The Dark Side of Transparency: Mission Variety and Industry Equilibrium in Decentralized Public Good Provision

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Abstract

We study the implications of transparency policies on decentralized public good provision. The moral hazard inside non-profits interacts with the competitive structure of the sector under alternative informational regimes. More transparency on the use of funds has an ambiguous effect on the total public good provision and donor's welfare. Transparency encourages non-profits to more actively curb rent-seeking inside organizations, but it also tilts the playing field against non-profit managers facing higher monitoring costs, inducing them to abandon their missions and reducing non-profit diversity. Donors' welfare is lower under transparency for intermediate levels of asymmetry in monitoring costs.

Keywords: non-profit organizations, charitable giving, altruism, transparency.
JEL codes: L31, D64, D43, D23.

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1 Introduction

The traditional view in economics considers private profit-oriented firms as the main channel of provision of private goods, and governments as the main providers of public goods. This view is an imperfect representation of real-life economies. The provision of public goods is to a large extent delegated to the private sector (Bilodeau and Steinberg, 2006; Iossa and Saussier, 2018). Typically, the firms specializing in such provision are non-profits.[1] They mobilize funds (from donors and governments) and then put those funds, together with other inputs (such as labor) to the production of specific public goods. Hence, these organizations act as intermediaries between the funders and the beneficiaries (which can be the society at large) of the public goods.

Modern economies exhibit a large number of highly diverse organizations that work in this manner. These organizations compete with each other for funding, labor resources, visibility, political influence, etc. The non-profit sector in a modern economy has therefore three key features. First, the disconnection between the funding side (donors, governments) and the beneficiary side. Crucially, this disconnection severs the flow of informational feedback about non-profits' performance (which contrasts with the feedback typically provided by markets in the private-good sector). Second, the complexity of the non-profit organizations, with internal hierarchies, specialization in tasks (e.g. fundraising and carrying out the projects), and the consequent need to motivate and monitor the lower echelons of the organizations (similar to the private-good sector). Third, the decentralized nature of the sector: given the diversity in the missions and methods of non-profits, they can be considered as firms providing horizontally differentiated goods (which is again similar to the private-good sector).

The moral hazard problem and the related issue of monitoring that naturally arise from the intermediated nature of the sector require mechanisms to prevent the risk of rent-seeking and misappropriation by those actors within the sector which are not motivated by altruism. One such key mechanism involves a push for transparency concerning the use of funds: the funders/donors increasingly request that the non-profits clarify how their donations to these organizations are used. In the Unites States, several well-known organizations (for example, GuideStar USA, Charity Watch, Charity Navigator, and GiveWell) provide online

[1] In the United States, non-profits account for 71 per cent of total private employment in the education sector in 2019. For health care, social assistance, and arts & recreation sectors, this share stands at 44 per cent, 42 per cent, and 16 per cent, respectively (Salamon and Newhouse, 2019).

information services about American non-profits, especially on the structure of their spending or their cost-effectiveness. Charity Intelligence Canada provides a similar service on Canadian non-profits. In the U.K., the Charity Commission for England and Wales maintains an online register of charities which provides the financial information (including the spending items) about all registered charities.

However, the implications of such push for transparency or "value for money" in the non-profit sector remain underexplored. There are some calls for a more critical approach to transparency and the effects it generates: for instance, Nicholas Kristof argues that the excessive emphasis on the expense ratio (one of the metrics used to rank charities on the basis of their spending structure) pushes non-profits to underinvest in administration and efficiency (Chronicle of Philanthropy, 2014). But we still lack a rigorous analysis of how the moral hazard problem interacts with the competitive structure of the sector, under different informational-transparency regimes.

Our understanding of the private sector of the economy has been revolutionized by the incomplete-contracts approach to the theory of the firm (pioneered by Grossman and Hart, 1986) and the recent embedding of this theory into the industry setting (see, e.g., Legros and Newman, 2013; Alfaro et al., 2016; and Legros and Newman, 2014, for a detailed review). These analyses allow us to understand the interplay between the organizational-design aspects of modern corporations and the industry structure and competition. This research line, however, has focused so far only on the private-good sector, whereas the similar analysis of the public-good sector has not yet been constructed.

This paper builds an analytical framework of "organizational industrial organization" of the competitive provision of public goods in an economy. In our model, the contractual imperfections that exist in the public-good sector are at the heart of the story. Non-profits are founded and managed by altruistic individuals who exhibit an intrinsic motivation towards a social mission, and compete among themselves for funding from a large pool of donors. Whereas setting up the social mission and raising funds are tasks typically set at the top of non-profits' organizational hierarchies, actual on-the-ground action is relegated to lower levels of the hierarchy. The use of collected funds is subject to potential diversion by lower echelons within firms. Founders/managers can curb such diversion, at a cost, by closer monitoring. Importantly, the cost of monitoring may differ across firms. Depending on the level of transparency in the non-profit sector, donors may receive (or not) information about the extent of funds diversion across non-profits, which in turn will influence their willingness to contribute to each of them. Thus, our model describes the industrial-organization aspects of the public-good sector (total quantity of public goods provided and their distribution across firms, the intensity of competition) and the organizational aspects of its participants (the internal resources devoted to monitoring, the diversion of funds). We start with a simple two-firm model, to highlight the main mechanism, and then generalize it to n firms, thus endogenizing the industry structure.

Our central findings are twofold. First, we show that there is an ambiguous effect of more transparency on the use of funds on the total public good provision and the welfare of donors. Second, we highlight that the sign of this effect depends crucially on the degree of heterogeneity of monitoring costs of the non-profits. Indeed, higher transparency generates two opposite forces affecting the internal allocation of resources and the resulting diversion of funds. The first is *the competitive effect*: more transparency encourages a non-profit manager to devote more resources to monitoring and curbing rent-seeking inside her organization. This is because donors are more inclined to give to a non-profit when the (expected) diversion of funds is lower, and thus reward "cleaner" firms with more donations. The competitive effect will then induce *all* non-profits to monitor rent-seeking more closely. The second is *the strategic-interaction effect*: more transparency encourages managers of *some* non-profits to reduce the internal resources devoted to preventing rent-seeking. This effect arises because more monitoring by one non-profit manager indirectly curbs the incentives of other managers to prevent rent-seeking in their organizations, and monitoring acts as a strategic substitute for competition for funds. More precisely, the non-profits with higher cost of monitoring might rationally cut on this effort under more transparency. Hence, the overall effect of higher transparency on total provision of public goods can be positive or negative, depending on the relative strength of the two effects.

From the donors' perspective, there are also two corresponding opposed effects. On the one hand, transparency implies higher welfare because of the reduction in diversion for the non-profits active in the market. On the other hand, under more transparency, the strategic-interaction effect noted above implies a lower diversity of non-profits, hence reducing the set of charitable causes among which a donor can choose when deciding on his/her donation. We show that the second (negative) effect dominates the first (positive) one if the gap in the cost of monitoring (between low-cost and high-cost non-profits) is at an intermediate level.

This surprising result arises because of the general-equilibrium aspect. Offered the option to observe or not the level of funds diversion, any rational donor always prefers transparency, when facing this choice *individually*. However, the regime with full transparency offers this option not individually, but to all the donors collectively. Hence, a generic donor may be better off in a context in which *no one* can observe the level of diversion, because this leads to an equilibrium where each donor will be able to pick the recipient of his donation from a more diverse set of non-profits.

The rest of the paper is organized as follows. The next sub-section discusses briefly the related literature. In section 2, we present a simple model of strategic interaction between non-profits and highlight the effect of increased transparency on non-profit competition and the equilibrium level of public good provision. Section 3 expands the model to the case of a monopolistically competitive non-profit industry structure. Section 4 models the entry decision by non-profits. Section 5 provides our analysis of the impact of transparency on welfare and discusses policy implications. Finally, section 6 concludes. The proofs of results and a robustness check are relegated to the appendix.

1.1 Related literature

Our paper contributes to two fields in economics: public economics and organizational economics. In the public economics literature focusing on the private provision of public goods, several important contributions focus on the problem of non-contractibility of output in the public good provision. Glaeser and Shleifer (2001) argue that the non-contractibility of the output creates scope for non-profit firm, because this is a good way to commit (by the firm manager) to restrict diversion of funds. However, as the well-documented problem of funds diversion in non-profits firms indicates, the non-profit status alone seems to be insufficient for such goal: in many non-profits, there remains substantial scope for fund diversion by lower echelons, which is the focus of our work. Besley and Ghatak (2005) study how the effort provision by workers in mission-oriented organizations is affected by the structure of the incentives (in particular, the role of matching the mission preferences of principals and agents). Besley and Malcomson (2018) analyze the effects of competition between the (incumbent) non-profit and (entrant) for-profit providers, in the presence of non-contractible quality. Non-contractibility of output is also at the heart of our model, and we contribute to this line of research by analyzing how a key asymmetry in one of the aspects of non-contractibility (i.e. the agency cost within the non-profit) maps into equilibrium provision of public goods under information disclosure.

Several papers (for instance, Delfgaauw and Dur (2008, 2010), Auriol and Brilon (2014), Scharf (2014), Krasteva and Yildirim (2016), and Aldashev et al. (2018)) have studied the selection into the non-profit/public-good sector, under various informational regimes or financing schemes. The key point of this literature is the motivational heterogeneity of potential workers/entrants into the non-profit/public-good sector and how the equilibrium sorting into the sector is driven by the institutional characteristics. We abstract from the motivational heterogeneity and instead focus on how certain technological differences between various public goods (in terms of the agency costs) drive the strategic behavior of non-profits in different informational environments.

A number of authors constructed industry-equilibrium models of the non-profit sector. Rose-Ackerman (1982), Castaneda et al. (2008), Aldashev and Verdier (2010), and Heyes and Martin (2017) focus on the effect of competition in the non-profit sector on the fundraising expenditures and the number and variety of non-profits, from the social welfare perspective. These papers rely on symmetric models of competition, and thus they do not address the distortions in provision of public goods caused by the asymmetry in monitoring costs across missions, which is central for our paper. In addition, these works do not aim at integrating how the informational environment is a key determinant of the equilibrium industry structure.

A few recent empirical papers have explicitly focused on the effects of transparency and increased performance measurement in the non-profit sector. In a laboratory experiment, Metzger and Guenther (2019) study the demand by donors for information about their donations' welfare impact, the beneficiary characteristics, and the administrative costs of the non-profits to which the donation is made. Surprisingly, they find that the demand for information about the welfare impact of donations is relatively small; however, those donors that are willing to obtain the information increase their donations to high-impact projects and cut donations to low-impact projects. In another laboratory experiment, Exley (2020) finds that donors may use charity performance metrics as an excuse to avoid giving. Hence, performance measurement might have the unintended consequence that (at least partially) counterbalances the positive effects of such policies. Dang and Owens (2020) rely on observational data, apply the forensic economics methods (the Benford's law) to the financial accounts of the UK non-profits and find that the non-profits with a high share of charitable spending report their data more accurately only when their effort on oversight (proxied by the governance-related overhead costs) is sufficiently high. We add to this strand of literature by building a theoretical framework that can help thinking about the policy and welfare implications of these findings.

In organizational economics, several key studies focus on the industry equilibrium with endogenous organizational aspects. Besides the aforementioned literature on "organizational industrial organization", three other papers are closely related to our work. Schmidt (1997) studies the conditions under which increased competition (in the product market) reduces managerial slack. Carlin et al. (2012) show that the presence of comparative performance considerations imply the tougher competition tends to make the disclosure of firms' private information less likely. Hermalin and Weisbach (2012) analyze the bargaining between firms' shareholders and managers and how this bargaining is affected by greater corporate disclosure requirements. The key difference of our work is the focus on the provision of public goods (where the disconnection between the funding side and the beneficiaries is crucial), whereas these papers focus on the private-good sector of the economy (where such disconnection is absent or marginal).

2 A Simple Model with Two Non-profits

We start with a simplified version of the model with two non-profit firms, A and B. Each non-profit targets a specific aspect of public good provision or its "core mission" (for example, A's core mission is women's empowerment, whereas B targets child malnutrition). To highlight the effects of transparency in the use of funds, we assume that the output of the non-profit sector affects the well-being of donors without affecting their incomes. This assumption is easily justified if the non-profits' production occurs in less developed countries whereas the donors are located in developed economies.

Each non-profit is founded and managed by a social entrepreneur. However, while social entrepreneurs are in charge of the non-profits, we assume that they do not directly work on the actual execution of their organizations' missions on the ground. Instead, because of specialization advantages or the need to know the local context, each social entrepreneur needs to hire one grassroot worker ("local partner") so as to help her fulfill the mission. We refer to a social entrepreneur as "she", and to her local partner as "he".

The social entrepreneurs have intrinsic motivation, driven by a sense of pure altruism towards their missions. In other words, they care about the social output generated by the organization that they manage. With regards to the grassroot workers, we instead assume these are self-interested agents who only care about their private payoffs.[2]

Non-profit firms collect donations from private donors who enjoy giving for a social cause. Let D_i denote the total amount of donations received by non-profit $i = A, B$. The social entrepreneurs collect their donations D_i and then allocate these funds within their non-profits, given the running costs and the implicit provision costs.

Grassroot workers receive a fixed up-front wage that we normalize to zero. Throughout the model, we assume that this wage lies above the grassroot workers' outside option, so that there is always a sufficient supply of them in the non-profit sector. In addition, a grassroot worker can divert (or misuse) a fraction $t_i \in [0, 1]$ of the total donations that the social manager channels to the fulfilment of the non-profit's mission. However, each social entrepreneur has access to internal control mechanisms that she can use to prevent such rent-seeking within her organization. In particular, we assume that social entrepreneurs can mitigate the diversion of funds by exerting a costly monitoring effort over their grassroot workers.

We denote by $\varepsilon_i \in [0, 1]$ the intensity of monitoring by the social entrepreneur of the non-profit i, and assume that it has a simple linear technology:

$$t_i = 1 - \varepsilon_i.$$

Expressed in monetary terms, the effort ε_i over the grassroot worker translates into a marginal cost $v_i \geq 0$. Hence, the total cost of monitoring the grassroot worker equals $v_i \varepsilon_i$, and must be paid up-front (i.e., before use of funds takes place) out of the total collected donations D_i. For example, this might involve planning a certain number of visits to the locations where the non-profits' projects take place or setting up reporting requirements on the reports that the grassroot workers have to file in.

Henceforth, we assume the following values for v_A and v_B:

[2] Considering all grassroots as self-interested agents who display no intrinsic motivation whatsoever towards to fulfillment of the non-profit's social mission is, of course, a strong assumption. However, none of our main results would be altered if we assumed that a fraction of the grassroot workers display some sense of social-mindedness, provided such intrinsic social-mindedness is unobservable or unknown to social entrepreneurs at the moment of hiring the grassroot workers.

Assumption 1 *i)* $v_A = k > 0$*; ii)* $v_B = vk$*, where* $0 \leq v \leq \frac{1}{2}$.

