THE DARK SIDE OF TRANSPARENCY: MISSION VARIETY AND INDUSTRY EQUILIBRIUM IN DECENTRALISED PUBLIC GOOD PROVISION[*]

Gani Aldashev, Esteban Jaimovich and Thierry Verdier

We study the implications of transparency policies on decentralised public good provision by the non-profit sector. We present a model where imperfect monitoring of the use of funds interacts with the competitive structure of the non-profit sector under alternative informational regimes. Increasing transparency regarding the use of funds may have ambiguous effects on total public good provision and on donors' welfare. On the one hand, transparency encourages all non-profit firms to engage more actively in curbing fund diversion. On the other hand, it tilts the playing field against non-profits facing higher monitoring costs, pressing them to give up on their missions. This effect on the extensive margin implies that transparency policies lead to a reduction in the diversity of social missions addressed by the non-profit sector. We show that the negative impact of transparency on social mission variety and on donors' welfare is highest for intermediate levels of asymmetry in monitoring costs.

The non-profit has increasingly taken on a leading role as provider of collective goods, while exhibiting several specificities that shape its market structure. One is that the funding side and the beneficiary side are connected to each other only indirectly through non-profits. This lack of direct connection severs the flow of information about non-profits' performance back to the funding side, which contrasts sharply with the feedback provided by markets in the private-good sector. Another important feature is the relative complexity of non-profit organisations with various layers of internal hierarchies and specialisation in tasks (e.g., setting up the mission, fundraising and carrying out the projects), combined with a deep problem non-contractibility of final output. This results in a strong need to motivate and monitor the lower layers of those organisations working on the ground to deliver output to beneficiaries. Finally, the non-profit sector represents a rather heterogeneous set of decentralised organisations, which differ vastly in terms of their core missions and their final beneficiaries.[1]

The non-profit sector is thus characterised by a peculiar intermediated nature: donors provide one of the main inputs (funds), but have essentially no control on how their donations are ultimately put to use in the production of social goods. This problem may resemble, in principle, a standard principal-agent situation. There are, however, three crucial differences in the context with non-profits that merit a separate analysis relative to the standard for-profit sector. The first is that donors usually comprise a large number of dispersed small agents who cannot easily exert

[1] The Charity Navigator (www.charitynavigator.org) lists over 9,000 non-profit organisations that are active in the United States across 38 different subcategories. Examples of these subcategories are 'Wildlife Conservation', 'Environmental Protection and Conservation', 'Medical Research', 'Foodbanks and Food Distribution', 'Humanitarian Relief Supplies', etc.

control on non-profits' actions. The second is that the output typically produced by non-profits exhibits a large social good component, and hence relies strongly on the presence of altruistic motives by different agents. The third is to do with output observability: non-profit's final output is inherently difficult to measure.[2]

These informational failures have called for the need to establish specific schemes that help in preventing rent seeking and misappropriation by agents who may be attracted to the non-profit sector by the prospects of monetary rewards, rather than by a sense of altruism. In the United States, this had led to the creation of several well-known watchdogs, e.g., GuideStar USA, Charity Watch, Charity Navigator and GiveWell. These organisations provide online information about non-profits based in the United States, placing special emphasis on the structure of their spending, their cost-effectiveness and in providing metrics of accountability and transparency. Charity Intelligence Canada provides similar metrics for Canadian non-profits. In the UK, the Charity Commission maintains an online register that provides the financial information about all registered charities, and it also conducts inquiries and issues public reports when finding cases of misconduct in charities.

Voicing support for enhancing transparency within a sector so prone to moral hazard and highly reliant on trust seems perfectly reasonable. Yet, the general equilibrium implications of such a push for transparency in the context of a large and diverse sector like that formed by non-profits remain largely under-explored. In fact, most of the metrics used by watchdogs that evaluate non-profits performance tend to be overly standardised, and simply ignore two key issues: actual social output and diversity of missions.

Concerns about those shortcomings have been raised time and again by practitioners and academics. Some have called for a more critical approach to transparency and the effects it generates. The twice Pulitzer-winning journalist, Nicholas Kristof, has argued that online watchdogs have led to a massive increase in non-profits' efforts on accountability, deviating effort from actual impact (Bermudez, 2014). Large philanthropic organisations like the Gates Foundation have been criticised for overemphasising accountability over social benefits, and imposing a costly administrative burden that can prove overwhelming for smaller recipients based in developing countries, shifting as a result funding towards recipients based in developed countries; see Economist (2021). It has also been claimed that their approach has led to focus charitable giving mostly on social actions that can be more easily measured (such as vaccination campaigns), at the expense of those where measuring output proves harder (e.g., women's empowerment).[3]

Anecdotal evidence and several practitioners have thus raised caution about the effects of excessive emphasis on performance metrics on the overall operation of the non-profit sector. We lack, however, a tractable framework to study how informational asymmetries within non-profits interact with the competitive structure of the sector, especially under different informational-transparency regimes. Our paper aims at closing this key gap.

