f}$ is donor i's Nash supply. Also let $\overline{f}_m$, $\overline{f}_w$, and $\overline{f}_p$ be the respective partial derivatives, signifying propensity to give due to altruism, warm-glow, and price increase. Normality of the goods implies that $0 < p\overline{f}_m < 1$; $\overline{f}_w \geq 0$; and $f_p < 0$. Note that $\overline{f}_w = 0$ refers to a purely altruistic donor, who cares only about the charitable output, as in the base model, whereas $p\overline{f}_m + \overline{f}_w = 1$ refers to a pure warm-glow giver who is unresponsive to others' contributions. To capture both motives for giving here, we assume $0 < p\overline{f}_m + \overline{f}_w \leq 1$.

From the fundraiser's perspective, gifts are fixed in equilibrium; so the optimal contract and the price of giving stay the same as in pure altruism in Section 4. The following result extends Proposition 2 and derives the condition under which the charity's net revenue is increasing in fundraiser's efficiency – a necessary condition for outsourcing. In its statement, $\overline{\varepsilon}^p = \frac{p\overline{f}_p}{\overline{f}}$ represents the price elasticity of Nash supply.

Proposition 5 *Consider warm-glow giving described in this subsection and suppose that donors are aware of paid solicitations. Then, there is a unique and symmetric equilibrium. In equilibrium, the charity's net revenue is increasing in fundraiser efficiency, i.e.,* $\frac{d}{d\alpha_o}\overline{G}^o > 0$, *if and only if* $|\overline{\varepsilon}^p| < p\overline{f}_m \times (1 + \frac{\ln n}{\alpha_o n}) + \overline{f}_w \times (\frac{1}{n} + \frac{\ln n}{\alpha_o n})$, *where* $p = 1 + \alpha_o$ *and* $n = n^o$.

Clearly, by setting $\overline{f} = f$ and $\overline{f}_w = 0$, the outsourcing condition coincides with that found in Proposition 2. To discern the role of warm-glow, note that for mass solicitations,

[21] Hence, we implicitly assume that donors do not obtain warm-glow from simply paying for the fundraising cost. Results would only be stronger if they did.

i.e., large n, the condition in Proposition 4 approximately becomes: $|\bar{\varepsilon}^p| \leq p\overline{f}_m$. Since $p\overline{f}_m < 1$ by the normality, as with no warm-glow, the Nash supply must be sufficiently price-inelastic, implying that private good must be a gross complement to the public good. It is intuitive that with an added warm-glow motive, giving should be less price sensitive; that is, it should be that $|\bar{\varepsilon}^p| \leq |\varepsilon^p|$. Moreover, all else equal, we expect a warm-glow donor to give a larger fraction of her marginal dollar than a pure altruist; that is, we expect that $pf_m \leq p\overline{f}_m$. Taken together, the warm-glow motive is likely to relax the outsourcing condition. To determine if it is satisfied, however, we examine a CES example – extending those in Example 1.

Example 2 (CES with warm-glow) *Suppose*

$$u_i = \left[ax_i^{\rho} + (1-a)((1-\omega)\overline{G} + \omega\overline{g}_i)^{\rho}\right]^{\frac{1}{\rho}},$$

where $\rho \in (-\infty, 1)$ *and* $\omega \in [0,1]$. *Again, letting* $r = \frac{\rho}{\rho-1}$ *and* $A = (a/(1-a))^{1-r}$, *we find* $\overline{f}(M; \overline{G}_{-i}; p) = \frac{1}{Ap^{1-r}+p}M + \frac{\omega A}{A+p^r}\overline{G}_{-i}$, *which yields*

$$p\overline{f}_m = \frac{p^r}{A+p^r} \text{ and } \overline{f}_w = \frac{\omega A}{A+p^r},$$

and

$$|\bar{\varepsilon}^p| = |\varepsilon^p| - \frac{\omega(1-r)A}{A+p^r}\left(\frac{n-1}{n}\right),$$

where $|\varepsilon^p| = 1 - r\frac{A}{A+p^r}$ *is the price elasticity found in Example 1. Proposition 4 implies that*

$$\frac{d}{d\alpha_o}\overline{G}^o > 0 \Longleftrightarrow (1-r)(1-\omega)A \leq (p^r + \omega A)\frac{\ln n}{\alpha_o n} + \frac{r\omega A}{n}.$$

For $n \to \infty$, $\overline{G}^o$ *is increasing in* α_o *if and only if* $\omega \to 1$ *or* $\rho \to -\infty$. *For* $\omega = 1$, $\overline{G}^o$ *is increasing in* α_o *if* $\rho \leq 0$; *and it is decreasing if* $\rho \to 1$.