In other words, non-profit B works towards a mission where monitoring effort is easier (less costly) than in the case of the mission of non-profit A.[3]

The part of donation D_i that is neither spent on monitoring nor misappropriated by the grassroot worker, is what ultimately remains available to fulfil the non-profit's mission. We denote this amount by $\widetilde{D}_i$, and call it 'net available donations'. Bearing in mind that $t_i = 1 - \varepsilon_i$, net available donations $\widetilde{D}_i$ can be expressed as a function of ε_i, namely:

$$\widetilde{D}_i(\varepsilon_i) = (D_i - v_i \varepsilon_i)\, \varepsilon_i. \tag{1}$$

We assume that the total output generated by non-profit i, denoted by V_i, is an increasing and concave function of $\widetilde{D}_i$.[4] Henceforth, we let $V_i(\widetilde{D}_i)$ be given by $V_i(\widetilde{D}_i) = 2\, \widetilde{D}_i^{\frac{1}{2}}$. Thus, using the expression in (1), we can then write:[5]

$$V_i(\varepsilon_i) = 2\, \left(D_i \varepsilon_i - v_i \varepsilon_i^2\right)^{\frac{1}{2}}. \tag{2}$$

Given that the social entrepreneurs are pure altruists, their payoffs equal the amounts of public good produced by their non-profits; that is, the payoff of the social entrepreneur running non-profit i is given by $V_i(\cdot)$ in (2).

2.1 Donors

There is a continuum of donors with mass equal to Δ. In other words, Δ denotes the exogenously given size of the donation market. Each donor has 1 unit of resource to allocate to donations.

[3]The upper bound $v \leq \frac{1}{2}$ in Assumption 1 restricts $v_B \leq v_A/2$. We impose this parametric restriction only to focus on cases in which the two non-profits differ sufficiently in terms of their efficiency at curbing funds diversion. The results could be extended to $v < 1$, albeit at the cost of heavier algebraic expressions for the solutions of the model with informed donors.

[4]Notice that the concavity of V_i with respect to $\widetilde{D}_i$, does *not* actually imply that V_i is also concave with respect to the *total* amount of received donations D_i. Given that $\widetilde{D}_i = (D_i - v_i \varepsilon_i)\, \varepsilon_i$, and that the value of ε_i will be an equilibrium outcome of the model, the response of V_i with respect to D_i will be mediated by how $\widetilde{D}_i$ endogenously responds to D_i.

[5]The model could be extended to a encompass a more general concave function $V_i(\widetilde{D}_i) = \psi\, \widetilde{D}_i^{\alpha}$, with $\alpha \in (0, 1)$ and $\psi > 0$. The main reason for fixing $\alpha = \frac{1}{2}$ is that it allows us to obtain neat closed-form solutions for most of the main results of the paper.

We model donors as impurely altruistic agents: they receive a warm-glow utility from the act of giving to a non-profit. However, despite their impurely altruistic nature, we assume that donors are not oblivious to the rent-seeking behavior inside the non-profit sector: donors *only* get warm-glow utility from the part of their donation that they *expect* to be non-diverted. Formally, when donor j gives to non-profit i, he derives warm-glow utility only from a fraction $(1-\tau_{j,i})$ of his donation, where $\tau_{j,i} \in [0,1]$ denotes the level of diversion t_i expected by j to occur within firm i. Notice that donors may be *imperfectly* informed about the level of rent seeking within the non-profits, which is reflected by the possibility that $\tau_{j,i} \neq t_i$.

We also assume that donors are heterogeneous in terms of their warm-glow motives. Each donor j has a "taste shock" $\sigma_{j,i}$, for $i = A, B$, which reflects how intensely j cares about the mission fulfilled by the non-profit i. Henceforth, we assume that a realization of the taste shock $\sigma_{j,i}$ is independently drawn from a probability distribution with the following density function:

$$f(\sigma_{j,i}) = \frac{\exp(-\sigma_{j,i}^{-1})}{\sigma_{j,i}^{2}}, \qquad \text{for } \sigma_{j,i} \geq 0. \tag{3}$$

Notice that (3) is a specific case of the Fréchet distribution.[6]

Consider a donor j with taste shocks $\sigma_{j,A}$ and $\sigma_{j,B}$, and denote by $d_{j,i}$ the amount donated by j to non-profit $i = A, B$. We assume that the following utility function describes the preferences of donor j:

$$U(d_{j,A}, d_{j,B}) = \sigma_{j,A}\,(1-\tau_{j,A})\,d_{j,A} + \sigma_{j,B}\,(1-\tau_{j,B})\,d_{j,B}. \tag{4}$$

The utility function (4) combines the two above-mentioned features that we introduce to the standard warm-glow preferences: (i) donors only care about the parts of the donations that they expect not to be misappropriated by the grassroot workers $(1-\tau_{j,i})$; and (ii) the donors' heterogeneity in the intensity of the warm-glow for different social missions $(\sigma_{j,i})$.

Given the perfect substitutability between $d_{j,A}$ and $d_{j,B}$, an individual donor never chooses to donate to A and B simultaneously:

$$d_{j,A}^{*} = 1 \;\text{ and }\; d_{j,B}^{*} = 0, \quad \text{if} \quad \sigma_{j,A}\,(1-\tau_{j,A}) > \sigma_{j,B}\,(1-\tau_{j,B}), \tag{5}$$

[6] The use of a Fréchet distribution is purely for analytical tractability. While all our main insights will still hold true under many other probability distributions (e.g., uniform, Pareto, or exponential), it is much harder to obtain a tractable solution from those, especially when we extend the model to more than two non-profits (see Section 3).

and

$$d_{j,A}^* = 0 \ \text{ and } \ d_{j,B}^* = 1, \quad \text{if} \quad \sigma_{j,A}(1-\tau_{j,A}) < \sigma_{j,B}(1-\tau_{j,B}). \tag{6}$$

In the case of perfect equality $\sigma_{j,A}(1-\tau_{j,A}) = \sigma_{j,B}(1-\tau_{j,B})$, the donor decides on the non-profit of her choice by a coin toss.

2.2 Equilibrium with Uninformed Donors

We start by analyzing the solution of the model when donors are *uninformed* about the level of rent-seeking that takes place within each organization. This can result, for instance, if donors are unable to observe the monitoring effort exerted by each social entrepreneur (i.e., ε_i is publicly unobservable). Furthermore, we assume that donors do not know the values of marginal costs v_A and v_B, which implies that they cannot form an expectation about ε_A and ε_B based on the respective marginal costs of monitoring. Under these informational assumptions, donor j simply maximizes (4) subject to the budget constraint $d_{j,A} + d_{j,B} = 1$ and the rent-seeking expectations:

Assumption 2 $\tau_{j,A} = \tau_{j,B} = \mathrm{E}(t_i) = \dfrac{t_A + t_B}{2}$ *for all* j*.*

Using (5) and (6), Assumption 2 implies that donor j chooses to give only to the non-profit whose mission he cares about relatively more (i.e., the non-profit that exhibits the larger value of $\sigma_{j,i}$). Given that all $\sigma_{j,i}$ are independently drawn from an identical probability distribution, we easily obtain:

Lemma 1 *Let Assumption 2 hold. Then, each non-profit receives half of the aggregate pool of private donations:* $D_A = D_B = \Delta/2$*.*

Each social entrepreneur $i = A, B$ chooses optimally her level of monitoring effort, so as to maximize her utility:

$$\max_{\varepsilon_i \in [0,1]} V_i(\varepsilon_i) = 2\left[\left(\frac{\Delta}{2} - v_i \varepsilon_i\right)\varepsilon_i\right]^{\frac{1}{2}}. \tag{7}$$

Solving (7) for A and B, we obtain the monitoring effort intensity of non-profits working towards each of the two missions, as a function of the aggregate amount of private donations Δ:

$$\begin{aligned}
&\varepsilon_A^* = \Delta/4k \quad \text{and} \quad \varepsilon_B^* = \Delta/4vk && \text{if} \quad \Delta < 4vk, \\
&\varepsilon_A^* = \Delta/4k \quad \text{and} \quad \varepsilon_B^* = 1 && \text{if} \quad 4vk \le \Delta < 4k, \\
&\varepsilon_A^* = \varepsilon_B^* = 1 && \text{if} \quad \Delta \ge 4k.
\end{aligned} \tag{8}$$

Expression (8) shows that the optimal levels of monitoring intensity chosen by non-profit managers is (weakly) increasing in the level of aggregate donations, Δ. This result is driven by the pure altruism of social entrepreneurs. They optimally try to limit how much of the donations is diverted by the grassroot workers, although this limiting action entails sacrificing a part of D_i to cover the monitoring cost. As the amount of donations collected by each non-profit increases with the market size Δ, social entrepreneurs raise the level of monitoring (as long as $\varepsilon_i^* < 1$). This occurs because the amount of donations saved from diversion per dollar spent on monitoring rises with the gross donations received by each non-profit.

In addition, from (8) we observe that monitoring intensity is always (weakly) greater in B than in A. This happens because the opportunity cost of a unit of monitoring intensity (i.e. the amount of funds sacrificed to curb rent-seeking by the grassroot worker) is lower in non-profit B than in non-profit A. Note, however, that while $\varepsilon_B^* > \varepsilon_A^*$ whenever $\Delta < 4k$, total *monetary* spending devoted to monitoring is not necessarily greater in B than that in A. Total spending for monitoring equals $c(\varepsilon_i) = \varepsilon_i v_i$. Hence, by using (8) and Assumption 1, we observe that $c(\varepsilon_B^*) = c(\varepsilon_A^*) = \Delta/4$ whenever $\Delta < 4vk$, whereas $c(\varepsilon_B^*) < c(\varepsilon_A^*)$ whenever $\Delta \geq 4vk$.[7]

2.3 Equilibrium with Fully Informed Donors

Next, we study the equilibrium in the non-profit market when private donors are fully informed about the level of rent-seeking that takes place in each of the two organizations. More specifically, we now substitute Assumption 2 with the following one:

Assumption 3 *$\tau_{j,A} = t_A$ and $\tau_{j,B} = t_B$ for all j.*

Under Assumption 3, the decision rule of a donor j is now different: he donates one unit of resource to non-profit i (and nothing to $-i \neq i$) when

$$\sigma_{j,i}(1 - t_i) > \sigma_{j,-i}(1 - t_{-i}). \tag{9}$$

Using condition (9) and the probability distribution generating $\sigma_{j,i}$ in (3), we can calculate the total donations received by each non-profit, given the levels of t_A and t_B.

[7] The lower monetary cost of effort in firm B arises as a consequence of the upper bound of 1 on monitoring effort. Nevertheless, even in the absence of such upper bound, the firm with the lower marginal cost of monitoring effort will tend to exert stronger effort intensity, but that will not necessarily translate in incurring a higher monetary effort cost.

Lemma 2 *Let Assumption 3 hold. Then, the total amount of donations received by non-profit i decreases with t_i and increases with t_{-i}. In particular, D_A and D_B are given by:*

$$D_A = \frac{1-t_A}{2-t_A-t_B}\Delta \quad \textit{and} \quad D_B = \frac{1-t_B}{2-t_A-t_B}\Delta. \tag{10}$$

As Lemma 2 shows, when donors are perfectly informed about the levels of rent seeking in each non-profit, the total amount of donations received by non-profit i will respond to both t_i and t_{-i}. This, in turn, implies that when choosing the level of ε_i, the non-profit manager i takes into account the fact that ε_{-i} also has an impact on her own payoff. Note that the expressions in (10) imply $D_i(\varepsilon_i, \varepsilon_{-i}) = \Delta \frac{\varepsilon_i}{\varepsilon_i + \varepsilon_{-i}}$, the optimization problem faced by social entrepreneur i now looks as follows:

$$\widehat{\varepsilon}_i\left(\varepsilon_{-i}\right) \equiv \underset{\varepsilon_i \in [0,1]}{\arg\max} : V_i(\varepsilon_i, \varepsilon_{-i}) = 2\left[\left(\frac{\varepsilon_i}{\varepsilon_i + \varepsilon_{-i}}\Delta - v_i \varepsilon_i\right)\varepsilon_i\right]^{\frac{1}{2}}, \quad \text{where } i = A, B. \tag{11}$$

From (11), we obtain the best-response functions of each social entrepreneur, given the monitoring effort intensity chosen by its rival.

Lemma 3 *Problem (11) yields a best-response function $\widehat{\varepsilon}_i(\varepsilon_{-i}) : [0,1] \to [0,1]$, where*

$$\widehat{\varepsilon}_i(\varepsilon_{-i}) = \begin{cases} 0 & \textit{if } \Delta \le v_i \varepsilon_{-i} \\ \dfrac{\Delta - 4v_i\varepsilon_{-i} + \sqrt{\Delta^2 + 8v_i\varepsilon_{-i}\Delta}}{4v_i} & \textit{if } v_i \varepsilon_{-i} < \Delta < \dfrac{2v_i\left(1+\varepsilon_{-i}\right)^2}{\left(1+2\varepsilon_{-i}\right)} \\ 1 & \textit{if } \Delta \ge 2v_i\left(1+\varepsilon_{-i}\right)^2/(1+2\varepsilon_{-i}). \end{cases} \tag{12}$$

Two properties of $\widehat{\varepsilon}_i(\varepsilon_{-i})$ are worth noting. First, for a given value of ε_{-i}, the best-response function $\widehat{\varepsilon}_i(\varepsilon_{-i})$ is non-increasing in v_i. Intuitively, when mitigating rent-seeking becomes cheaper, non-profits optimally choose higher levels of monitoring. Second, in the interior case ($0 < \widehat{\varepsilon}_i(\varepsilon_{-i}) < 1$), we observe that both $\partial\widehat{\varepsilon}_i/\partial\varepsilon_{-i} < 0$ and $\partial(\partial\widehat{\varepsilon}_i/\partial\varepsilon_{-i})/\partial v_i < 0$ hold. The strategic substitutability $\partial\widehat{\varepsilon}_i/\partial\varepsilon_{-i} < 0$ reflects an important source of (negative) interaction between non-profits' monitoring effort: when $-i$ increases ε_{-i}, this indirectly lowers the marginal return of ε_i to firm i in terms of the pool of marginal donors who would reallocate their donation from $-i$ to i following an increase in ε_i. The negative cross-derivative ($\partial(\partial\widehat{\varepsilon}_i/\partial\varepsilon_{-i})/\partial v_i < 0$) means that the discouragement effect of ε_{-i} on ε_i is stronger when the marginal cost of monitoring (v_i) is larger.

The equilibrium with informed donors requires finding the Nash equilibrium levels of ε_i by A and B. The best-response functions in (12) imply that this equilibrium will always be unique, and it will involve strictly positive monitoring effort by *at least* one non-profit. The next proposition formally summarizes the levels of monitoring intensity by A and B in the Nash equilibrium for different values of Δ.