In our model, the contractual imperfections associated with the provision of public goods are at the heart of the story. Non-profits are managed by altruistic agents who exhibit an intrinsic motivation towards a social mission. Non-profits compete for funding from a large pool of impurely altruistic donors who choose a mission to give to. A crucial aspect in the model is

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[2] In a sense, if non-profits' output could be easily and accurately measured, one could think that for-profit firms could 'sell' units of social output contributions to altruistic private agents who would pay for it, as opposed to these agents donating part of their income in the form of gifts to non-profit organisations.

[3] Related concerns have been raised by Meer (2017), arguing that there is a tenuous connection between charity rating agencies with excessive standardised metrics and the actual effectiveness of charities.

that, whereas setting up the social mission and raising funds are tasks typically set at the top of the organisations, the actual on-the-ground action is relegated to lower levels of the hierarchy. The actors at that lower level are often simply seeking monetary rewards, as it is hard to find a mechanism that would select them purely based on their intrinsic altruism. As a consequence of this, the actual use of collected funds is subject to potential diversion by grassroots. Managers can curb such diversion, albeit at a cost, by closer monitoring of grassroots' actions. In the model, the cost of monitoring differs across non-profits. Heterogeneity in monitoring cost generates unequal benefits across non-profits. Importantly, those unequal benefits are magnified as transparency increases. The reason for this is that, when donors receive information about the extent of fund diversion across non-profits, this will impact their willingness to contribute to each of them, which in turn further influences non-profits' incentives to strengthen monitoring.

We show that there is an ambiguous effect of greater transparency regarding the use of funds on the total public good provision and the welfare of donors, and that the overall effect hinges crucially on the degree of heterogeneity of monitoring costs. More specifically, increasing transparency gives rise to two opposite forces on the internal allocation of resources and the resulting diversion of funds. The first is a *competitive effect*: greater transparency encourages all non-profit managers to devote more resources to monitoring and curbing rent seeking inside their organisations. This is because donors tend to reward 'cleaner' non-profits with a greater share of the donations pool. The second is a *strategic-interaction effect*: in the presence of heterogeneities in monitoring costs, greater transparency dampens the incentives to counter rent seeking in the case of social entrepreneurs facing higher monitoring costs. This effect arises because monitoring acts as a strategic substitute for competition for funds, and hence greater monitoring by one non-profit manager indirectly curbs the incentives of other managers to prevent rent seeking in their organisations. Transparency thus generates unequal effects across social missions: it rewards missions that can be more effectively monitored, at the expense of those facing higher monitoring costs.

From the donor's perspective, there are also two corresponding opposed effects. On the one hand, transparency implies that donors are better off because they expect lower misuse of funds by the non-profits active in the market. On the other hand, under more transparency, the strategic-interaction effect noted above leads to a lower diversity of non-profits in equilibrium. As a consequence, donors face a narrower set of charitable causes among which they can choose to give. We show that the second (negative) effect dominates the first (positive) effect when asymmetries in monitoring costs lie at an intermediate level.

The problem of non-contractibility of output in sectors producing public goods has been a crucial theme in the public economics literature. Glaeser and Shleifer ([2001]) have argued that it is the issue of output non-contractibility that creates scope for non-profit firms to arise, as these organisations provide a way to commit to restricting diversion of funds. Nevertheless, evidence suggests that fund diversion is still a problem that is largely present in non-profits, especially at lower layers of the organisation ranks and with local partners outside the rich world.[4] Mechanisms

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[4] A large number of studies document rent extraction and fund diversion, especially by local non-profit partners. For instance, Platteau and Gaspart ([2003]) argued that the risk of misappropriation of funds by local NGOs is a frequent problem, stating that the most common forms of misappropriation include 'falsifying of accounts, invoice over-reporting, under-performance by contractors using low-quality materials, etc.', p. 1689. Similarly, in their study of the Ugandan NGO sector, Barr *et al.* ([2003]) noted that 'the fluidity of the NGO sector and the focus on non-material services (e.g., 'talk' and 'advocacy') enable unscrupulous individuals to take advantage of the system [...]' and that '[Some] accounts speak of crooks and swindlers attracted to the sector by the prospect of securing grant money'. See also Mansuri and Rao ([2013]) on various cases of rent extraction by local NGOs and community-based groups, Tvedt ([1998]) and Bano

to cope with agency problems in such contexts have been studied by Besley and Ghatak (2005), showing the crucial role of matching mission preferences of principals and agents to improve efficiency. Besley and Malcomson (2018) analysed the effects of competition between non-profits in the presence of non-contractible quality. Output non-contractibility is also at the heart of our model, and we study how it maps into equilibrium provision of public goods under information disclosure.