Evidently, a higher ω implies a stronger warm-glow preference, with $\omega = 1$ representing a pure warm-glow giver. Example 2 reveals that in addition to unaware donors, the charity may outsource its mass solicitations to a professional if warm-glow is the sole charitable motive. It also reveals that mass solicitations are optimal for aware pure warm-glow givers if warm-glow and private good are complements, or else substitution between them is not too high so that the negative price effect is not pronounced. This is consistent with the literature on charitable motives: in general, donors are found to have both altruistic and warm-glow preferences for giving but the latter is likely to dominate in a large economy (Ribar and Wilhelm, 2002; Yildirim, 2013). More interestingly, the observation from Example 2 is also consistent with the telemarketing strategy alluded to above in which the fundraiser promises to make donors act solely on their emotions such as "sympathy, fear, anger, guilt, etc.". While we are unaware of any direct evidence on which charitable causes arouse such emotions, Keating et al. (2003) observe that about one-third of telemarketing campaigns in New York's *Pennies* reports from 1994 to 2001 were police-related and another one-third were conducted on behalf of activist or advocacy organizations, civic clubs, groups that support the military, and illness-related associations. In a comparable study that exploited Pennsylvania data from 1991 to 1996, Greenlee and Gordon (1998) find that charities in the advocacy, disease/disorder, youth development and public safety subsectors were more likely to hire paid solicitors. Andreoni and Payne (2011) support these findings. Across a wide range of social welfare and community-based charities, they measure about 75% crowding out but attribute almost all to reduced fundraising and little to donor response, implying strong warm-glow for these charities. For international relief and development organizations, Ribar and Wilhelm (2002) also present compelling evidence of warm-glow giving.

5.3 Improving watchdog ratings

Our analysis suggests that a charity which is net-revenue maximizing but inexperienced and unequipped to run complex, large-scale campaigns hires a professional solicitor only if the professional is significantly more efficient. While net-revenue maximization is a reasonable objective,[22] some charities might be more concerned about their cost-to-donation ratios in order to receive better watchdog ratings and more donations as a result (Gordon et al. 2009; Cnaan et al. 2011). When a fundraising campaign involves a significant fixed cost due, for instance, to its planning and staff training, outsourcing may indeed help lower the ratio. To see this formally, let $K > 0$ be the fixed cost of fundraising, which we have ignored so far. Then, the in-house ratio in Eq.(3) is modified to be:

$$r^{I,K} \equiv \frac{C^I + K}{G^I} = \frac{\alpha_I}{1+\alpha_I} + \frac{K}{G^I}. \tag{8}$$

Under outsourcing, recall that absent the fixed cost, the professional earns a positive

[22] As previously discussed in Section 3, the evidence on charities' objectives is mixed (Andreoni 2006). The net-revenue maximization is, however, often adopted in theoretical studies.

profit, namely $\Pi^o > 0$. Thus, the professional is willing to absorb the additional cost as long as $K \leq \Pi^o$, leaving the charity's cost-to-donation ratio under outsourcing intact:[23]

$$r^{o,K} \equiv s^o = \frac{\alpha_o}{1+\alpha_o}. \tag{9}$$

Comparing Eqs.(8) and (9), it is evident that $r^{o,K} < r^{I,K}$ for $\alpha_I = \alpha_o = \alpha$. In words, the charity will attain a lower cost-to-donation ratio under outsourcing even if the fundraiser is no more efficient solicitor than itself. The reason is evident: by shifting the fixed cost onto the fundraiser, the charity improves its cost-to-donation ratio.

6 Extensions

To further understand the market for professional fundraising, we examine dynamic fundraising in which paid solicitors establish a repeat donor base for charity as well as investigate how additional sources of funding from government and repeat donors affect hiring paid solicitors. For robustness, we also investigate an extension with heterogenous incomes.

6.1 Professional fundraising as an investment

It is not uncommon that charities may actually incur a loss on some telemarketing campaigns.[24] The leading explanation for this phenomenon is that the professional fundraiser solicits a "cold" list of donors, with an understanding that the list is then turned over to the charity for future solicitations. In particular, professional fundraising is viewed as an investment into bringing new donors. To formalize, consider a multi-period extension of our base model with unaware donors so outsourcing is possible. In period 1, the fundraiser (successfully) solicits n new donors in return for a share s of donations. In the remaining $T-1$ periods, the charity contacts the same donors without additional cost. The charity discounts future revenues by δ but, for simplicity, we assume that donors are short-sighted.[25]

Let g be the (equilibrium) gift from each solicitation. Then, the charity's discounted net revenue is

$$\overline{G}^t = (1 - s + \delta + ... + \delta^{T-1})ng. \tag{10}$$

[23] The same conclusion also holds for $K > \Pi^o$, though less trivially since the fundraiser's (IR) – not (IC) – constraint would bind in this case.

[24] For instance, the *Pennies* report reveals that about 10% of campaigns results in a loss for the charity.

[25] δ can also be interpreted as the probability of losing donors each period.