Proposition 1 *When donors are perfectly informed about the level of rent-seeking within each non-profit, the equilibrium level of monitoring efforts, $\widehat{\varepsilon}_A$ and $\widehat{\varepsilon}_B$, are given by:*

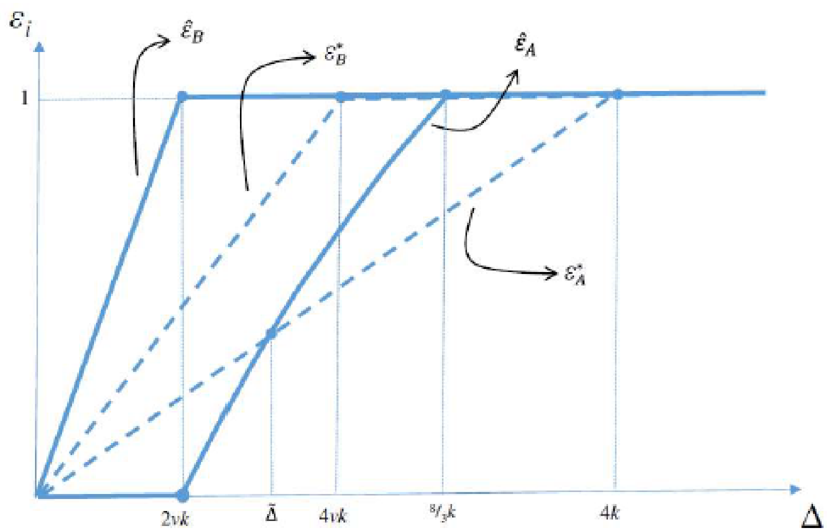
$$\begin{array}{lll}\widehat{\varepsilon}_A = 0 \quad \textit{and} \quad \widehat{\varepsilon}_B = \Delta/2vk & \textit{if} & \Delta < 2vk, \\ \widehat{\varepsilon}_A = \max\left\{0, \dfrac{\Delta - 4k + \sqrt{\Delta^2 + 8k\Delta}}{4k}\right\} \quad \textit{and} \quad \widehat{\varepsilon}_B = 1 & \textit{if} & 2vk \le \Delta < \frac{8}{3}k, \\ \widehat{\varepsilon}_A = \widehat{\varepsilon}_B = 1 & \textit{if} & \Delta \ge \frac{8}{3}k.\end{array} \tag{13}$$

This result is portrayed graphically in Figure 1. Solid lines show the levels of monitoring intensity that prevail in the Nash equilibrium solution with informed donors. For comparison, we also plot with dashed lines the optimal levels monitoring intensity with uninformed donors, ε_A^* and ε_B^*, donors as given by (8). The figure reveals that for a sufficiently small market size (low values of Δ), the presence of informed donors shifts $\widehat{\varepsilon}_A$ and $\widehat{\varepsilon}_B$ in opposite directions (relative to ε_A^* and ε_B^*).

The presence of informed donors always induces non-profit B to raise $\widehat{\varepsilon}_B$ above ε_B^* (except, obviously, for the cases where the upper-bound $\varepsilon_B = 1$ is binding). This is the consequence of a *positive* competitive effect across non-profits. Intuitively, in the presence of informed donors, higher monitoring effort becomes instrumental to attracting a larger pool of donors, which in turn fosters stronger monitoring effort to curb funds diversion.

The effect of transparency on the level of monitoring within non-profit A is less straightforward. The reason is that the presence of informed donors also brings about a *negative* interaction effect across non-profits: stronger monitoring intensity by non-profit $-i$ lowers non-profit i's marginal return of monitoring intensity in terms of its capacity of attracting donations away from $-i$ to i. Given the difference in the marginal cost of monitoring (i.e., that $v_A > v_B$), non-profit A, facing a higher cost of monitoring, is more sensitive to this negative interaction effect than non-profit B. This, in turn, implies that $\widehat{\varepsilon}_A < \varepsilon_A^*$ in the range of the market size $\Delta < \widetilde{\Delta} \equiv 4\left(\sqrt{2} - 1\right) k$. Strikingly, for sufficiently low levels of Δ (i.e., when $\Delta < 2vk$), $\widehat{\varepsilon}_A$ falls all the way down to zero: non-profit A ceases to operate in the range $\Delta < 2vk$, leaving the entire non-profit market to be catered to by the non-profit B which has a lower monitoring cost.

Figure 1. Two non-profits model: equilibrium monitoring as a function of market size



The above result yields an important message: full transparency in the non-profit market can fail to induce more efforts to curb rent-seeking in *all* non-profits. When the efficiency in limiting rent-seeking behavior within the organization differs across non-profit firms, competition for donations may become so tough for the organizations with the higher monitoring cost that they may end up reducing their monitoring intensity (rather than increasing it). This strategic-substitution effect could become so strong that such non-profits may end up abandoning their mission and exiting the market. On the one hand, this cleansing mechanism has a positive aspect: it leads the entire non-profit market being catered to by the non-profit with lower susceptibility to the diversion of funds. On the other hand, this cleansing mechanism comes at the expense of leaving out some social problems unaddressed. In the next two sections, we analyze this tension in a framework with a large number of horizontally differentiated non-profits and endogenous entry.

3 Model with N Non-profits

In modern economies, the non-profit sector typically consists of a large number of competing organizations. To study the effect of the information regime on the strategic interaction between many non-profits, we need to build a more realistic model with many firms. This section presents the generalized version of the two-firm model studied above.

In this richer model, the non-profit sector comprises N firms, indexed by $i = 1, 2, ..., N$. Each non-profit targets a specific mission. Henceforth, we will think of N as a large number, which reflects better the real-life structure of the non-profit market (as compared to the simple two-firm model above). Analytically, a large N implies that each non-profit disregards the (negligible) effects their individual choices have on the *aggregate* behavior of the non-profit market.[8]

Donors' preferences are analogous to those in (4), extended to comprise N different social missions. For a generic donor j, we have:

$$U(\{d_{j,i}\}_{i\in\{1,..,N\}}) = \sum\nolimits_{i=1}^{N} \sigma_{j,i} \left(1 - \tau_{j,i}\right) d_{j,i}. \tag{14}$$

As in the two-firm model, $\tau_{j,i} \in [0, 1]$ denotes the extent of funds diversion expected by j to occur in non-profit i. We maintain the assumption that each $\sigma_{j,i}$ is independently drawn from a Fréchet distribution (3).

Given the utility function (14), each donor optimally donates all of her resource to a single non-profit (and gives nothing to all the other non-profits): $d^*_{j,i} = 1$ for non-profit i and $d^*_{j,l} = 0$ for all $l \neq i$, where $\sigma_{j,i} \left(1 - \tau_{j,i}\right) \geq \sigma_{j,l} \left(1 - \tau_{j,l}\right)$ for all l.

Let $\mathcal{N}$ denote the N-element set of non-profits operating in the market. Consider a generic non-profit firm $i \in \mathcal{N}$. The probability that donor j donates to i is given by:

$$\Pr(j \text{ donates to } i) = \int_0^\infty \left[\prod\nolimits_{l\in\mathcal{N},l\neq i} F\left(\frac{\left(1-\tau_{j,i}\right)\sigma_{j,i}}{\left(1-\tau_{j,l}\right)}\right)\right] f(\sigma_{j,i})\, d\sigma_{j,i}.$$

Using (3), and the fact that $F(\sigma) = \exp(-\sigma^{-1})$, the above expression simplifies to:

$$\Pr(j \text{ donates to } i) = \frac{1 - \tau_{j,i}}{N - \tau_{j,i} - \sum_{l\in\mathcal{N},l\neq i} \tau_{j,l}}. \tag{15}$$

To introduce heterogeneity in monitoring costs, let's assume that each non-profit $i \in \mathcal{N}$ draws a specific monitoring cost parameter v_i from the following binary probability distribution:

Assumption 4 *Each social entrepreneur $i \in \mathcal{N}$ draws a specific monitoring marginal cost $v_i \in \{v_A, v_B\}$, where: i)* $\Pr(v_i = v_A) = \Pr(v_i = v_B) = \frac{1}{2}$*; ii)* $v_B = 0$*; iii)* $v_A = k > 0$.

We impose Assumption 4 to extend our previous framework in Section 2 to an environment with N non-profits. Given that we focus on cases in which N is a large number,

[8] This differs with the simple two-firm model, where each firm always internalizes the aggregate market changes generated by its own actions.

Assumption 4 entails that there will be $N/2$ non-profits with marginal cost $v_A = k$ and $N/2$ with marginal cost $v_B = 0$. The main reason for such parametric restriction is that it allows us to focus the attention on the effect of full transparency on the behavior of non-profits who find it harder to curb funds diversion (i.e., those with $v_A = k > 0$), as it implies that those firms whose $v_B = 0$ will always optimally set the monitoring effort at its maximum level (i.e., in the optimum, $\varepsilon_B = 1$ will always hold). As we show in the Appendix, all the main results can be extended to a setup with $0 < v_B < v_A = k$.

3.1 Equilibrium with Uninformed Donors

Let's extend Assumption 2 for the case of N non-profit firms.

Assumption 2 (b) $\tau_{j,i} = \tau_j = \dfrac{\sum_{s=1}^{N} t_s}{N}$, for all j and all firms $i = 1, 2, .., N$.

When Assumption 2 (b) holds, one easily observes that the donation probability (15) reduces to $\Pr(j \text{ donates to } i) = 1/N$, for any generic non-profit $i \in \mathcal{N}$. Consequently, all non-profits receive the same amount of donations, $D_i = \Delta/N$. A social entrepreneur i then chooses the level of monitoring effort ε_i optimally, by solving:

$$\max_{\varepsilon_i \in [0,1]} : V_i(\varepsilon_i) = 2\left[\left(\frac{\Delta}{N} - v_i\varepsilon_i\right)\varepsilon_i\right]^{\frac{1}{2}}, \quad \text{where } v_i \in \{v_A, v_B\}. \tag{16}$$

The solution of this problem gives:

$$\varepsilon_i^* = \begin{cases} \dfrac{\Delta}{2v_i N} & \text{if} \quad \Delta/2N < v_i, \\ 1 & \text{if} \quad \Delta/2N \geq v_i. \end{cases} \tag{17}$$

The expression in (17) shows that the optimal level of monitoring responds to both the aggregate size of donations and to the firm's efficiency in monitoring. Analogously to the two-firm case in (8), ε_i^* is (weakly) increasing in the level of aggregate pool of donations and (weakly) decreasing in the cost of monitoring rent-seeking within the nonprofit.

3.2 Equilibrium with Fully Informed Donors

As in Section 3.1, let's extend Assumption 3 to the case of N non-profit firms.

Assumption 3 (b) $\tau_{j,i} = t_i$ for all j and all firms $i = 1, 2, .., N$.

Using the donation probability (15) in conjunction with Assumption 3 (b), the amount of donations received by non-profit i is given by:

$$D_i = \frac{\varepsilon_i}{E}, \quad \text{where } E \equiv \varepsilon_i + \sum\nolimits_{l \in \mathcal{N}, l \neq i} \varepsilon_l. \tag{18}$$

Consequently, a social entrepreneur i's optimization problem is now:

$$\max_{\varepsilon_i \in [0,1]} : V_i(\varepsilon_i, E) = 2 \left[\left(\frac{\varepsilon_i}{E} \Delta - v_i \varepsilon_i \right) \varepsilon_i \right]^{\frac{1}{2}}, \quad \text{where } v_i \in \{v_A, v_B\}. \tag{19}$$

Recall that N is assumed to be a large number. Therefore, when solving (19), the non-profit manager i takes the value of E as given. This generates the following simple best-response function:

$$\varepsilon_i^{br}(E; \Delta, v_i) = \begin{cases} 0 & \text{if} \quad \Delta/E < v_i, \\ 1 & \text{if} \quad \Delta/E \geq v_i. \end{cases} \tag{20}$$

The best-response functions $\varepsilon_i^{br}(E)$ are always corner solutions for ε_i. The decision by non-profit i to monitor at full intensity ($\varepsilon_i = 1$) or not at all ($\varepsilon_i = 0$) depends on the aggregate level of donations (Δ), the firm's monitoring cost parameter (v_i), and the aggregate level of monitoring intensity in the non-profit market (E). The level of E is itself endogenous, determined by the Nash equilibrium solution stemming from the best-response functions of all non-profit managers. The main features of the Nash equilibrium in the non-profit market are as follows.

Lemma 4 *Let N be large, and suppose Assumption 3 (b) holds. Then:*

1. *If $\Delta/N \geq k$, in equilibrium, $\widehat{\varepsilon}_i = 1$ for all $i \in \mathcal{N}$.*

2. *If $k/2 < \Delta/N < k$, in equilibrium, $n = \frac{\Delta}{k} \in \left(\frac{1}{2}N, N\right)$ non-profits set $\widehat{\varepsilon}_i = 1$, and the remainder $1 - n \in \left(0, \frac{1}{2}N\right)$ set $\widehat{\varepsilon}_i = 0$. All $i \in \mathcal{N}$ such that $v_i = v_B = 0$ set $\widehat{\varepsilon}_i = 1$.*

3. *If $\Delta/N \leq k/2$, in equilibrium, the $\frac{1}{2}N$ non-profits with $v_i = v_B = 0$ set $\widehat{\varepsilon}_i = 1$, while the $\frac{1}{2}N$ non-profits with $v_i = v_A = k$ set $\widehat{\varepsilon}_i = 0$.*

An interesting implication of Lemma 4 is that, in a regime with informed donors, no rent-seeking ever occurs in equilibrium. The reason for this becomes clear from (20): only the non-profits that monitor at full intensity ($\widehat{\varepsilon}_i = 1$) receive positive donations in equilibrium. Furthermore, Lemma 4 shows that, when $\Delta/N \geq k$, full transparency induces perfect monitoring by *all* non-profits entering the market. This differs quite drastically from the case with uninformed donors, where from (17) it follows that $\varepsilon_A^* < 1$ whenever $\Delta/N < 2k$.

Similarly to the simple two-firm model, Lemma 4 carries also a negative message. When $\Delta/N < k$, some social entrepreneurs with $v_i = v_A$ choose *not* to spend any resources in monitoring funds misuse. Given that they receive no donations, such non-profits will not to operate in equilibrium. In other words, a negative consequence of full transparency is that it induces a subset of the social missions (those where monitoring grassroot workers is more costly) being abandoned by non-profit firms. This occurs because non-profits operating towards those missions are unable to withstand the intense competition that transparency generates. Compared to the situation with uninformed donors, the fully transparent donation market implies all the donations being put to good use (no diversion), but it induces a bias in the set of social problems that are addressed by the decentralized non-profit sector, over-emphasizing the issues with relatively low cost of monitoring (e.g. vaccination campaign, food distribution) and under-serving those with relatively high cost of monitoring (e.g. empowerment, development education).

4 Entry into the Non-Profit Market

Let now N be endogenously determined as a result of equilibrium entry decisions by the set of *potential* social entrepreneurs. Suppose that potential non-profit managers have an opportunity cost of running a non-profit firm equal to ϕ which we normalize to 1. Assume as well that, at the moment of setting up their non-profits, social entrepreneurs do not know the value of the monitoring cost parameter $v_i \in \{v_A, v_B\}$ that applies to their firms. The value of v_i is drawn according to Assumption 4, and each non-profit manager learns this value only *after* setting up the non-profit firm.

Henceforth, we implicitly assume that the pool of potential social entrepreneurs is large enough so as to ensure that the entry condition in the non-profit market always binds in equilibrium. Consequently, in equilibrium, the following condition holds:

$$\frac{1}{2}V_B + \frac{1}{2}V_A = 1, \tag{21}$$

where V_i denotes the payoff of social entrepreneur i under monitoring cost $v_i \in \{v_A, v_B\}$. The equilibrium expressions of V_B and V_A will depend on the informational regime (i.e. whether donors are uninformed or informed).

To keep the analysis consistent with Section 3, we consider that the free-entry equilibrium condition (21) always leads to a large value of N (which amounts to assuming that Δ is a large number). This has two implications. Firstly, there will be $N/2$ non-profits with monitoring cost $v_A = k$ and $N/2$ with monitoring cost $v_B = 0$. Secondly, in a regime with informed donors, each individual non-profit manager i disregards the effect of her own monitoring choice ε_i on the aggregate monitoring effort level, $E \equiv \sum_{l=1}^{N} \varepsilon_l$.