A growing number of studies have analysed self-selection into the non-profit/public sector under various informational regimes or financing schemes—e.g., Delfgaauw and Dur (2008; 2010), Auriol and Brilon (2014), Scharf (2014), Krasteva and Yildirim (2016), Besley and Ghatak (2017), Aldashev *et al.* (2018) and Valasek (2018). This literature has been centred around motivational heterogeneity and how self-selection is affected by alternative institutional characteristics. We abstract from the motivational heterogeneity and self-selection, and instead focus on how asymmetries in agency costs across different types of social missions may generate strategic behaviour across non-profits in different informational environments.

Various articles have proposed industry-equilibrium models of the non-profit sector, and used them to study the effect of competition on fundraising expenditures and variety of non-profits from the social welfare perspective—see, e.g., Rose-Ackerman (1982), Castaneda *et al.* (2008), Aldashev and Verdier (2010) and Heyes and Martin (2017). These papers rely on symmetric models of competition, and thus do not address the distortions in provision of public goods caused by the asymmetry in monitoring costs across missions. Moreover, they do not take into account how the informational environment becomes a key determinant of the equilibrium industry structure and its degree of horizontal differentiation.

Our results also relate to the IO literature on information disclosure, and how transparency on some quality dimension may affect competition and consumer surplus.[5] This line of research has underscored a variety of contexts where information disclosure may actually have unintended perverse welfare effects. For instance, transparency may lead to excessive price or quality competition in monopolistically competitive industries (Dranove and Satterthwaite, 1992). It has also been shown that it may stimulate reporting better quality through welfare-reducing restrictions of access of patients, as in the case of hospital report cards (Dranove *et al.*, 2003). In the public sector, it may result in rationing and reduced efficiency owing to binding capacity constraints of high-quality suppliers (Gavazza and Lizzeri, 2007). Furthermore, when goods feature multiple characteristics, firms might under-provide certain characteristics when consumers become more informed about others, and this might decrease welfare (Bar-Isaac *et al.*, 2012). We expand on this literature by analysing the role of information disclosure in the context of the market for charitable giving driven by social altruism and fundraising competition. Our model highlights a new extensive margin effect related to the market structure of the non-profit sector: the negative impact of transparency on social mission variety, and how that impacts on donors' welfare.[6]

(2008) on evidence of Southern NGOs acting as 'empty shells' or Dang and Owens (2020) on evidence on misreporting by NGOs.

[5] See, e.g., Matthews and Postlewaite (Quality Testing and Disclosure 1985), Dranove and Satterthwaite (1992), Albano and Lizzeri (2001), Dranove *et al.* (2003), Gavazza and Lizzeri (2007), Bar-Isaac et al. (2010; 2012) and also Dranove and Jin (2010) for a survey of this literature. For more recent work using an information design approach and optimal rating, see Hopenhayn and Saeedi (2019), Zapechelnyuk (2020) and Vatter (2022).

[6] Three other papers related to our work are Schmidt (1997), Carlin *et al.* (2012) and Hermalin and Weisbach (2012). Schmidt (1997) studied the conditions under which increased product competition lowers managerial slack. Carlin *et al.* (2012) showed that comparative performance considerations tends to make the disclosure of firms' private information less likely via tougher competition environments. Hermalin and Weisbach (2012) analysed how the bargaining between firms' shareholders and managers is affected by greater corporate disclosure requirements. A key difference of our work

Lastly, our paper also contributes to the recent literature embedding the incomplete-contract approach to the theory of the firm into an industrial-organisation perspective (see, e.g., Legros and Newman, 2013; 2014 and Alfaro *et al.*, 2016). This research line has focused so far only on the private-good sector. Our paper extends this approach to the case of the competitive provision of public goods.