Since the fundraiser is hired only in period 1, the number of solicitations again is dictated by Eq.(4); that is, $\overline{n}(s) = (sg)^{\alpha_o}$. Inserting this into Eq.(10) and maximizing it with respect to s, we find the optimal contract:

$$s^{o,T} = \left(\frac{1-\delta^T}{1-\delta} \right) \frac{\alpha_o}{1+\alpha_o}. \tag{11}$$

Clearly, $s^{o,T}$ is increasing in T and δ. That is, as the charity cares more about future returns, it motivates the fundraiser to solicit a longer list of new donors by offering him a larger percentage. In fact, it is now possible that the percentage exceeds 1, implying a loss for the charity for a number of periods. To illustrate, for $T = \infty$, the charity incurs a loss for the first t periods if $\delta > 1/(1+\alpha_o)^{\frac{1}{1+t}}$.

It is worth noting that investing into new donors can be a viable strategy only for large charities that have additional resources to pay for it. Our analysis predicts that it is such large charities that are also likely to promise a significantly high percentage to professional fundraisers on initial campaigns. This seems consistent with the 2012 *Bloomberg* report in which the featured telemarketing company had several of the America's biggest charities as clients. This is also confirmed by Greenle and Gordon (1998) who empirically found professional solicitor charities to be significantly larger than nonsolicitor charities.

6.2 Government grants and repeat donors

Up to now, we have assumed that the single revenue source for the charity is new donors. In reality, the charity may have access to two additional revenue sources: (1) repeat donors who require no further solicitations, and (2) government grants. As the following result shows, outsourced fundraising becomes less pronounced in both cases.

Proposition 6 *Let $R \geq 0$ and $n_0 \geq 0$ be the government grant and the number of repeat donors, respectively. Suppose $f(m+R) > R$ and that donors are unaware of professional solicitations. Then, a charity with technology α_I outsources fundraising to a professional solicitor with technology α_o if and only if $\alpha_o > \widehat{\alpha}(R, n_0)$ where $\widehat{\alpha}(.)$ exceeds α_I and it is increasing in R and n_0.*

Proposition 5 says that the charity is less likely to outsource if it has a larger repeat donor base and/or obtains a more generous grant. The reason is not that the marginal return to each dollar falls for the charity (as the production of the public good is linear in funds) but that with additional funds, each donor gives less, which makes it costlier for the charity to motivate the professional fundraiser. In fact, if, contrary to our assumption, the government grant were high enough so that $f(m+R) \leq R$, then donors would give nothing and outsourcing would trivially be suboptimal.

6.3 Heterogenous donors

To be written!

7 Discussion and conclusion

To be written!

A Appendix

Proof of Proposition 1. To ease notation, we drop the superscript "I" in this proof. Note first that in equilibrium, $n > 0$ if and only if $\overline{G} > 0$, or equivalently $G - C > 0$. Clearly, if $G - C > 0$, it must follow that $n > 0$ to have $G > 0$. Now suppose $n > 0$ but $G - C \leq 0$. Then, by definition no public good would be provided, i.e., $\overline{G} = 0$. In particular, a solicited donor would be strictly better off contributing nothing to the public good. Given this, the charity would find it optimal not to solicit any donor, contradicting $n > 0$.

Next consider a solicited donor's problem. Conjecturing n, its cost C, and others' total contribution G_{-i}, donor i solves

$$\max_{x_i, g_i} u(x_i, G - C)$$
$$\text{s. to } x_i + g_i = m.$$

By definition, $g_i = (G - C) - (G_{-i} - C)$, or equivalently $g_i = \overline{G} - \overline{G}_{-i}$ where $\overline{G} \equiv G - C$ and $\overline{G}_{-i} \equiv G_{-i} - C$. Thus, i's program can be written:

$$\max_{x_i, \overline{G}} u(x_i, \overline{G})$$
$$\text{s. to } x_i + \overline{G} = m + \overline{G}_{-i}$$
$$\overline{G} \geq \overline{G}_{-i}$$

Let $\overline{G} = \max\{f(m + \overline{G}_{-i}), \overline{G}_{-i}\}$ be the solution to this program, where f is the demand for the public good as in the text. In equilibrium, individual contributions must be equal.