4.1 Equilibrium with Uninformed Donors

From (16) and (17), it follows that in a regime with uninformed donors the payoff obtained by a social entrepreneur $i \in \mathcal{N}$ with $v_i = v_A = k$ will be

$$V_A^* = \begin{cases} \dfrac{\Delta}{N}\dfrac{1}{k^{\frac{1}{2}}} & \text{if} \quad k > \dfrac{\Delta}{2N}, \\ 2\left(\dfrac{\Delta}{N} - k\right)^{\frac{1}{2}} & \text{if} \quad k \leq \dfrac{\Delta}{2N}. \end{cases} \tag{22}$$

A social entrepreneur with the marginal cost of monitoring $v_i = v_B = 0$ always sets $\varepsilon_B^* = 1$, and her payoff in this regime equals

$$V_B^* = 2\left(\frac{\Delta}{N}\right)^{\frac{1}{2}}. \tag{23}$$

Using (22) and (23) in (21), we obtain the following result:

Proposition 2 *Suppose Assumption 2 (b) holds. Let N^* denote the value of N that satisfies condition (21). Then,*

$$N^* = \begin{cases} \dfrac{1}{2}\left[\left(\dfrac{1+k^{\frac{1}{2}}}{k^{\frac{1}{2}}}\right) + \left(\dfrac{2+k^{\frac{1}{2}}}{k^{\frac{1}{2}}}\right)^{\frac{1}{2}}\right]\Delta & \textit{if} \quad k > 3 - 2\sqrt{2} \\ \dfrac{4}{(1+k)^2}\Delta & \textit{if} \quad k \leq 3 - 2\sqrt{2} \end{cases}, \tag{24}$$

with $\partial N^*/\partial k < 0$ for all $k > 0$. The equilibrium levels of monitoring by the non-profit managers with costs $v_i = v_A$ and $v_i = v_B$ are given, respectively, by:

$$\varepsilon_A^* = \begin{cases} \left[k^{\frac{1}{2}}\left(1+k^{\frac{1}{2}}\right) + k^{\frac{3}{4}}\left(2+k^{\frac{1}{2}}\right)^{\frac{1}{2}}\right]^{-1} < 1 & \textit{if} \quad k > 3 - 2\sqrt{2} \\ 1 & \textit{if} \quad 0 < k \leq 3 - 2\sqrt{2} \end{cases} \tag{25}$$

and $\varepsilon_B^* = 1$ for all $k > 0$.

Proposition 2 describes how the number of potential social entrepreneurs deciding to set up a non-profit firm varies with k. Intuitively, a higher value of the monitoring cost for the social entrepreneurs drawing $v_i = v_A$ lowers the overall expected return of setting up a non-profit, hence reducing entry into the non-profit market. Proposition 2 also shows that $\varepsilon_A^* < 1$ whenever $k > 3 - 2\sqrt{2}$. Consequently, unless k is sufficiently small, the regime with uniformed donors will exhibit a positive level of funds diversion in equilibrium.

4.2 Equilibrium with Informed Donors

As Lemma 4 shows, whenever N is greater than Δ/k, some social entrepreneurs deciding to found a non-profit end up exerting zero monitoring effort in equilibrium. In that case, some of the N non-profits remain *inactive* ex-post. Let's denote with $\widehat{N}$ the number of potential non-profit managers that choose to enter the non-profit market under a regime of full transparency, and with $\widehat{n}$ the number of non-profits that *remain active* upon learning their monitoring cost parameter $v_i \in \{v_A, v_B\}$.

Proposition 3 *Suppose Assumption 3 (b) holds. Then,*

1. *When $k > 1$, the number of potential social entrepreneurs who enter the non-profit market is $\widehat{N} = 2\Delta$. After setting up their non-profit firm, $\widehat{N}/2 = \Delta$ social entrepreneurs receive a draw $v_i = v_B$ and set $\widehat{\varepsilon}_B = 1$, while $\widehat{N}/2 = \Delta$ receive a draw $v_i = v_A$ and set $\widehat{\varepsilon}_A = 0$. The number of non-profits that remain active in equilibrium is then:*

$$\widehat{n} = \frac{\widehat{N}}{2} = \Delta. \tag{26}$$

2. *When $k \leq 1$, the number of potential social entrepreneurs who enter the non-profit market is $\widehat{N} = 4(1+k)^{-2}\Delta$. After incurring setting up the non-profit firm, all the social entrepreneurs set $\widehat{\varepsilon}_i = 1$, regardless of the value of v_i. Thus, in the equilibrium,*

$$\widehat{n} = \widehat{N} = \frac{4}{(1+k)^2}\Delta \tag{27}$$

Proposition 3 shows that the number of active non-profits $\widehat{n}$ is weakly decreasing in k (and strictly decreasing in k for $k \leq 1$). The relationship between $\widehat{n}$ and k is qualitatively analogous to that displayed in (24) in Proposition 2. Yet, despite their similarities, there is an important difference between the results in Proposition 2 and Proposition 3. In a regime with uninformed donors *all* potential social entrepreneurs who choose to enter the non-profit market will (ex-post) remain active, and they will all receive a positive share of the total pool of donations. This is not the case under full transparency: when $k > 1$, only those who enter the non-profit market and receive a draw $v_i = v_B$ will end up (actively) running a non-profit and receiving positive donations in equilibrium.

Proposition 3 illustrates again the tension between the competitive effect and the strategic-interaction effect. The former tends to foster monitoring effort by all non-profits, whereas the latter tends to depress monitoring effort by non-profits that find it harder to rein in the diversion of funds. Notice that the value of k governs the degree of heterogeneity in costs to curb rent-seeking across non-profits. When k is sufficiently high, the strategic-interaction effect ends up nullifying the competitive effect for high-cost non-profits, thus driving them out of the market.

5 Welfare Analysis

We are now ready to compare a number of welfare properties between the equilibrium outcomes in the two informational regimes. We start by comparing the number of active non-profits. This is important as more non-profit diversity means that a larger variety of social issues are addressed by social entrepreneurs. Secondly, we study the total amount of non-profit output generated in each regime, regardless of the variety of non-profit firms. Finally, we investigate the donors' welfare under the two regimes.

Note that the results in Propositions 2 and 3 entail that both regimes deliver the same equilibrium outcomes when $0 < k < 3 - 2\sqrt{2}$. In this case, all social entrepreneurs set $\varepsilon_i = 1$, regardless of whether $v_i = v_A = k$ or $v_i = v_B = 0$, and regardless of transparency or lack thereof in terms of funds diversion. To avoid trivially comparing such cases, we henceforth impose the following parametric restriction:

Assumption 5 $k > \underline{k} \equiv 3 - 2\sqrt{2} \simeq 0.17$.

This assumption intuitively states that the difference in the marginal cost of monitoring between high-cost and low-cost non-profits is sufficiently large to make the information regime matter for equilibrium behavior.

5.1 Number of active non-profits

We use the results in Proposition 2 and Proposition 3 to compare the total number of non-profits operating in the market under the two regimes.

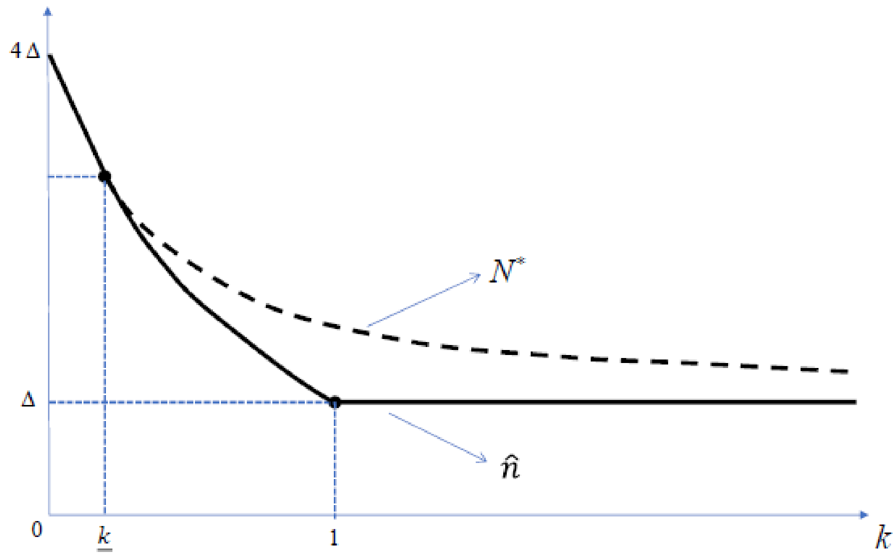
Proposition 4 *Whenever $k > \underline{k}$, the number of active non-profits is always smaller under full transparency than in the regime with uninformed donors; that is, $\widehat{n} < N^*$.*

The result in Proposition 4 is illustrated in Figure 2 for different levels of k. The solid line and the dashed line indicate, respectively, the number of active non-profits in the regimes with informed and uninformed donors.

What are the reasons underlying $\widehat{n} < N^*$? For values of $k > 1$, this rests primarily on the fact that under full transparency, the social entrepreneurs who receive a high-cost draw ($v_i = v_A$) choose ex-post to remain inactive. The main reason for $\widehat{n} < N^*$ is substantially different when k lies below 1. In that range, all social entrepreneurs entering the non-profit market remain *active* after learning the value of v_i; however, there is an upward distortion in the level of monitoring effort exerted by non-profit managers in the regime with informed donors. Full transparency induces a *rat race* among non-profit managers, as they all try to curb funds diversion in their own firms in order to attract a larger share of donors. This rat race leads (in equilibrium) to a fruitless competition for additional donors on the aggregate, ultimately hurting the level of net output generated by each non-profit. Foreseeing this outcomes, there are fewer social entrepreneurs that enter the market, which leads to a smaller number of non-profits in equilibrium under the full transparency regime. Note that this general-equilibrium effect has an impact on projects of both types (with high and low costs of monitoring).

Another interesting feature of Figure 2 is the fact that the difference between N^* and $\widehat{n}$ is non-monotonic in k. In particular, we can observe that: *i)* $N^* - \widehat{n} \to 0$ as k approaches $\underline{k}$, *ii)* $N^* - \widehat{n}$ increases with k when $k \in (\underline{k}, 1)$, *iii)* $N^* - \widehat{n}$ decreases with k when $k > 1$, converging asymptotically to zero as k grows to infinity. Intuitively, as k rises within the interval $k \in (\underline{k}, 1)$, the rat race distortion mentioned above becomes more severe to those social entrepreneurs with $v_i = v_A$, discouraging entry into the non-profit market. On the other hand, when k rises above unity, all social entrepreneurs with $v_i = v_A$ remain inactive in the regime with full transparency. Consequently, whenever $k > 1$, the level of k does not matter for the number of entrants into the market ($\widehat{n}$). Contrarily, in the regime with

Figure 2. Model with N non-profits: equilibrium number of active non-profits, as a function of asymmetry in monitoring costs



uninformed donors, a higher k will always hurt the payoff of social entrepreneurs with $v_i = v_A$, as those agents remain always active in equilibrium, and therefore the expected payoff of a social entrepreneur entering the market monotonically decreases with k.

5.2 Aggregate output in the non-profit sector

The result in Proposition 4 does not give us much information about the levels of *aggregate* output generated within the non-profit sector in each regime. Let's show that the value of k is also crucial for determining which of the two regimes yields greater aggregate output. In addition, we show that the output gap between the regimes is non-monotonic in k.

Proposition 5 *Let V^{UN} and V^{IN} denote the aggregate level of non-profit output in the equilibrium with uninformed and informed donors, respectively. Then,*

1. $V^{UN} > V^{IN}$ *for all* $k \in (\underline{k}, 1)$. *Furthermore,* $\partial(V^{UN} - V^{IN})/\partial k > 0$ *for all* $k \in (\underline{k}, 1)$, *while* $\lim_{k \to \underline{k}} \left(V^{UN} - V^{IN}\right) = 0$.

2. $V^{IN} > V^{UN}$ *for all* $k \geq 1$. *Furthermore,* $\partial(V^{IN} - V^{UN})/\partial k > 0$ *for all* $k \geq 1$.

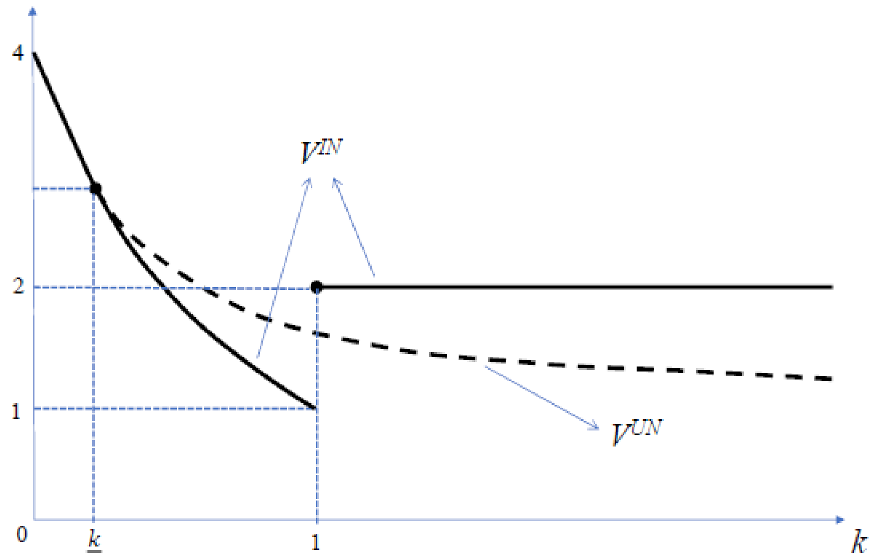
Figure 3 displays the results of Proposition 5. The non-monotonicity of the difference between V^{UN} and V^{IN} may at first seem counter-intuitive. This is, however, the result of an implicit trade-off between the rat-race distortion in monitoring spending induced by full transparency, and the fact that informed donors tend to channel their donations to cleaner non-profits. It turns out that the intensity of this trade-off is non-monotonic at different levels of k.

The first part of Proposition 5 shows that, for relatively low levels of the monitoring cost, $V^{UN} > V^{IN}$. Intuitively, in those cases, non-profits with $v_i = v_A = k$ will find it worthwhile to exert sufficient monitoring effort to keep funds diversion at relatively low levels, even when donors remain uninformed about the level of diversion. This in turn means that aggregate spending on monitoring in the regime with informed donors is unnecessarily high (because of the rat race feature explained earlier). The severity of the rat race distortion in monitoring effort becomes worse when k is greater, which is why the gap between V^{UN} and V^{IN} grows with k while $k \in (\underline{k}, 1)$.

The situation changes drastically once k lies above one. When $k > 1$, only the social entrepreneurs with $v_i = v_B = 0$ remain active in the non-profit market. As a consequence, for relatively large levels of k, the rat race distortion described above vanishes completely, rather than worsening as k rises. The sudden switch to an equilibrium where all the donations are managed by non-profits with $v_i = v_B = 0$ leads to the result $V^{IN} > V^{UN}$ when $k = 1$. Furthermore, since rent-seeking in the regime with uninformed donors gets worse with higher k, the gap between V^{IN} and V^{UN} expands as k keeps rising above one.