The rest of the paper is organised as follows. Section 1 introduces the environment and agents in the model. In Section 2, we present a model of strategic interaction between non-profits within a monopolistically competitive industry structure under two different informational regimes: (*i*) uninformed donors, (*ii*) full transparency. Section 3 allows for the entry decision by non-profits and solves for the equilibrium number of firms. Section 4 provides our analysis of the impact of transparency on welfare. Section 5 concludes.

1. Environment and Agents

The non-profit sector comprises N firms, indexed by $i = 1, 2, \ldots, N$. Each non-profit firm targets a specific social mission (e.g., women's empowerment, child malnutrition, animal rights, etc.). Henceforth, we think of N as a large number. This will allow us to carry out the analysis, assuming that each single firm will disregard the (negligible) impact that their individual choices have on the *aggregate* behaviour of the non-profit market.

1.1. *Technology and the Organisational Structure of Non-Profits*

Each non-profit is founded by a social entrepreneur. Social entrepreneurs are in charge of the general management of non-profits, but that they do not directly work on the actual execution of their organisations' missions on the ground. Instead, owing to specialisation advantages, each social entrepreneur needs to hire one grassroot worker ('local partner') to help her fulfil the non-profit's mission. Following the seminal article by Besley and Ghatak (2005), we assume that social entrepreneurs are mission oriented, driven by a sense of pure altruism towards some specific social cause. With regards to the grassroot workers, we instead assume that these are self-interested agents who only care about their private payoffs.

Non-profit firms collect donations from private donors who enjoy giving for a social cause. Social entrepreneurs next allocate these funds within their non-profits, given the running costs and the implicit provision costs. We denote by D_i the total amount of donations received by non-profit i. Grassroot workers receive a fixed up-front wage that we normalise to zero. Throughout the model, we assume that there is always a sufficient supply of grassroots willing to work in the non-profit sector.

Grassroots can divert (or misuse) a fraction $t_i \in [0, 1]$ of the total funds that the social manager channels to the fulfilment of the non-profit's mission. To counter this, social entrepreneurs can mitigate the diversion of funds by exerting a costly monitoring effort.[7] We denote by $m_i \in [0, 1]$ the intensity of monitoring by the social entrepreneur of the non-profit i, and assume that it has

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is the focus on the provision of public goods, where the disconnection between the funding side and the beneficiaries becomes crucial.

[7] In our model, monitoring effort is a cost that must be committed before donations are collected. In that sense, it could be thought of as a fixed cost (albeit of variable size) decided before hiring a grassroot and collecting donations, but paid out of the collected donations.

a simple linear technology:

$$t_i = 1 - m_i. \tag{1}$$

Expressed in monetary terms, the effort m_i over the grassroot worker translates into a constant marginal cost $v_i > 0$. Hence, the total cost of monitoring the grassroot worker equals $v_i m_i$, and must be paid 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.

Let $\mathcal{N}$ denote the set of non-profits operating in the market. We assume that each non-profit $i \in \mathcal{N}$ draws a cost parameter v_i from the following binary distribution.

ASSUMPTION 1. *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) $v_B = 1$,
(iii) $v_A = k > 1$.

Assumption 1 generates two different subsets of nonprofits: (*i*) those with high monitoring marginal cost ($v_A = k$), (*ii*) those with low monitoring marginal cost ($v_B = 1$). Since we assume that N is a large number, the size of each subset will be equal to $N/2$.

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 (1), net available donations $\widetilde{D}_i$ can be expressed as a function of m_i, namely,

$$\widetilde{D}_i(m_i) = (D_i - v_i m_i) m_i. \tag{2}$$

We assume that the total output generated by non-profit i, denoted by V_i, is an increasing and concave function of $\widetilde{D}_i$. Henceforth, we let $V_i(\widetilde{D}_i)$ be given by $V_i(\widetilde{D}_i) = \widetilde{D}_i^{1/2}$.[8] Thus, using the expression in (2), we can then write

$$V_i(m_i) = (D_i m_i - v_i m_i^2)^{1/2}. \tag{3}$$

Given that the social entrepreneurs are pure altruists, the payoff of the social entrepreneur running non-profit i is given by $V_i(\cdot)$ in (3).

1.2. *Donors*

There is a continuum of small donors with mass equal to Δ. Each donor has one unit of resource to allocate to donations. Thus, Δ equals the exogenously given size of the donation market.[9] In line with the public and experimental economics (e.g., Tonin and Vlassopoulos, 2010; Korenok *et al.*, 2013), we model small donors as impurely altruistic agents: they receive a warm-glow utility from the act of giving to a non-profit. Despite their impurely altruistic nature, we assume

[8] None of our main insights crucially depend on the production function exhibiting a square-root specification, and the model could be easily generalised to encompass $V_i(\widetilde{D}_i) = \widetilde{D}_i^{\alpha}$ with $\alpha \in (0, 1)$. The key reason for fixing $\alpha = \frac{1}{2}$ is that it allows us to obtain closed-form solutions for most of our relevant expressions.