To prove, suppose this is not the case. Then, we would have $g_k > g_l$ for some donors k and l, which would mean $g_k > 0$ and thus $\overline{G} = f(m + \overline{G}_{-k})$. It would also mean that $\overline{G} \geq f(m + \overline{G}_{-l})$. Together we must have $f(m + \overline{G}_{-k}) \geq f(m + \overline{G}_{-l})$ or equivalently $g_k \leq g_l$, yielding a contradiction. Hence, in a fundraising equilibrium, $g_i = g$ for all solicited donors. Moreover, $G - C > 0$ as argued above, it must be that $g > \frac{C}{n} > 0$, which implies $\overline{G} = f(m + \overline{G}_{-i})$ or equivalently

$$\overline{G} = f(m + \overline{G} - g). \tag{A-1}$$

On the charity side, Eqs. (2) and (1) reveal that

$$G = (1 + 1/\alpha)C \text{ and } \overline{G} = C/\alpha. \tag{A-2}$$

Together with the facts that $n = [(1 + 1/\alpha)C]^{\frac{\alpha}{1+\alpha}}$ from Eq.(1) and $g = \frac{G}{n}$ by symmetry, Eqs.(A-1) and (A-2) thus require that

$$\begin{aligned} C/\alpha &= f(m + C/\alpha - \frac{(1+1/\alpha)C}{[(1+1/\alpha)C]^{\frac{\alpha}{1+\alpha}}}) \\ &= f(m + C/\alpha - (1+1/\alpha)^{\frac{1}{1+\alpha}} C^{\frac{1}{1+\alpha}}) \end{aligned}$$

Define

$$\Phi(C) = C/\alpha - f(m + C/\alpha - (1+1/\alpha)^{\frac{1}{1+\alpha}} C^{\frac{1}{1+\alpha}}).$$

Evidently, $\Phi(0) = -f(m) < 0$ and $\Phi(\frac{m^{1+\alpha}}{1+1/\alpha}) = \frac{m^{1+\alpha}}{1+\alpha} - f(\frac{m^{1+\alpha}}{1+\alpha}) > 0$. Thus, there is a solution to $\Phi(C) = 0$ such that $C \in (0, \frac{m^{1+\alpha}}{1+1/\alpha})$. Moreover, since $\Phi'(C) = \frac{1}{\alpha}[1 - f'(.) \times (1 - 1/n)] > 0$, the solution is unique, proving the existence of a unique fundraising equilibrium.

To prove comparative statics with respect to α, first differentiate (A-1):

$$\overline{G}' = f_m \times (\overline{G}' - g'),$$

which implies that $(1 - f_m) \times \overline{G}' = -f_m \times g'$. Since $0 < f_m < 1$,

$$\overline{G}' =^{sign} -g'. \tag{A-3}$$

Next, since $\overline{G} = \frac{C}{\alpha}$ from Eq.(A-2) and $g = n^{\frac{1}{\alpha}}$ from Eq.(2), using Eq.(1), we respectively write: $\ln(\overline{G}) = -\ln(1+\alpha) + (1 + \frac{1}{\alpha}) \ln n$ and $\ln g = \frac{1}{\alpha} \ln n$. Differentiating both with respect to α yields,

$$\frac{\overline{G}'}{\overline{G}} = -\frac{1}{1+\alpha} - \frac{\ln n}{\alpha^2} + (1+\frac{1}{\alpha})\frac{n'}{n} \tag{A-4}$$
$$\frac{g'}{g} = -\frac{\ln n}{\alpha^2} + \frac{1}{\alpha}\frac{n'}{n}. \tag{A-5}$$

Suppose $g' \geq 0$. Then, $\overline{G}' \leq 0$ by Eq.(A-3), which, from Eq.(A-4), implies that $-\frac{1}{1+\alpha} + \frac{n'}{n} \leq 0$. Moreover, since $g' \geq 0$ by hypothesis, $-\frac{\ln n}{\alpha^2} + \frac{1}{\alpha}\frac{n'}{n} \geq 0$ by Eq.(A-5). Together we have

$$\frac{\ln n}{\alpha} \leq \frac{n'}{n} \leq \frac{1}{1+\alpha},$$

which requires that $n \leq e^{\frac{\alpha}{1+\alpha}}$, contradicting our assumption that $n > e^{\frac{\alpha}{1+\alpha}}$. Hence, $g' < 0$ and in turn $\overline{G}' > 0$ and $n' > 0$. Furthermore, the fact that $\overline{G}' > 0$ implies from Eq.(**??**) that $C' > 0$ and $G' > 0$. ■

Proof of Proposition 2. To ease notation, we drop the superscript "o" in this proof. Conjecturing n, s and G_{-i}, donor i solves

$$\max_{x_i, g_i} u(x_i, (1-s)G)$$
$$\text{s. to } x_i + g_i = m.$$

By definition, $g_i = G - G_{-i} = \frac{1-s}{1-s}G - \frac{1-s}{1-s}G_{-i}$. Defining $p = \frac{1}{1-s}$, $g_i = p\overline{G} - p\overline{G}_{-i}$ where $\overline{G} \equiv (1-s)G$ and $\overline{G}_{-i} \equiv (1-s)G_{-i}$. Thus, i's program can be written:

$$\max_{x_i, \overline{G}} U(x_i, \overline{G})$$
$$\text{s. to } x_i + p\overline{G} = m + p\overline{G}_{-i}$$
$$\overline{G} \geq \overline{G}_{-i}.$$