Our analysis suggests that when considering promoting institutions that increase transparency in use of funds, policy-makers should be mindful about the degree of heterogeneity in monitoring efficiency across non-profits. When monitoring cost asymmetries are relatively mild (i.e., k lies near $\underline{k}$), promoting transparency comes both at low cost of variety loss and aggregate output loss, while it tends to increase monitoring effort. When monitoring cost asymmetries are very large, promoting transparency comes also at a low cost of variety loss, while it substantially increases aggregate non-profit output by cleansing the sector from non-profits subject to high levels of funds diversion. On the other hand, it's for intermediate levels of monitoring cost asymmetries (i.e., when k is around 1) that the trade-off between enhanced transparency and output/variety loss is hardest to resolve. In those situations, variety loss owing to transparency tends to be largest, while aggregate output behavior becomes especially sensitive to whether high-cost non-profits choose to stay and increase monitoring or simply give up on their missions altogether.

Figure 3. Model with N non-profits: aggregate non-profit output, as a function of asymmetry in monitoring costs



5.3 Donors' Welfare

We can now compute the welfare of a generic donor in each informational regime. We compute the expected utility *before* the idiosyncratic sources of uncertainty are revealed to the donor (i.e., before the taste shocks $\{\sigma_{j,i}\}_{i=1,..,N}$ are drawn for donor j). This is analogous to computing the aggregate expected utility of the unit continuum of donors. Hence, the welfare analysis that follows could alternatively be interpreted as resulting from an utilitarian view of donors welfare.

Notice that if a donor (situated behind the veil of ignorance) could freely choose the informational regime, he would be confronted with the following trade-off. On the one hand, a regime with informed donors tends to induce the set of *active* non-profits to spend more in monitoring the grassroot workers, which raises donors' expected utility (by reducing the expected misuse of donations $\tau_{j,i}$ in (14)). On the other hand, since the regime with informed donors tends to generate a smaller number of active non-profits, this regime will offer less variety of social missions to choose from. For this reason, informed donors will tend to end up giving (in expectation) to non-profits with a smaller realization of the taste parameter $\sigma_{j,i}$, relative to the regime with uninformed donors.

Consider first the regime with informed donors. In equilibrium, social entrepreneurs always choose a corner solution for ε_i (i.e., either no monitoring, $\varepsilon_i = 0$, or monitoring at full intensity, $\varepsilon_i = 1$). Thus, from donor j's viewpoint, the utility he expects to obtain from giving to his selected non-profit is given by:

$$\mathrm{E}_{IN}(U_j) = \int_0^{\infty} \sigma_{j,IN}^{\max} \, \widetilde{f}\left(\sigma_{j,IN}^{\max}\right) \, d\sigma_{j,IN}^{\max},$$

$$\text{where:} \quad \sigma_{j,IN}^{\max} \equiv \max\{\sigma_{j,1}, \sigma_{j,2}, .., .\sigma_{j,n^{ne}}\} \quad \text{and} \quad \widetilde{f}\left(\sigma_{j,IN}^{\max}\right) = \widehat{n}\frac{\exp(-\widehat{n}\sigma_{j,IN}^{\max})}{(\sigma_{j,IN}^{\max})^2}. \tag{28}$$

In (28) $\widetilde{f}(\sigma_{j,IN}^{\max})$ is the probability density function of the extreme value $\sigma_{j,IN}^{\max}$, and its particular shape follows from the Fréchet distribution (3). Intuitively, in a regime with informed donors, all *active* non-profits (which amount to the number $\widehat{n}$) will set in equilibrium $\varepsilon^* = 1$. As a result, a generic donor j will always choose to give his unit donation to the non-profit carrying the highest taste shock, denoted by $\sigma_{j,IN}^{\max}$. Notice also that donors know that no rent-seeking will ever take place in equilibrium in this regime, hence their expected utility in (28) attaches no discount on the donation.[9]

Consider now the regime with uninformed donors. Since donors are *symmetrically* uninformed about the exact level of funds diversion taking place within each non-profit, they choose to give to the non-profit that carries the highest taste shock (from a set of N^* active non-profits). Differently from the full-transparency regime, in some parameter range, social entrepreneurs with $v_i = v_A$ choose interior solutions for ε_A^* (thus, allowing for positive rent-seeking in equilibrium). Then, the *expected* utility that a generic (uninformed) donor j receives from giving to their selected non-profit is:

$$\mathrm{E}_{UN}(U_j) = \int_0^{\infty} \left(\tfrac{1}{2}\,\varepsilon_A^*\,\sigma_{j,UN}^{\max} + \tfrac{1}{2}\varepsilon_B^*\,\sigma_{j,UN}^{\max}\right) \, \widetilde{f}\left(\sigma_{j,UN}^{\max}\right) \, d\sigma_{j,UN}^{\max},$$

$$\text{where:} \quad \sigma_{j,UN}^{\max} \equiv \max\{\sigma_{j,1}, \sigma_{j,2}, .., .\sigma_{j,N^*}\} \quad \text{and} \quad \widetilde{f}\left(\sigma_{j,UN}^{\max}\right) = N^*\frac{\exp(N^*\sigma_{j,UN}^{\max})}{(\sigma_{j,UN}^{\max})^2}. \tag{29}$$

In the case of (29), $\widetilde{f}\left(\sigma_{j,UN}^{\max}\right)$ is the probability density function of the extreme value $\sigma_{j,UN}^{\max}$. In addition, ε_A^* is given by (25), while $\varepsilon_B^* = 1$. Note that j knows that his donation will go to a non-profit with $v_i = v_A$ (resp. $v_i = v_B$) with probability $\frac{1}{2}$, in which case the warm-glow utility received from the donation is $\varepsilon_A^*\sigma_{j,UN}^{\max}$ (resp. $\varepsilon_B^*\sigma_{j,UN}^{\max}$).

Lemma 5 *The expected utility of a donor j in the two regimes compares as*

$$\mathrm{E}_{IN}(U_j) \gtreqqless \mathrm{E}_{UN}(U_j) \quad \Leftrightarrow \quad \frac{\widehat{n}}{N^*} \gtreqqless \frac{1+\varepsilon_A^*}{2}, \tag{30}$$

[9] More precisely, donor j knows that, in equilibrium, he will always end up giving to a non-profit i, such that $\tau_{j,i} = t_i = 0$.

where $\widehat{n}$ is given by (26) when $k > 1$ and by (27) when $k \leq 1$, N^* is given by (24), and ε_A^* is given by (25).

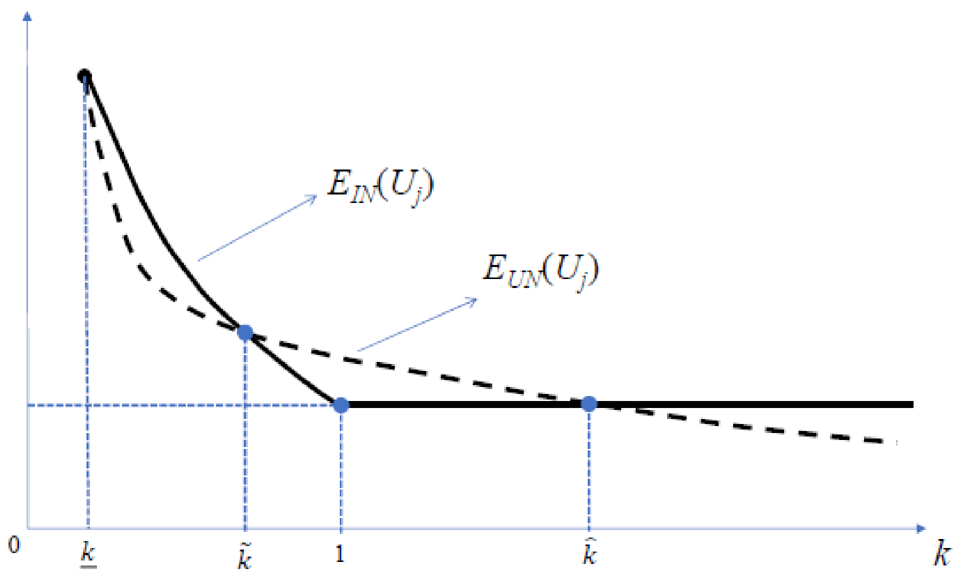
Condition (30) pins down precisely the trade-off faced by a generic donor behind the veil of ignorance. On the one hand, full transparency leads to a smaller variety of *active* non-profits in equilibrium (i.e., $\widehat{n}/N^* < 1$). On the other hand, the average level of monitoring effort by *active* non-profits in a regime with uninformed donors – which is given by $(1 + \varepsilon_A^*)/2$ – is lower than one whenever $\varepsilon_A^* < 1$, whereas it is always equal to one under full transparency. Which of the two forces (variety versus efficiency) dominates is crucial in governing the welfare comparison between the two regimes. The following proposition finally ties this condition (30) to the value of the marginal cost of monitoring in the less efficient non-profits.

Proposition 6 *There exist thresholds $\widetilde{k} \in (\underline{k}, 1)$ and $\widehat{k} > 1$, such that:*

1. *A generic donor j behind the veil of ignorance prefers a regime with full transparency to a regime with uninformed donors for all $k \in (\underline{k}, \widetilde{k})$, and for all $k > \widehat{k}$.*
2. *A generic donor j behind the veil of ignorance prefers a regime with uninformed donors to a regime with full transparency for all $k \in (\widetilde{k}, \widehat{k})$.*
3. *Donors are indifferent between the two regimes for all $k \in [0, \underline{k}]$, for $k = \widetilde{k}$, and for $k = \widehat{k}$.*

Proposition 6 and Figure 4 show that, if donors could choose (behind the veil of ignorance) between the two regimes, they would prefer to remain uninformed for values of $k \in (\widetilde{k}, \widehat{k})$. The intuition for this result is clear if one recalls Figure 2. The gap between N^* and $\widehat{n}$ (the loss of non-profit variety in the full-transparency regime) is widest for levels of k around 1. As k approaches $\underline{k}$, the gap between $\widehat{n}$ and N^* narrows, and this happens at a faster speed than the shrinking of the ratio $(1 + \varepsilon_A^*)/2$ with a declining k. In other words, as the asymmetry of monitoring costs declines (from 1 to $\underline{k}$), the welfare loss resulting from the loss of non-profit variety shrinks faster than the decline in the ratio of monitoring efforts by *active* non-profits (under uninformed-donors regime as compared to the full-transparency regime). At $k = \widetilde{k}$, these two effects cancel each other, and for k below $\widetilde{k}$, the welfare loss from less non-profit variety is smaller than the welfare gain from the more intense monitoring by active non-profits. On the other hand, for values of $k > \widehat{k}$, the equilibrium level of monitoring effort

Figure 4. Model with N non-profits: donors' welfare as a function of asymmetry in monitoring costs



ε_A^* is too low in order to compensate for the larger variety of non-profits that donors can choose from in a regime with uninformed donors.

The result in Proposition 6 crucially rests on a deep general equilibrium consideration. A generic donor j may prefer a regime where donors remain uninformed about the level of diversion is not because he appreciates ignorance. Offered the option to observe or not the level of funds diversion, any rational donor always prefers transparency, when facing this choice *individually*. However, the regime with full transparency does not offer this option individually, but does it to all the donors. In that case, a generic donor j may be better off in a context in which no one can observe the level of diversion, because this leads to an equilibrium where each donor will be able to pick the recipient of his donation from a more diverse set of non-profits.

6 Large Donors: Crowding in while Crowding out?

The previous sections have studied a non-profit sector where all donations come from a continuum of small (atomistic) donors. We have looked at two alterative institutional frameworks: one without any knowledge on how donations are put to use by each non-profit, and one which there is full transparency about non-profits behavior. In this section, we look at a related context, in which a continuum of atomistic donors coexist alongside a large donor. Throughout this section, we remain within a context where funds diversion is unobservable to donors. However, we consider two alternative informational setups: i) the case in which the behavior by the large donor remains also unobservable; ii) the case in which the behavior by the large donor becomes publicly observable. In what follows we study the equilibrium level of monitoring efforts under each of those alternative informational setups.

In order to keep this section brief, we will revert back to the simpler model presented in Section 2 with two firms: A and B. We keep all the technological assumptions introduced in Section 2. That is, the level of funds diversion in non-profit $i = A, B$ is given by $t_i = 1 - \varepsilon_i$, where ε_i is the level of monitoring intensity.The marginal cost of monitoring intensity in non-profit i be given Assumption 1. Output by non-profit i is given by (2).

We keep assuming that there is a mass Δ of atomistic donors, and each of them has 1 unit of resource to allocate to donations. Small donors' preferences are given by (4) with $\sigma_{j,i}$ governed by (3). In addition, there is now also a large donor with positive mass. The large donor gives a donation of size $\gamma > 0$ to the non-profit whose mission he happens to consider to be the more important one amongst the two. We assume that there is an equal probability that his most preferred mission is either A or B.

6.1 Unobservable Action by Large Donor

In this case, the large donor gives γ to either A or B, but none of the small donors knows which of the two non-profits receives it. Given that all small donors are ex-ante identical and that each of the two non-profits faces the same probability to receive γ, in equilibrium, Δ will be split in half amongst A and B.

From now on, we will use the subindex l (resp.$-l$) to denote the non-profit that received γ (resp. did not receive γ). Notice that the optimization problem faced by $-l$ is identical to the one faced by i in (16). Hence, the results in (8) remain all valid for $-l$. On the other hand, the optimization problem faced by l is given by:

$$\max_{\varepsilon_l \in [0,1]} V_l(\varepsilon_l) = 2\left[\left(\frac{\Delta}{2} + \gamma\right)\varepsilon_l - v_l \varepsilon_l^2\right]^{\frac{1}{2}},$$

from which the following solution obtains:

$$\varepsilon_l^* = \min\left\{\frac{\Delta + 2\gamma}{4v_l}, 1\right\}, \tag{31}$$

where $v_l = k$ when $l = A$ and $v_l = vk$ when $l = B$.

Henceforth, in the sake of brevity, we will restrict the analysis to cases in which the size of γ is sufficiently large, relative to the marginal cost of monitoring of non-profit A:

Assumption 6 $\gamma \geq 2k$.

When Assumption 6 holds, we can observe from (31) that $\varepsilon_l^* = 1$ will hold both for $l = A$ and $l = B$, even in the case when $\Delta = 0$. This means that the non-profit that receives γ will always exert perfect monitoring on their grassroot and, accordingly, bring rent-seeking down to zero. The main intention for imposing Assumption 6 is that of focusing on the starkest results when comparing the equilibrium level of monitoring effort by non-profits that arise when the recipient of γ is publicly observable versus when it is not. These results naturally tend to arise for relatively large values of γ.[10]

Using the results in (8) for ε_{-l}^*, together with (31), we can compute the expected level of monitoring effort by non-profit A and B. Since there is an equal chance for each of them to receive γ, the expected value of monitoring effort by non-profit $i = A, B$ is $E(\varepsilon_{i,unobs}^*) = \frac{1}{2}(\varepsilon_{l,i}^* + \varepsilon_{-l,i}^*)$. Assumption 6 implies that $\varepsilon_{l,i}^* = 1$ for $i = A, B$, no matter Δ. As a result,

$$E(\varepsilon_{i,unobs}^*) = \begin{cases} \dfrac{1}{2} + \dfrac{\Delta}{8v_i} & \text{if } \Delta < 4v_i, \\ 1 & \text{if } \Delta \geq 4v_i. \end{cases}, \tag{32}$$

where $v_i = k$ for $i = A$ and $v_i = vk$ for $i = B$.