The solution to this program is $\overline{G} = \max\{f(m + p\overline{G}_{-i}; p), \overline{G}_{-i}\}$ where $f(m, p)$ is the demand for the public good. As in the previous proof, it is straightforward to argue that in equilibrium, gifts must be symmetric and positive. Hence, in equilibrium

$$\overline{G} = f(m + p\overline{G} - g; p). \tag{A-6}$$

On the charity side, from Eqs. (4) and (6), it must be that

$$G = (1+\frac{1}{\alpha})^2 C \text{ and } \overline{G} = (1+\frac{1}{\alpha})\frac{1}{\alpha}C. \tag{A-7}$$

Together with the fact that $n = [(1+\frac{1}{\alpha})C]^{\frac{\alpha}{1+\alpha}}$ from Eq.(1) and $g = \frac{G}{n}$ by symmetry, Eqs.(A-6) and (A-7) thus require that

$$\begin{aligned}(1+\frac{1}{\alpha})\frac{C}{\alpha} &= f(m+(1+\frac{1}{\alpha})^2C - \frac{(1+\frac{1}{\alpha})^2C}{[(1+\frac{1}{\alpha})C]^{\frac{\alpha}{1+\alpha}}}; p)\\ &= f(m+(1+\frac{1}{\alpha})^2C - (1+\frac{1}{\alpha})^{\frac{2+\alpha}{1+\alpha}}C^{\frac{1}{1+\alpha}}; p)\end{aligned}$$

Define

$$\Psi(C) = (1+\frac{1}{\alpha})\frac{C}{\alpha} - f(m+(1+\frac{1}{\alpha})^2C - (1+\frac{1}{\alpha})^{\frac{2+\alpha}{1+\alpha}}C^{\frac{1}{1+\alpha}}; p).$$

Clearly, $\Psi(0) = -f(m;p) < 0$ and $\Psi(\frac{m^{1+\alpha}}{(1+\frac{1}{\alpha})^{2+\alpha}}) = \frac{1}{1+\alpha}\left[\frac{m^{1+\alpha}}{(1+\frac{1}{\alpha})^{\alpha}} - (1+\alpha)f(\frac{m^{1+\alpha}}{(1+\frac{1}{\alpha})^{\alpha}};p)\right] > 0$. The latter follows because $p = 1+\alpha$ and $M - pf(M;p) > 0$ from the budget line. Thus, there is a solution to $\Psi(C) = 0$ such that $C \in (0, m^{1+\alpha}/(1+\frac{1}{\alpha})^{2+\alpha})$. Moreover, since $pf_m < 1$ and $f_m > 0$, $\Psi'(C) = (1+\frac{1}{\alpha})\frac{1}{\alpha}[1 - pf_m + \frac{f_m}{n}] > 0$, the solution is unique, which proves the existence of a unique fundraising equilibrium.

Differentiating (A-6) with respect to α and recalling that $p = 1+\alpha$,

$$\overline{G}' = f_m \times (p'\overline{G} + p\overline{G}'g') + f_p p',$$

or since $p = 1+\alpha$, $\overline{G} = f$ and $\varepsilon^p = \frac{pf_p}{f}$,

$$(1-pf_m)\overline{G}' = \frac{\overline{G}}{p}\{pf_m - |\varepsilon^p|\} - f_m g'. \quad \text{(A-8)}$$

Next, since $\overline{G} = (1+\frac{1}{\alpha})\frac{C}{\alpha} = \frac{n^{1+\frac{1}{\alpha}}}{\alpha}$ and $sg = n^{\frac{1}{\alpha}}$, we have $\ln\overline{G} = -\ln\alpha + (1+\frac{1}{\alpha})\ln n$ and $\ln g + \ln(\frac{\alpha}{1+\alpha}) = \frac{1}{\alpha}\ln n$. Thus

$$\begin{aligned}\frac{g'}{g} &= -\frac{1}{\alpha(1+\alpha)} - \frac{1}{\alpha^2}\ln n + \frac{1}{\alpha}\frac{n'}{n},\\ \frac{\overline{G}'}{\overline{G}} &= -\frac{1}{\alpha} + (1+\frac{1}{\alpha})\frac{n'}{n} - \frac{1}{\alpha^2}\ln n.\end{aligned}$$

From the above it follows that

$$\frac{\overline{G}'}{\overline{G}} = (1+\alpha)\frac{g'}{g} + \frac{1}{\alpha}\ln n. \quad \text{(A-9)}$$

Substituting for g' into (A-8), we obtain:

$$(1-pf_m)\overline{G}' = \frac{\overline{G}}{p}(pf_m - |\varepsilon^p|) - f_m \times \left(\frac{g\overline{G}'}{p\overline{G}} - \frac{g\ln n}{\alpha(1+\alpha)}\right).$$