6.2 Observable Action by a Large Donor

When the recipient of the large donation γ is publicly known, a generic small donor j will no longer simply give to the non-profit with the greater realization of $\sigma_{j,i}$. In particular, small donors will incorporate into their decisions the fact that receiving γ enhances a non-profit's incentive to exert monitoring effort. Recall, however, that small donors remain uninformed about the cost structure within non-profits – i.e., small donors observe which non-profit receives γ, yet they do not know whether this non-profit is the one with $v_A = k$ or $v_B = vk$.

Small donors will form an expectation about the monitoring effort exerted by non-profit l and by non-profit $-l$. We will henceforth denote by ε_l^e (resp. ε_{-l}^e) the *expectation* held by

[10] The results in the following subsection could indeed be extended to cases in which $\gamma < 2k$, at the cost of a much lengthier set of cases in Lemma 6 below. These additional results are available upon request.

small donors about the level of monitoring effort exerted by l (resp. by $-l$). Given those expectations, it follows that the share of Δ that will end up being channeled to l will be given by $\varepsilon_l^e/(\varepsilon_l^e+\varepsilon_{-l}^e)$. Notice that small donors know that the probability that l happens to be the one with lower (resp. higher) marginal cost of monitoring is exactly one half. As a result, in equilibrium: $\varepsilon_l^e=\frac{1}{2}\varepsilon_{l,A}^e+\frac{1}{2}\varepsilon_{l,B}^e$ and $\varepsilon_{-l}^e=\frac{1}{2}\varepsilon_{-l,A}^e+\frac{1}{2}\varepsilon_{-l,B}^e$, where $\varepsilon_{l,i}^e$ (resp. $\varepsilon_{-l,i}^e$) denotes the expectation held by small donors about the level of monitoring effort exerted by non-profit $i=A,B$ when $i=l$ (resp. $i=-l$).

The optimization problem faced by non-profit l reads now:

$$\max_{\varepsilon_l\in[0,1]} V_l(\varepsilon_l)=2\left[\left(\frac{\varepsilon_l^e}{\varepsilon_l^e+\varepsilon_{-l}^e}\Delta+\gamma\right)\varepsilon_l-v_l\varepsilon_l^2\right]^{\frac{1}{2}}, \tag{33}$$

while the one faced by non-profit $-l$ is:

$$\max_{\varepsilon_{-l}\in[0,1]} V_{-l}(\varepsilon_{-l})=2\left[\left(\frac{\varepsilon_{-l}^e}{\varepsilon_l^e+\varepsilon_{-l}^e}\Delta\right)\varepsilon_{-l}-v_{-l}\varepsilon_{-l}^2\right]^{\frac{1}{2}}. \tag{34}$$

From (33) and (34), respectively, we can obtain the optimal level of effort by l and $-l$, given the expectations ε_l^e and ε_{-l}^e. Namely:[11]

$$\varepsilon_l^* = \max\left\{0,\min\left\{\frac{1}{2v_l}\left(\frac{\varepsilon_l^e}{\varepsilon_l^e+\varepsilon_{-l}^e}\Delta+\gamma\right),1\right\}\right\}, \tag{35}$$

$$\varepsilon_{-l}^* = \max\left\{0,\min\left\{\frac{1}{2v_{-l}}\left(\frac{\varepsilon_{-l}^e}{\varepsilon_l^e+\varepsilon_{-l}^e}\Delta\right),1\right\}\right\}. \tag{36}$$

Small donors will form expectations rationally. As a result, when computing $\varepsilon_l^e=\frac{1}{2}\left(\varepsilon_{l,A}^e+\varepsilon_{l,B}^e\right)$ and $\varepsilon_{-l}^e=\frac{1}{2}\left(\varepsilon_{-l,A}^e+\varepsilon_{-l,B}^e\right)$, they will base $\varepsilon_{l,A}^e$ and $\varepsilon_{l,B}^e$ on (35), and $\varepsilon_{-l,A}^e$ and $\varepsilon_{-l,B}^e$ on (36). The following lemma lays down the expressions for ε_l^e and ε_{-l}^e that will hold in equilibrium.

Lemma 6 *Let Assumption 6 hold true, and suppose small donors are able to observe which of the non-profits is the recipient of the large donation γ. Then, in equilibrium:*

$$\varepsilon_l^e=1,\ \textit{for any}\ \Delta\geq 0,$$

[11] The results in equations (35) and (36) have to apply both the *max* and *min* operators simultaneously, as in this version of the model we can have corner solutions with either zero effort or one unit of effort – see results in Lemma 6 later on.

and

$$\varepsilon^{e}_{-l}=\begin{cases}0 & \text{if } \Delta\leq 4kv/(1+v)\\ (1+v)\,\Delta/(4kv)-1 & \text{if } \frac{4kv}{1+v}<\Delta\leq\frac{2kv(3+v)}{1+v},\\ (\Delta-2k+\sqrt{\Delta^{2}+36k^{2}-4k\Delta})/(8k) & \text{if } \frac{2kv(3+v)}{1+v}<\Delta<4k,\\ 1 & \text{if } \Delta\geq 4k.\end{cases}$$

Lemma 6 states that, when $\Delta \leq 4kv/(1+v)$, small donors will expect the non-profit that did not receive γ to set the level of monitoring effort equal to zero. As a consequence, no small donor will end up donating their unit resource to $-l$ when $\Delta \leq 4kv/(1+v)$. From (36), this in turn implies that, when $\Delta \leq 4kv/(1+v)$, the non-profit $-l$ will set $\varepsilon^{*}_{-l}=0$. In other words, when information about which non-profit firm receives γ is publicly available, for sufficiently low levels of Δ, the non-profit $-l$ will exit the market. The main reason leading to such negative result is that, when information about γ becomes public, small donors will tend to be pulled towards non-profit l. For sufficiently small values of Δ, the bias created by observability of γ will end up fully crowding out non-profit $-l$. Strikingly, this result will apply not only to non-profit A, but also to B. That is, the crowding-out effect may even end up driving out of the market the non-profit with the *lower* cost of monitoring.[12]

We can now use Lemma 6, alongside the expressions for $\varepsilon^{*}_{l,A}$, $\varepsilon^{*}_{l,B}$ in (35) and for $\varepsilon^{*}_{-l,A}$, $\varepsilon^{*}_{-l,B}$ in (36), to compute the expected value of monitoring effort exerted by A and B in equilibrium when the recipient of γ is publicly observable. We relegate all the mathematical expressions to the Appendix, and we conclude this section with the following proposition that compares those expected values to the ones given by (32).

Proposition 7 *Let Assumption 6 hold true and suppose small donors are able to observe which of the non-profits is the recipient of the large donation γ. Denote by $E(\varepsilon^{*}_{i,obs})$ the expected level of monitoring effort in non-profit $i = A, B$ in equilibrium. Then:*

i) $E(\varepsilon^{*}_{A,obs}) < E(\varepsilon^{*}_{A,unobs})$ for all $\Delta < 4k$ and $E(\varepsilon^{*}_{A,obs}) = E(\varepsilon^{*}_{A,unobs}) = 1$ for all $\Delta \geq 4k$.

ii) $E(\varepsilon^{*}_{B,obs}) < E(\varepsilon^{*}_{B,unobs})$ for all $\Delta < 4vk$ and $E(\varepsilon^{*}_{B,obs}) = E(\varepsilon^{*}_{B,unobs}) = 1$ for all $\Delta \geq 4vk$.

The results in Proposition 7 show that observability of the recipient of the large donation leads to an equilibrium with (on average) lower level of monitoring. Interestingly, this results

[12] Notice that the crowding-out effect never takes place in the case in which γ remains publicly unobservable. As a result, when the recipient of the large donation remains unobservable, none of the non-profits will ever end up exiting the market in equilibrium.

arises both for A (the 'high' monitoring cost non-profit) and for B (the 'low' monitoring cost non-profit). The intuition behind this result becomes clear from Lemma 6. Public knowledge about which non-profit receives γ induces small donors to reallocate their donation towards that non-profit. This tends to increase the incentives to raise monitoring effort by the recipient non-profit. However, the flip-side of this is that it simultaneously lowers the incentives to exert monitoring effort by the other non-profit. When the size of γ is sufficiently large relative to k, the latter effect is stronger than the former, leading (in expectation) to lower levels of monitoring effort by both non-profits as stated by Proposition 7.

7 Conclusion

We have analyzed the implications of transparency/"value-for-money" policies in the non-profit sector, and how the moral hazard problem inside non-profit organizations interacts with the competitive structure of the sector. Our main result is that more transparency on the use of funds has an ambiguous effect on the total public good provision and the welfare of donors. This occurs because of the two opposed forces. On the one hand, more transparency encourages a non-profit manager to devote more resources to monitoring and curbing rent-seeking inside her organization. On the other hand, more transparency encourages managers of *some* non-profits (those with higher cost of monitoring) to reduce the internal resources devoted to preventing rent-seeking. From the donors' perspective, there are also two corresponding opposed effects: transparency is good because of the reduction in diversion for the non-profits active in the market, but it also backfires because of a lower diversity of non-profits, hence reducing the set of charitable causes among which a donor can choose.

Our analysis fits into the broad debate about the new architecture of foreign aid that features more reliance on NGOs, community-driven development, and impact philanthropy (see, for instance, Smillie, 1995, Platteau and Gaspart, 2003; Easterly, 2008; Mansuri and Rao, 2012). Our main policy implication of is that in the contexts where the strategic-interaction effect is important, it leads to the under-provision of public goods in dimensions where monitoring is relatively more costly. This is crucial, for example, when development NGOs focusing on empowerment of certain beneficiary groups (minorities, women) have to compete for funds with NGOs engaging in projects with highly visible or easily measured output (child fostering, vaccination). In such settings, our analysis suggests that the transparency initiatives should be paired with increased public funding earmarked for NGOs engaged in projects with more costly monitoring, so as to avoid the loss of project diversity that more intense competition might trigger.

A natural avenue for future research is to test empirically the mechanisms proposed in our model. This would required first of all identifying a clear date of introduction of a policy requiring more transparency, at an aggregate (e.g. national) level. Secondly, data (proxies) on non-profit behavior in terms of monitoring and project choice (before and after the policy) would need to be collected. Although this might seem challenging, the proxies developed in recent empirical work on transparency (e.g. Dang and Owens, 2020) seem promising. Given the potential policy importance, we hope that our study encourages further empirical and theoretical investigation on the strategic behavior of non-profits in response to changes in information-related policy initiatives.

Appendix A: Proofs of lemmata and propositions

Proof of Lemma 1. Consider a generic donor j. He will donate to i when $\sigma_{j,i} > \sigma_{j,-i}$, where $i = A, B$ and $-i \neq i$. Denoting by $F(\sigma_{j,i})$ the cdf associated to $f(\sigma_{j,i})$, the probability that j donates to i, rather than to $-i$, is given by:

$$\Pr(j \text{ donates to } i) = \int_0^\infty F(\sigma_{j,i})\, f(\sigma_{j,i})\, d\sigma_{j,i} = \frac{1}{2}, \quad \text{where } i = A, B. \tag{37}$$

There is a mass Δ of donors, each one of them giving a unit donation to $i = A, B$ with probability 0.5. Hence, $D_A = D_B = \Delta/2$. ■

Proof of Lemma 2. Consider a generic donor j. He will donate to non-profit i when (9) holds. This implies that the probability that j donates to i, rather than to $-i$, is:

$$\Pr(j \text{ donates to } i) = \int_0^\infty F\left(\frac{(1-t_i)\sigma_{j,i}}{(1-t_{-i})}\right) f(\sigma_{j,i})\, d\sigma_{j,i}, \quad \text{for } i = A, B. \tag{38}$$

Next, using the fact that (3) entails $F\left((1-t_i)\sigma_{j,i}(1-t_{_{-i}})^{-1}\right) = \exp\left(-(1-t_{_{-i}})(1-t_i)^{-1}\sigma_{j,i}^{-1}\right)$, together with (3), we can solve (38) to obtain $\Pr(j \text{ donates to } i) = (1-t_i)/(2-t_i-t_{-j})$. From this expression, (10) immediately obtains. ■

Proof of Lemma 3. The first-order condition of (11) yields

$$V'(\varepsilon_i) = \left(\frac{\varepsilon_i + 2\varepsilon_{-i}}{(\varepsilon_i + \varepsilon_{-i})^2}\Delta - 2v_i\right)\varepsilon_i = 0. \tag{39}$$

From (39), we observe that $V^{'}(0) = 0$, and there may also exist one additional critical value $\varepsilon_i = \varepsilon_i^{FOC} > 0$ satisfying it. When $\varepsilon_i^{FOC} > 0$ exists, it satisfies the condition:

$$\frac{\varepsilon_i^{FOC} + 2\varepsilon_{-i}}{(\varepsilon_i^{FOC} + \varepsilon_{-i})^2}\Delta = 2v_i. \tag{40}$$

Taking the second derivative of $V_i(\cdot)$, we obtain:

$$V''(\varepsilon_i) = \frac{2\varepsilon_{-i}^2}{(\varepsilon_i + \varepsilon_{-i})^3}\Delta - 2v_i. \tag{41}$$

Hence, plugging (40) into (41) implies that, when $\varepsilon_i^{FOC} > 0$ exists, $V''(\varepsilon_i^{FOC}) < 0$, and therefore $\varepsilon_i^{FOC} > 0$ must be (at least) a local maximum. Next, from (11) it follows that $V(0) = 0$, while using (41) we can obtain that

$$V''(0) = 2\Delta/\varepsilon_{-i} - 2v_i.$$

Furthermore, differentiating (41), it is straightforward to observe that $V'''(\varepsilon_i) < 0$ for all ε_i. Hence, on the one hand, when $V''(0) \leq 0$ it must be that $\varepsilon_i^{br} = 0$ is the global maximum of (11) for $\varepsilon_i \in [0, 1]$. On the other hand, when $V''(0) > 0$, there necessarily exists one (and only one) $\varepsilon_i^{FOC} > 0$ satisfying (40), and this value is the global maximum of (11) for $\varepsilon_i \geq 0$. In turn, this implies that, when $V''(0) > 0$, the global maximum of (11) for $\varepsilon_i \in [0, 1]$ must be given by $\min\{1, \varepsilon_i^{FOC}\}$. Lastly, solving for the positive root of the quadratic polynomial implicit in (40) the expression in the second row of (12) obtains, which completes the proof.

■

Proof of Proposition 1 . Notice first that the best-response functions (12) will cross each other only once within the strategy space $[0, 1] \times [0, 1]$, implying that there is a unique Nash equilibrium in pure strategies. We proceed now to prove the proposition in four steps.

Suppose that, for some $\Delta > 0$, in the Nash equilibrium, $\widehat{\varepsilon}_B = 0$. Using (12) for $\widehat{\varepsilon}_A(0)$, we should have that, in such a Nash equilibrium, $\widehat{\varepsilon}_A = \Delta/2k$ must hold. But, using again (12), we can observe that $\widehat{\varepsilon}_B(\Delta/2k) > 0$, contradicting the fact that $\widehat{\varepsilon}_B = 0$ can hold true for some $\Delta > 0$. Let now $\widehat{\varepsilon}_A = 0$, and notice that (12) yields $\widehat{\varepsilon}_B(0) = \Delta/2vk$ for $0 < \Delta < 2vk$. Note also that when $\varepsilon_B = \Delta/2vk$, given Assumption 1, we have that $\Delta \leq \Delta/2v$. Hence, (12) yields $\widehat{\varepsilon}_A(\Delta/2vk) = 0$. Suppose now that $\widehat{\varepsilon}_B = 1$ holds for all $\Delta \geq 2vk$. This would in turn mean that $\widehat{\varepsilon}_A(1) > 0$ whenever $k < \Delta < \frac{8}{3}k$, while $\widehat{\varepsilon}_A(1) = 0$ for $2vk \leq \Delta \leq k$. Therefore, according to (12) we would have that $\widehat{\varepsilon}_A(1) = \max\left\{0, (\Delta - 4k + \sqrt{\Delta^2 + 8k\Delta})/4k\right\}$ when $2vk \leq \Delta \leq \frac{8}{3}k$. Using this last result, we can also observe that $\Delta > 2vk(1 + \widehat{\varepsilon}_A(1))^2/(1 + 2\widehat{\varepsilon}_A(1))$ whenever $\Delta \geq 2vk$. Finally, notice that when $\Delta > \frac{8}{3}k$, $\widehat{\varepsilon}_A = \widehat{\varepsilon}_B = 1$ is the only solution consistent with (12) for both $v_A = k$ and $v_B = vk$, completing the proof. ■

Proof of Lemma 4. Notice first that $v_B = 0$ implies that, in equilibrium, $\varepsilon_B^* = 1$ always hold. Then, the results in the lemma follow straightforwardly from (18) and (20), recalling that Assumption 4 implies there are $N/2$ non-profits with $v_i = v_B = 0$ and $N/2$ non-profits with $v_i = v_A = k$. ■

Proof of Proposition 2. Suppose that the equilibrium with endogenous satisfies the inequality $\Delta/2N^* < k$. Then, using the relevant expressions in (22) and (23), it must be that N^* stems from the following equality:

$$\left(\frac{\Delta}{N}\right)^{\frac{1}{2}} + \frac{1}{2}\frac{\Delta}{N}k^{-\frac{1}{2}} = 1. \tag{42}$$

Equation (42) can be rearrange to yield: $N^2 - (1 + k^{-\frac{1}{2}})\Delta N + \Delta^2/4k = 0$, from where the expression on the top row of (24) obtains. Next, replacing the expression of N^* in the top row of (24) into $\Delta/2N^* < k$, we can observe that this only holds true for $k > 3 - 2\sqrt{2}$. This in turn means that when $k \leq 3 - 2\sqrt{2}$, the value of N^* will result from the following equality:

$$\left(\frac{\Delta}{N}\right)^{\frac{1}{2}} + \left(\frac{\Delta}{N} - k\right)^{\frac{1}{2}} = 1. \tag{43}$$

Solving (43), we get $N^* = 4(1 + k)^{-2}\Delta$. ■

Proof of Proposition 3. First of all, notice that the assumption that $v_B = 0$ straightforwardly implies that $\widehat{\varepsilon}_B = 1$ will always hold in a Nash equilibrium. We focus then next in which cases will the Nash equilibrium entail $\widehat{\varepsilon}_A = 0$, and in which ones it will entail $\widehat{\varepsilon}_A = 1$, for those social entrepreneurs with marginal cost of monitoring $v_A = k$.

To prove the first part of the proposition, notice that when the Nash equilibrium entails $\widehat{\varepsilon}_A = 0$ for all i with $v_i = v_A = k$, the value of $\widehat{n}$ will stem from $\frac{1}{2} \times \widehat{V}_B(\widehat{\varepsilon}_B = 1) = 1$, with $\widehat{V}_B(\widehat{\varepsilon}_B = 1) = 2(\Delta/\widehat{n})^{\frac{1}{2}}$, from which (26) immediately obtains. For this to be a Nash equilibrium it must be that $\widehat{V}_A(\varepsilon_A = 1) < 0$ when $\widehat{n}$ is given by (26). Replacing (26) into $\widehat{V}_A(\varepsilon_A = 1) = 2(\Delta/\widehat{n} - k)^{\frac{1}{2}}$, we can indeed observe that $\widehat{V}_A(\varepsilon_A = 1) < 0$ when $k > 1$.

For the second part, notice that when the Nash equilibrium entails $\widehat{\varepsilon}_i = 1$ for all $i \in \mathcal{N}$, the value of $\widehat{n}$ stems from replacing $\widehat{V}_A = 2(\Delta/\widehat{n} - k)^{\frac{1}{2}}$ and $\widehat{V}_B = 2(\Delta/\widehat{n})^{\frac{1}{2}}$ into the zero-profit condition (21). This leads to

$$\left(\frac{\Delta}{\widehat{n}}\right)^{\frac{1}{2}} + \left(\frac{\Delta}{\widehat{n}} - k\right)^{\frac{1}{2}} = 1, \tag{44}$$

from where (27) obtains after some algebra. For this to be a Nash equilibrium it must be that $\widehat{V}_A(\varepsilon_A = 1) \geq 0$ when $\widehat{n} = 4(1 + k)^{-2}\Delta$ and $k \leq 1$, which is indeed the case. Finally, note that $\widehat{n} = 4(1 + k)^{-2}\Delta$ cannot be an equilibrium for $k > 1$, as it would violate (44). ■

Proof of Proposition 4. For $k > 1$, the proof follows from noting from (24) that $\lim_{k\to\infty} N^* = 1$, together with $\partial N^*/\partial k < 0$. For $k \in (\underline{k}, 1]$, where $\underline{k} \equiv 3 - 2\sqrt{2}$, the proof follows from noting that

$$\frac{1}{2}\left[\left(\frac{1+\underline{k}^{\frac{1}{2}}}{\underline{k}^{\frac{1}{2}}}\right)+\left(\frac{2+\underline{k}^{\frac{1}{2}}}{\underline{k}^{\frac{1}{2}}}\right)^{\frac{1}{2}}\right]=\frac{4}{(1+\underline{k})^{2}},$$

coupled again with the fact that $\partial N^*/\partial k < 0$. ■

Proof of Proposition 5. Note first that the equilibrium entry condition (21) implies that $V^{UN} = N^*$ and $V^{IN} = \widehat{N}$. From this, the fact that $V^{UN} - V^{IN} > 0$ for all $k \in (\underline{k}, 1)$, together with $\partial(V^{UN} - V^{IN})/\partial k > 0$ in that interval and $\lim_{k \to \underline{k}}(V^{UN} - V^{IN}) = 0$, follow directly from (24) and (27).

To prove the second part of the proposition, note from (24) that $N^*(k = 1) = \left[(2 + \sqrt{3})/2\right] \Delta < 2\Delta$, and recall that $\widehat{N} = 2\Delta$ for all $k > 1$. Given that $\partial N^*/\partial k < 0$, it then follows that $N^* < \widehat{N}$ for all $k > 1$, implying in turn that $V^{UN} < V^{IN}$ for all $k > 1$. Lastly, the fact that $\partial(V^{IN} - V^{UN})/\partial k > 0$ for all $k > 1$ follows directly from $\partial N^*/\partial k < 0$ and the fact that $\widehat{N} = 2\Delta$ for all $k > 1$. ■

Proof of Lemma 5. Using the properties of the Fréchet distribution, we can obtain:

$$E_{IN}(U_j) = \widehat{n} \times \lim_{x \to 0} \Gamma(x) \quad \text{and} \quad E_{UN}(U_j) = N^* \left(\frac{1}{2}\varepsilon_A^* + \frac{1}{2}\varepsilon_B^*\right) \times \lim_{x \to 0} \Gamma(x),$$

where $\widehat{n}$ is given by (26) and (27), N^* by (24), ε_A^* by (25), $\varepsilon_B^* = 1$, and $\Gamma(\cdot)$ is the Gamma function. Consequently, the condition (30) obtains. ■

Proof of Proposition 6.

Let first $k > 1$. Plugging (24), (25), and (26), into (30), it follows that $E_{IN}(U_j) > E_{UN}(U_j)$ if and only if the following condition holds:

$$\Upsilon(k) \equiv \frac{1 + k^{\frac{1}{2}}\left(1 + k^{\frac{1}{2}}\right) + k^{\frac{3}{4}}\left(2 + k^{\frac{1}{2}}\right)^{\frac{1}{2}}}{k^{\frac{1}{2}}\left(1 + k^{\frac{1}{2}}\right) + k^{\frac{3}{4}}\left(2 + k^{\frac{1}{2}}\right)^{\frac{1}{2}}}\left[\left(\frac{1 + k^{\frac{1}{2}}}{k^{\frac{1}{2}}}\right) + \left(\frac{2 + k^{\frac{1}{2}}}{k^{\frac{1}{2}}}\right)^{\frac{1}{2}}\right] < 4. \qquad (45)$$

Notice now from $\Upsilon(k)$ in (45) that: *i)* $\Upsilon'(k) < 0$; *ii)* $\Upsilon(1) = 3+\sqrt{3} > 4$, *iii)* $\lim_{k\to\infty} \Upsilon(k) = 2$. As a consequence, by continuity, there must exist some finite threshold $\widehat{k} > 1$, such that: $\Upsilon(\widehat{k}) = 4$, $\Upsilon(k) > 4$ for all $1 < k < \widehat{k}$, and $\Upsilon(k) < 4$ for all $k > \widehat{k}$.

Let now $\underline{k} < k < 1$, where recall that $\underline{k} \equiv 3 - 2\sqrt{2}$. Plugging (24), (25), and (27), into (30), it follows that $E_{IN}(U_j) > E_{UN}(U_j)$ if and only if the following condition holds true:

$$\Psi(k) \equiv (1 + k)^2\ \Upsilon(k) < 16, \qquad (46)$$

where $\Upsilon(k)$ is defined in (45). Note now that $\Psi(k)$ as defined in (46) satisfies the following conditions: *i)* $\Psi(1) > 16$; *ii)* $\Psi(\underline{k}) = 16$; *iii)* there exists a value $k_{\min} \in (\underline{k}, 1)$ such that $\Psi(k)$ reaches a global minimum within the interval $[\underline{k}, 1]$. As a consequence, by continuity, there must exist some threshold $\widetilde{k} \in (k_{\min}, 1)$ such that: $\Psi(\widetilde{k}) = 16$, $\Psi(k) > 16$ for all $\widetilde{k} < k < 1$, and $\Psi(k) < 16$ for all $\underline{k} < k < \widetilde{k}$. ■

Proof of Lemma 6. To prove that, in equilibrium, $\varepsilon_l^e = 1$ for any $\Delta = 0$, notice that Assumption 6 implies that (35) will yield $\varepsilon_l^* = 1$, for any $\Delta \geq 0$ and any admissible values of $\varepsilon_l^e/(\varepsilon_l^e + \varepsilon_{-l}^e)$, and for $l = A, B$. As a result, under rational expectations, it must be that $\varepsilon_l^e = 1$ for any $\Delta = 0$.

Suppose now that, in equilibrium, $0 < \varepsilon_{-l,A}^e < \varepsilon_{-l,B}^e < 1$. Then, using and (36) and $\varepsilon_{-l}^e = \frac{1}{2}\left(\varepsilon_{-l,A}^e + \varepsilon_{-l,B}^e\right)$, it follows that:

$$\varepsilon_{-l}^e = \frac{1}{4k}\frac{1+v}{v}\left(\frac{\varepsilon_{-l}^e}{\varepsilon_l^e + \varepsilon_{-l}^e}\Delta\right). \tag{47}$$

Equation (47) implies that, in an equilibrium where both $\varepsilon_{-l,A}^e$ and $\varepsilon_{-l,B}^e$ are interior, it must be that $\varepsilon_l^e + \varepsilon_{-l}^e = (1+v)\,\Delta/(4kv)$. Using $\varepsilon_l^e = 1$, this in turn leads to:

$$\varepsilon_{-l}^e = \frac{1}{4k}\frac{1+v}{v}\Delta - 1. \tag{48}$$

Equation (48) entails that $\varepsilon_{-l}^e > 0$ if and only if $(1+v)\,\Delta/(4kv) > 0$. As a result, when $(1+v)\,\Delta/ \leq 4kv/\,(1+v)$, it must be that in equilibrium $\varepsilon_{-l}^e = 0$.

By continuity, the previous result implies that when $\Delta = 4kv/\,(1+v) + \epsilon$, then ε_{-l}^e is given by (48) for $\epsilon > 0$ sufficiently small. Also, by continuity, there must exist $\bar{\epsilon} > 0$, such that for all $\epsilon < \bar{\epsilon}$, in equilibrium, $0 < \varepsilon_{-l,A}^e < \varepsilon_{-l,B}^e < 1$. Thus, the value of $\bar{\epsilon}$ is pinned down by the level of Δ that turns $\varepsilon_{-l,B}^e = 1$ when using (48). Thus, plugging (48) into (36) for the case when $l = B$, it follows that in equilibrium $\varepsilon_{-l,B}^e < 1$ if and only if $\Delta < 2kv(3+v)/(1+v)$.

From the previous result, it follows that when $\Delta = 2kv(3+v)/(1+v) + \xi$, we must have an equilibrium where $0 < \varepsilon_{-l,A}^e < \varepsilon_{-l,B}^e = 1$ for $\xi > 0$ sufficiently small. Again, by continuity, there must exist $\bar{\xi}$ such that for all $\xi < \bar{\xi}$, in equilibrium, $0 < \varepsilon_{-l,A}^e < \varepsilon_{-l,B}^e = 1$. In that range, $\varepsilon_{-l}^e = \frac{1}{2} + \frac{1}{2}\varepsilon_{-l,A}^e$. Hence, using (36) for the case when $l = A$, we can observe that, in an equilibrium where $0 < \varepsilon_{-l,A}^e < \varepsilon_{-l,B}^e = 1$, the value of ε_{-l}^e will be pinned down by:

$$\varepsilon_{-l}^e = \frac{1}{2} + \frac{1}{4k}\left(\frac{\varepsilon_{-l}^e}{1 + \varepsilon_{-l}^e}\Delta\right),$$

which, after some algebra, leads to the result

$$\varepsilon^e_{-l} = \Upsilon(\Delta) \equiv (\Delta - 2k + \sqrt{\Delta^2 + 36k^2 - 4k\Delta})/(8k). \tag{49}$$

Notice now that $\Upsilon'_\Delta > 0$, and that $\Upsilon(\Delta) = 1$ when $\Delta = 4k$. Therefore, the equilibrium where $\varepsilon^e_{-l} = \Upsilon(\Delta)$ holds for $2kv(3+v)/(1+v) < \Delta < 4k$, while $\varepsilon^e_{-l} = 1$ for $\Delta \geq 4k$. ■

Proof of Proposition 7. Using the results in Lemma 6 together with the expressions in (35) and (36), while bearing in mind that each non-profit has a probability to receive γ equal to one half, the following results obtain:

$$E(\varepsilon^*_{A,obs}) = \begin{cases} \frac{1}{2} & \text{if } \Delta \leq 4\frac{4kv}{1+v}, \\ \frac{1}{2} + \frac{v}{1+v}\left(\frac{1+v}{v}\frac{1}{4k}\Delta - 1\right) & \text{if } \frac{4kv}{1+v} < \Delta \leq \frac{2kv(3+v)}{1+v}, \\ \frac{1}{2} + \frac{1}{4k}\frac{\Upsilon(\Delta)}{1+\Upsilon(\Delta)}\Delta & \text{if } \frac{2kv(3+v)}{1+v} < \Delta < 4k, \\ 1 & \text{if } \Delta \geq 4k, \end{cases} \tag{50}$$

with $\Upsilon(\Delta)$ given by (49), and

$$E(\varepsilon^*_{B,obs}) = \begin{cases} \frac{1}{2} & \text{if } \Delta \leq \frac{4kv}{1+v} \\ \frac{1}{2} + \frac{1}{1+v}\left(\frac{1+v}{v}\frac{1}{4k}\Delta - 1\right) & \text{if } \frac{4kv}{1+v} < \Delta < \frac{2kv(3+v)}{1+v}, \\ 1 & \text{if } \Delta \geq \frac{2kv(3+v)}{1+v}. \end{cases} \tag{51}$$

Comparing (50) case by case to $E(\varepsilon^*_{A,unobs})$ stemming from (32) with $v_i = k$, and next comparing (51) case by case to $E(\varepsilon^*_{B,unobs})$ stemming from (32) with $v_i = vk$, all the results in Proposition 7 follow after some algebra. ■

Appendix B: Analysis with a positive value of v_B

This appendix briefly describes how the main results in the model with N non-profits can be extended when Assumption 4 is modified to allow also a positive value of v_B. Namely,

Assumption 4 (bis) *Each social entrepreneur $i \in N$ draws a specific monitoring marginal cost $v_i \in \{v_A, v_B\}$, where: i) $\Pr(v_i = v_A) = \Pr(v_i = v_B) = \frac{1}{2}$; ii) $v_A = k > 0$.; iii) $v_B = vk$, with $0 \leq v < 1$.*

It is straightforward that the optimal monitoring effort schedules described by (17) and (20) are still valid under Assumption 4 (bis), as both expressions are written down for generic values of v_i. Nevertheless, given that v_B is now allowed to be larger than zero, it is no longer true that all non-profit managers with $v_i = v_B$ will *always* set $\widehat{\varepsilon}_i = 1$ in equilibrium. In particular, $v_B > 0$ brings about the possibility of Nash equilibria where only a fraction of the non-profit managers with $v_i = v_B$ will end up setting $\widehat{\varepsilon}_i = 1$. Below we extend the results in Lemma 4 accordingly.