Given that $p\overline{G} = G$ and $\frac{G}{g} = n$, it follows that

$$
\begin{aligned}
(1 - pf_m + \frac{f_m}{n})\overline{G}' &= \frac{\overline{G}}{p}(pf_m - |\varepsilon^p|) + f_m \frac{g \ln n}{\alpha p} \\
&= \frac{\overline{G}}{p}(pf_m - |\varepsilon^p|) + f_m \frac{G \ln n}{\alpha n p} \\
&= \frac{\overline{G}}{p}(pf_m - |\varepsilon^p|) + f_m \frac{\overline{G} \ln n}{\alpha n} \\
&= \frac{\overline{G}}{p}(pf_m - |\varepsilon^p|) + \frac{\overline{G}}{p} pf_m \frac{\ln n}{\alpha n}. \\
&= \frac{\overline{G}}{p}\left[pf_m(1 + \frac{\ln n}{\alpha n}) - |\varepsilon^p|\right].
\end{aligned}
$$

Since $pf_m < 1$ and $f_m > 0$, $\overline{G}' > 0$ if and only if $|\varepsilon^p| < pf_m(1 + \frac{\ln n}{\alpha n})$, as desired. ■

Proof of Proposition 3. Suppose that the charity outsources but unlike in the base model, the fundraiser verifiably discloses s to donors. Let $n(s)$ be the equilibrium number of solicitations and $\overline{g}(s) \equiv g(s, n(s))$. Given s, the fundraiser solves

$$\Pi^o(s) = \max_n [ns\overline{g}(s) - C(n; \alpha)].$$

The FOC for the fundraiser is: $s\overline{g}(s) = n^{\frac{1}{\alpha}}$. Setting $n = n(s)$ and differentiating with respect to s, we obtain

$$\frac{1}{\alpha}\frac{n_s}{n} = \frac{1}{s} + \frac{d\overline{g}(s)/ds}{\overline{g}(s)}. \tag{A-10}$$

On the donor side, recalling $p = 1/(1-s)$, $\overline{G} = G/p$ and $G = ng$, we re-write Eq.(A-1):

$$n(s)\overline{g}(s) = pf(m + (n(s) - 1)\overline{g}(s); p).$$

Differentiating with respect to s yields

$$(1 - pf_m)n_s\overline{g}(s) + (n - (n-1)pf_m) \times d\overline{g}(s)/ds = \frac{1}{(1-s)^2} f(.) \times (1 - |\varepsilon^p|). \tag{A-11}$$

Finally, subject to $n = n(s)$, the charity's program reduces to:

$$\max_s \overline{G}(s) \equiv (1-s)s^\alpha(\overline{g}(s))^{1+\alpha},$$

which is equivalent to Eq.(5) except that g^o is replaced with $\overline{g}(s)$.

$$\text{FOC: } \frac{d\overline{G}(s)/ds}{\overline{G}(s)} \equiv -\frac{s(1+\alpha) - \alpha}{s(1-s)} + (1+\alpha)\frac{d\overline{g}(s)/ds}{\overline{g}(s)} = 0,$$

which, given $s^o = \frac{\alpha}{1+\alpha}$, results in:

$$\frac{d\overline{g}(s)/ds}{\overline{g}(s)} = \frac{s - s^o}{s(1-s)}. \tag{A-12}$$

From here, we find the optimal disclosure contract, $s^{o,d}$. Eqs.(A-10) and (A-12) reveal that $n_s = \alpha n \frac{1-s^o}{s(1-s)} > 0$. Since $pf_m < 1$ by normality and $|\varepsilon^p| \geq 1$ by hypothesis, this implies that $d\overline{g}(s)/ds < 0$ from Eq.(A-11) and thus $s^{o,d} < s^o$ from Eq.(A-12).

By the Envelope Theorem, note that $d\Pi^o(s)/ds > 0$ if and only if $d(s\overline{g}(s))/ds > 0$. Note also that

$$\begin{aligned} d(s\overline{g}(s))/ds &= \overline{g}(s)\left[1 + sd\overline{g}(s)/ds\right] \\ &= \overline{g}(s)\frac{1-s^o}{1-s} \text{ at } s = s^{o,d} \\ &> 0 \text{ at } s = s^{o,d}. \end{aligned}$$

Thus, $d\Pi^o(s)/ds > 0$ at $s = s^{o,d}$. Since $s^{o,d} < s^o$, this implies that $\Pi^o(s^{o,d}) < \Pi^o(s^o)$; that is, the fundraiser is worse off under disclosure than under nondisclosure. The charity is, however, better off under disclosure because it sets s; $s = s^o$ is feasible and $s^{o,d} \neq s^o$. ■

Proof of Proposition 4. Fix α_I and let $g = g^I$. Then, $\overline{G}^I(\alpha, g) = \frac{1}{1+\alpha}g^{1+\alpha}$ and $\overline{G}^o(\alpha, g) = \frac{1}{\alpha(1+1/\alpha)^{1+\alpha}}g^{1+\alpha}$. It is straightforward to verify that $\overline{G}^o(\alpha_I, g) < \overline{G}^I(\alpha_I, g)$. Moreover, since $g > 1 + 1/\alpha_o$ from Eq.(4), $\overline{G}^o(\alpha_o, g)$ is strictly increasing in α_o and $\lim_{\alpha_o\to\infty}\overline{G}^o(\alpha_o, g) = \infty$. Hence, there is a unique and finite $\underline{\alpha}(g, \alpha_I) > \alpha_I$ such that

$$\overline{G}^I(\alpha_I, g) = \overline{G}^o(\underline{\alpha}(g, \alpha_I), g) \tag{A-13}$$

and $\overline{G}^o(\alpha_o, g) > \overline{G}^I(\alpha_I, g)$ for $\alpha_o > \underline{\alpha}(g, \alpha_I)$. Next differentiating both sides of Eq.(A-13), we obtain

$$\frac{\partial\underline{\alpha}}{\partial g} =^{sign} \frac{\partial\overline{G}^I(\alpha_I, g)}{\partial g} - \frac{\partial\overline{G}^o(\underline{\alpha}, g)}{\partial g}.$$

Note that $\frac{\partial\overline{G}^I(\alpha_I,g)}{\partial g} = (1+\alpha_I)\frac{\overline{G}^I(\alpha_I,g)}{g}$ and $\frac{\partial\overline{G}^o(\underline{\alpha},g)}{\partial g} = (1+\underline{\alpha})\frac{\overline{G}^o(\underline{\alpha},g)}{g}$. Together with the facts that $\overline{G}^o(\underline{\alpha}, g) = \overline{G}^I(\alpha_I, g)$ and $\underline{\alpha} > \alpha_I$, we have

$$\frac{\partial\underline{\alpha}}{\partial g} =^{sign} (\alpha_I - \underline{\alpha})\frac{\overline{G}^I(\alpha_I, g)}{g} < 0,$$

proving the first comparative static. To prove the one with respect to α_I, we again differentiate both sides of Eq.(A-13) by recalling that $g = g^I$:

$$\frac{\partial\underline{\alpha}}{\partial\alpha_I} = \frac{\frac{d\overline{G}^I}{d\alpha_I} - \frac{\partial\overline{G}^o(\alpha_o,g^I)}{\partial g} \times \frac{\partial g^I}{\partial\alpha_I}}{\frac{\partial\overline{G}^o(\alpha_o,g^I)}{\partial\alpha_o}} > 0,$$

because $\frac{d\overline{G}^I}{d\alpha_I} > 0$ and $\frac{\partial g^I}{\partial \alpha_I} < 0$ by Proposition 1 and $\frac{\partial \overline{G}^o(\alpha_o, g^I)}{\partial g} > 0$ and $\frac{\partial \overline{G}^o(\alpha_o, g^I)}{\partial \alpha_o} > 0$ follow from above. ■

Proof of Proposition 5. Using a similar argument to the proof of Proposition 1, it is easily argued that a unique equilibrium exists and equilibrium gifts must be symmetric and positive. Hence, on the donor side, the equilibrium condition reduces to:

$$\overline{G} = \overline{f}(m + p\overline{G} - g; \overline{G} - \frac{g}{p}; p), \tag{A-14}$$

where $\overline{G}_{-i} = \overline{G} - \overline{g} = \overline{G} - \frac{g}{p}$. Differentiating (A-14) with respect to α:

$$\overline{G}' = \overline{f}_m \times (p'\overline{G} + p\overline{G}' - g') + \overline{f}_w \times [\overline{G}' - \frac{(pg' - p'g)}{p^2}] + \overline{f}_p p'$$

Recalling that $p = 1 + \alpha$ and $\overline{G} = \overline{f}$ from (A-14), it follows that:

$$(1 - p\overline{f}_m - \overline{f}_w)\overline{G}' = \frac{\overline{G}}{p}\left(p\overline{f}_m - |\bar{\varepsilon}^p|\right) - \frac{1}{p}[\left(p\overline{f}_m + \overline{f}_w\right)g' - \frac{\overline{f}_w ng}{np}],$$

where $\bar{\varepsilon}^p = \frac{p\overline{f}_p}{\overline{f}}$. Using Eq.(A-9) from the proof of Proposition 2, we know that: $\frac{g'}{g} = \frac{1}{1+\alpha}\frac{\overline{G}'}{\overline{G}} - \frac{1}{\alpha}\frac{\ln n}{(1+\alpha)}$. Hence upon substituting for g',

$$(1 - p\overline{f}_m - \overline{f}_w)\overline{G}' = \frac{\overline{G}}{p}\left(p\overline{f}_m - |\bar{\varepsilon}^p|\right) - \frac{1}{p}\left[\left(\frac{1}{(1+\alpha)}\frac{\overline{G}'g}{\overline{G}} - \frac{1}{\alpha}\frac{(\ln n)ng}{(1+\alpha)n}\right)\left(p\overline{f}_m + \overline{f}_w\right) - \frac{\overline{f}_w ng}{np}\right].$$