Lemma 4 (bis) *Let N be a large number, and suppose Assumption 3 (bis) and Assumption 4 (bis) jointly hold. Then:*

1. *If $\Delta/N \geq k$, in equilibrium, $\widehat{\varepsilon}_i = 1$ for all $i \in N$*

2. *If $k/2 \leq \Delta/N < k$, in equilibrium, there will be $n = \Delta/k \in (N/2, N)$ non-profits that set $\widehat{\varepsilon}_i = 1$, and the remaining $1 - n \in (0, N/2)$ set $\widehat{\varepsilon}_i = 0$. All $i \in N$ such that $v_i = v_B = vk$ set $\widehat{\varepsilon}_i = 1$.*

3. *If $vk/2 \leq \Delta/N < k/2$, in equilibrium, the $N/2$ non-profits with $v_i = v_B = vk$ set $\widehat{\varepsilon}_i = 1$, while the $N/2$ non-profits with $v_i = v_A = k$ set $\widehat{\varepsilon}_i = 0$.*

4. If $\Delta/N < vk/2$, *in equilibrium, there will be $n = \Delta/vk \in (0, N/2)$ non-profits with $v_i = v_B = vk$ that will set $\widehat{\varepsilon}_i = 1$. The remainder $N/2 - (\Delta/vk)$ non-profits with $v_i = v_B = vk$ will set $\widehat{\varepsilon}_i = 0$, and all non-profits with $v_i = v_A = k$ and will set $\widehat{\varepsilon}_i = 0$.*

Entry Decisions with Uniformed Donors

Using (16) and (17), it follows that in the regime with uninformed donors the payoff obtained by a social entrepreneur $i \in \mathcal{N}$, with $v_i \in \{vk, k\}$, will be given by

$$V_i^* = \begin{cases} \dfrac{\Delta}{N} v_i^{-\frac{1}{2}} & \text{if} \quad v_i > \dfrac{\Delta}{2N}, \\ 2\left(\dfrac{\Delta}{N} - v_i\right)^{\frac{1}{2}} & \text{if} \quad v_i \leq \dfrac{\Delta}{2N}. \end{cases} \tag{52}$$

By plugging each respective (52) into (21), after taking into Assumption 4 (bis), we can obtain the version of Proposition 2 when $v_B = vk$.

Proposition 2 (bis) *Suppose Assumption 2 (bis) and Assumption 4 (bis) jointly hold. Then:*

$$N^* = \begin{cases} \dfrac{1+\sqrt{v}}{2\sqrt{vk}}\Delta & \text{if} \quad k > \dfrac{1}{v\left(1+\sqrt{v}\right)^2} \\ \dfrac{k+\sqrt{k}+\sqrt{k^2+2k^{\frac{3}{2}}-k^2 v}}{2k+2k^2 v}\Delta & \text{if} \quad \dfrac{3-v-2\sqrt{2-v}}{\left(1-v\right)^2} < k \leq \dfrac{1}{v\left(1+\sqrt{v}\right)^2} \\ \dfrac{4}{\left(1+k\right)^2+kv\left(kv+2-2k\right)}\Delta & \text{if} \quad k \leq \dfrac{3-v-2\sqrt{2-v}}{\left(1-v\right)^2} \end{cases} . \tag{53}$$

The expression in (53) describes the number of non-profits that enter the non-profit market when donors are uniformed about the level of monitoring effort within each non-profit. Combining (53) with (17), we can obtain the levels of monitoring effort that hold in equilibrium: ε_A^* and ε_B^*. The exact algebraic expressions for ε_A^* and ε_B^* turn out to be rather cumbersome for interior solutions. For brevity, we skip writing them down fully, and just state their following general features: *i*) for all $k > 1/\left[v\left(1+\sqrt{v}\right)^2\right]$, in equilibrium, $0 < \varepsilon_A^* < \varepsilon_B^* < 1$; *ii*) for all $\left(3-v-2\sqrt{2-v}\right)\left(1-v\right)^{-2} < k \leq 1/\left[v\left(1+\sqrt{v}\right)^2\right]$, in equilibrium, $0 < \varepsilon_A^* < \varepsilon_B^* = 1$; *iii*) for all $k \leq \left[3-v-2\sqrt{2-v}\right]\left(1-v\right)^{-2}$, in equilibrium, $\varepsilon_A^* = \varepsilon_B^* = 1$.

Entry Decisions with Informed Donors

Using the result in Lemma 4 (bis), and following a similar reasoning as in Section 4.2, we can now describe how the number of *active* non-profits varies of the level of v_A and v_B in an equilibrium with informed donors.

Proposition 3 (bis) *Suppose Assumption 2 (bis) and Assumption 4 (bis) jointly hold. Let $\widehat{N}$ denote the number social entrepreneurs that set up a non-profit in equilibrium, and $\widehat{n}$ the number of non-profits that remain active in equilibrium. Then:*

$$\widehat{n} = \begin{cases} \dfrac{\widehat{N}}{2} = \dfrac{1}{1+vk}\Delta & \text{if} \quad k > \dfrac{1}{1-v}, \\ \widehat{N} = \dfrac{4}{(1+k)^2 + kv\,(kv+2-2k)}\Delta & \text{if} \quad k \leq \dfrac{1}{1-v}. \end{cases} \tag{54}$$

Analogously to the results in Proposition 3 in the main text, the equilibrium levels of monitoring effort by social entrepreneurs depend on whether $k > 1/(1-v)$ or $k \leq 1/(1-v)$. When $k > 1/(1-v)$, while $\widehat{N} = 2\Delta/(1+vk)$ social entrepreneurs enter the non-profit market, only those $\widehat{N}/2$ who receive a draw $v_B = vk$ remain active and set $\widehat{\varepsilon}_B = 1$. Conversely, when $k \leq 1/(1-v)$, the number of social entrepreneurs that enter the non-profit market is $\widehat{N} = 4\Delta/\left[(1+k)^2 + kv\,(kv+2-2k)\right]$, and all of them remain active and set $\widehat{\varepsilon}_i = 1$ after receiving their draws $v_i \in \{vk, k\}$.

Comparison of Equilibrium Outcomes

From (53) and (54), an analogous result to Proposition 4 obtains. namely, $N^* > \widehat{n}$ whenever $k > (3 - v - 2\sqrt{2-v})/\,(1-v)^2$.

Proposition 4 (bis) *Suppose Assumption 4 (bis) holds. Whenever $k > (3-v-2\sqrt{2-v})/\,(1-v)^2$, the number of active non-profits is smaller under full transparency than in the regime with uniformed donors; that is, $\widehat{n} < N^*$.*

Bearing in mind that the equilibrium entry condition (21) implies that $V^{UN} = N^*$ and $V^{IN} = \widehat{N}$, a result analogous to Proposition 5 also obtains. There is, though, a slight difference in this result when $v_B = vk$, for values of k that are sufficiently large, as can be seen in the part *iii*) of Proposition 5 (bis).

Proposition 5 (bis) *Let V^{UN} and V^{IN} denote the aggregate level of non-profit output in the equilibrium with uninformed and informed donors, and suppose Assumption 4 (bis) holds. In addition, let $\underline{k}(v) \equiv \left(3 - v - 2\sqrt{2-v}\right)(1-v)^{-2}$. Then: i) $V^{UN} > V^{IN}$ for all $\underline{k}(v) < k < (1-v)^{-1}$, ii) $V^{IN} > V^{UN}$ for all $(1-v)^{-1} < k < \varphi(v)$, iii) $V^{UN} > V^{IN}$ for all $(1-v)^{-1} > \varphi(v)$; where $\varphi(v) > (1-v)^{-1}$, $\varphi'(v) < 0$, and $\lim_{v\to 0}\varphi(v) = \infty$.*

Lastly, the result regarding donor's welfare can also be extended to a context where $v_B = vk$, with $\widehat{v} \geq 0$. The main difference is that for donors to be better off under no transparency, the value of v must not be too large.

Proposition 6 (bis) *For $v < \widehat{v}$, where $0 < \widehat{v} < 1$, there exist values $\widetilde{k}$ and $\widehat{k}$, where $\underline{k}(v) < \widetilde{k} < \widehat{k}$, such that: i) a generic donor j behind the veil of ignorance prefers a regime with full transparency to a regime with uninformed donors for all $k \in (\underline{k}(v), \widetilde{k})$, and for all $k > \widehat{k}$; and ii) a generic donor j behind the veil of ignorance prefers a regime with uninformed donors to a regime with full transparency for all $k \in (\widetilde{k}, \widehat{k})$.*

References

[1] Aldashev, G. & Verdier, T. (2010). Goodwill bazaar: NGO competition and giving to development. *Journal of Development Economics*, 91, 48-63.

[2] Aldashev, G., Jaimovich, E., & Verdier, T. (2018). Small is beautiful: Motivational allocation in the nonprofit sector. *Journal of the European Economic Association*, 16, 730-780.

[3] Alfaro, L., Conconi, P., Fadinger, H., & Newman, A. F. (2016). Do prices determine vertical integration? *Review of Economic Studies*, 83(3), 855-888.

[4] Auriol, E., & Brilon, S. (2014). Anti-social behavior in profit and nonprofit organizations. *Journal of Public Economics*, 117, 149-161.

[5] Besley, T. & Ghatak, M. (2005). Competition and incentives with motivated agents. *American Economic Review,* 95, 616-636.

[6] Besley, T., & Malcomson, J. M. (2018). Competition in public service provision: The role of not-for-profit providers. *Journal of Public Economics*, 162, 158-172.

[7] Bilodeau, M. & Steinberg, R. (2006). "Donative non-profit organizations." Chapter 19 in S.-C. Kolm and J. Mercier Ythier (eds.), *Handbook of the Economics of Giving, Altruism, and Reciprocity*, Amsterdam: North-Holland, 2006.

[8] Carlin, B. I., Davies, S. W., & Iannaccone, A. (2012). Competition, comparative performance, and market transparency. *American Economic Journal: Microeconomics*, 4(4), 202-37.

[9] Castaneda, M. A., Garen, J., & Thornton, J. (2008). Competition, contractibility, and the market for donors to non-profits. *Journal of Law, Economics, & Organization*, 24(1), 215-246.

[10] Chronicle of Philanthropy (2014). "Inspiring people to make a difference." Available at https://www.philanthropy.com/article/Inspiring-People-to-Make-a/152645.

[11] Dang, C. T., & Owens, T. (2020). Does transparency come at the cost of charitable services? Evidence from investigating British charities. *Journal of Economic Behavior & Organization*, 172, 314-343.

[12] Delfgaauw, J., & Dur, R. (2008). Incentives and workers' motivation in the public sector. *Economic Journal*, 118(525), 171-191.

[13] Delfgaauw, Josse, and Robert Dur (2010). "Managerial talent, motivation, and self-selection into public management." *Journal of Public Economics*, 94, 654–660.

[14] Easterly, W. (ed.) (2008). *Reinventing Foreign Aid*. Cambridge, MA: MIT Press.

[15] Exley, C. L. (2020). Using charity performance metrics as an excuse not to give. *Management Science*, 66(2), 553-563.

[16] Glaeser, E. & Shleifer, A. (2001). Not-for-profit entrepreneurs. *Journal of Public Economics*, 81, 99-115.

[17] Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy*, 94(4), 691-719.

[18] Hermalin, B. E., & Weisbach, M. S. (2012). Information disclosure and corporate governance. *Journal of Finance*, 67(1), 195-233.

[19] Heyes, A., & Martin, S. (2017). Social labeling by competing NGOs: A model with multiple issues and entry. *Management Science*, 63(6), 1800-1813.

[20] Iossa, E., & Saussier, S. (2018). Public-private partnerships in Europe for building and managing public infrastructures: An economic perspective. *Annals of Public and Cooperative Economics*, 89(1), 25-48.

[21] Krasteva, S., & Yildirim, H. (2016). Information, competition, and the quality of charities. *Journal of Public Economics*, 144, 64-77.

[22] Legros, P., & Newman, A. F. (2013). A price theory of vertical and lateral integration. *Quarterly Journal of Economics*, 128(2), 725-770.

[23] Legros, P., & Newman, A. F. (2014). Contracts, ownership, and industrial organization: Past and future. *Journal of Law, Economics, & Organization*, 30(S1): 82-117.

[24] Mansuri, G., & Rao, V. (2012). *Localizing development: Does participation work?* Washington, DC: The World Bank.

[25] Metzger, L., & Günther, I. (2019). Making an impact? The relevance of information on aid effectiveness for charitable giving. A laboratory experiment. *Journal of Development Economics*, 136, 18-33.

[26] Platteau, J.-Ph., & Gaspart, F. (2003). The risk of resource misappropriation in community-driven development. *World Development*, 31, 1687–1703.

[27] Rose-Ackerman, S. (1982). Charitable giving and "excessive" fundraising. *Quarterly Journal of Economics*, 97(2), 193-212.

[28] Salamon, L., and Newhouse, C. (2019). The 2019 Nonprofit Employment Report, *Non-profit Economic Data Bulletin* no. 47. Baltimore: Johns Hopkins Center for Civil Society Studies. Available at ccss.jhu.edu.

[29] Scharf, K. (2014). Impure prosocial motivation in charity provision: Warm-glow charities and implications for public funding. *Journal of Public Economics*, 114, 50-57.

[30] Schmidt, K. M. (1997). Managerial incentives and product market competition. *Review of Economic Studies*, 64(2), 191-213.

[31] Smillie, Ian (1995). *The Alms Bazaar: Altruism Under Fire - Non-Profit Organizations and International Development*. London, UK: IT Publications.