Since $p\overline{G} = G$ and $\frac{G}{g} = n$, we have

$$(1 - p\overline{f}_m - \overline{f}_w)\overline{G}' = \frac{\overline{G}}{p}\left(p\overline{f}_m - |\bar{\varepsilon}^p|\right) - \frac{1}{p}\left[\left(\frac{\overline{G}'}{n} - \frac{\ln n}{\alpha n}\overline{G}\right)\left(p\overline{f}_m + \overline{f}_w\right) - \frac{\overline{f}_w\overline{G}}{n}\right].$$

Furthermore,

$$\begin{aligned}\left[1 - (p\overline{f}_m + \overline{f}_w) + \frac{1}{np}(p\overline{f}_m + \overline{f}_w)\right]\overline{G}' &= \frac{\overline{G}}{p}\left[p\overline{f}_m + \frac{\ln n}{\alpha n}\left(p\overline{f}_m + \overline{f}_w\right) + \frac{\overline{f}_w}{n} - |\bar{\varepsilon}^p|\right] \\ &= \frac{\overline{G}}{p}\left[p\overline{f}_m(1 + \frac{\ln n}{\alpha n}) + \overline{f}_w(\frac{1}{n} + \frac{\ln n}{\alpha n}) - |\bar{\varepsilon}^p|\right].\end{aligned}$$

Since $0 < p\overline{f}_m + \overline{f}_w \leq 1$, $\overline{G}' > 0$ if and only if $|\bar{\varepsilon}^p| < p\overline{f}_m(1 + \frac{1}{\alpha}\frac{\ln n}{n}) + \overline{f}_w(\frac{1}{n} + \frac{1}{\alpha}\frac{\ln n}{n})$, as claimed. ■

Proof of Proposition 6. Let $R \geq 0$ and $n_0 \geq 0$ be the government grant and the number of repeat donors, respectively. As in the proof of Proposition 1, it is readily argued that given $n_0 + n$, there is a unique equilibrium gift g, resulting in total contribution: $G = (n_0 + n)g$, and total net contribution: $\overline{G} = G - C$. In particular, in the presence of R, a modified Eq.(A-1) holds in equilibrium:

$$\overline{G} + R = f(m + \overline{G} + R - g). \tag{A-15}$$

From the charity's optimization, we have $n = g^{\alpha}$, which, since $n = [(1 + 1/\alpha)C]^{\frac{\alpha}{1+\alpha}}$ from Eq.(1), reveals that $g = [(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}$,

$$G = (1 + 1/\alpha)C + n_0[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}} \text{ and } \overline{G} = C/\alpha + n_0[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}.$$

Inserting these into Eq.(A-15), we obtain

$$C/\alpha + n_0[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}} + R = f(m + R + C/\alpha + (n_0 - 1)[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}).$$

Define

$$\widehat{\Phi}(C; n_0, R) = C/\alpha + n_0[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}} + R - f(m + R + C/\alpha + (n_0 - 1)[(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}).$$

Clearly, $\widehat{\Phi}(0; n_0, R) = R - f(m + R) < 0$ by assumption and $\widehat{\Phi}(\frac{m^{1+\alpha}}{1+1/\alpha}; n_0, R) = \frac{m^{1+\alpha}}{1+\alpha} + n_0 m + R - f(\frac{m^{1+\alpha}}{1+\alpha} + n_0 m + R) > 0$ by normality. Thus, $\widehat{\Phi}(C^*; n_0, R) = 0$ for some $C^* \in (0, \frac{m^{1+\alpha}}{1+1/\alpha})$. Moreover, since $\widehat{\Phi}_C(C; n_0, R) = \frac{1}{\alpha}[1 + \frac{n_0(1+\alpha)}{n} - f_m(.) \times (1 + \frac{n_0(1+\alpha)}{n} - \frac{(1+\alpha)}{n})] > 0$, the solution C^* is unique, proving the existence of a unique fundraising equilibrium in this extension.

The existence of a unique cutoff $\widehat{\alpha}(R, n_0)$ follows the same line of arguments as in Proposition 3. In light of Proposition 3, it also suffices to show for the rest of Proposition 5 that equilibrium g is decreasing in R and n_0. Note that

$$\widehat{\Phi}_{n_0}(.) = [(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}(1 - f_m(.)) > 0 \text{ and } \widehat{\Phi}_R(.) = 1 - f_m(.) > 0.$$

Hence, C^* is decreasing in n_0 and R; and so does g because $g = [(1 + 1/\alpha)C]^{\frac{1}{1+\alpha}}$. ■

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