[9] Online Appendix Section B.3 shows how results extend to a framework with endogenous donations.

that donors are not oblivious to the rent-seeking behaviour 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 the 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. Note that donors may be *imperfectly* informed about the level of rent seeking within the non-profits, which is reflected by the possibility that $\tau_{j,i} \neq t_i$.[10]

We also assume that donors are heterogeneous in terms of their warm-glow motives. Each donor j receives a 'taste shock' $\sigma_{j,i}$ for $i = 1, 2, \ldots, N$, which reflects how intensely j cares about i's mission. Henceforth, we assume that the taste shocks $\sigma_{j,i}$ are all independently drawn from a probability distribution with density function

$$f(\sigma_{j,i}) = \frac{\exp(-\sigma_{j,i}^{-1})}{\sigma_{j,i}^2} \quad \text{for } \sigma_{j,i} \geq 0. \tag{4}$$

Note that (4) is a specific case of the Fréchet distribution.[11]

We assume that preferences of donor j are given by

$$U(\{d_{j,i}\}_{i \in \{1,\ldots,N\}}) = \sum_{i=1}^{N} \sigma_{j,i} (1 - \tau_{j,i}) d_{j,i}, \tag{5}$$

where $d_{j,i}$ denotes the amount donated by donor j to non-profit i. The utility function (5) combines two crucial features: (*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 donor's heterogeneity in the intensity of the warm-glow for different social missions $(\sigma_{j,i})$.[12]

Given the perfect substitutability across social missions implied by (5), in the optimum, each donor will donate all of her unit resource to a single non-profit. That is, $d_{j,i}^* = 1$ for non-profit i and $d_{j,l}^* = 0$ for all $l \neq i$, where $\sigma_{j,i} (1 - \tau_{j,i}) \geq \sigma_{j,l} (1 - \tau_{j,l})$ for all l.

Consider thus a generic non-profit firm $i \in \mathcal{N}$. The probability that j donates to i is

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

Using (4), and the fact that $F(\sigma) = \exp(-\sigma^{-1})$, the above expression simplifies to

$$\Pr(j \text{ donates to } i) = \frac{1 - \tau_{j,i}}{(1 - \tau_{j,i}) + \sum_{l \in \mathcal{N}, l \neq i}(1 - \tau_{j,l})}. \tag{6}$$

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[10] There is vast support for the notion that donors tend to be quite poorly informed in terms of how donations are ultimately put to use by non-profits—see Bagwell *et al.* (2013) and Goldseker and Moody (2017), who provided support for this assumption on the basis of numerous interviews with donors. Relatedly, Metzger and Günther (2019) showed that donors' knowledge about the net impact of their donations is often quite limited. In a sense, this lack of knowledge is exactly what motivates the appearance of watchdogs such as Charity Navigator, GuideStar, GiveWell, whose mission is to inform unaware small donors.

[11] The use of a Fréchet distribution is purely for analytical tractability, as it yields closed-form solutions for any generic value of N. Similar results are obtained in the case when $N = 2$ based on other standard probability distributions, such as uniform, Pareto or exponential, albeit closed-form solutions cannot in general be obtained with those types of distributions for $N > 2$. In Online Appendix B.2 we allow for varying degrees of preference heterogeneity by working with a generalised Fréchet distribution.

[12] In Online Appendix B.1, we present an extension in which donors care both about fund diversion and the overhead cost ratio, defined as $v_i m_i / D_i$. This extension leads to even starker results than our benchmark model in terms of the asymmetric impact of transparency across non-profits, since both fund diversion and the overhead cost ratio tend to be greater for firms facing higher monitoring costs.

2. Optimal Monitoring Effort Analysis

In this section, we study donors' choices and monitoring effort by non-profits under two different informational regimes: (*i*) uninformed donors; (*ii*) fully informed donors. We carry out the analysis in this section for a given N. In the next section, we proceed to endogenise N by allowing entry into the non-profit sector.

2.1. *Equilibrium with Uninformed Donors*

We first study the case in which donors are unable to observe the level of rent seeking that takes place within each single organisation. We also assume that donors cannot observe whether the cost parameter of non-profit i is $v_i = v_A$ or $v_i = v_B$, and hence they are unable to form an expectation about m_i based on the specific value of v_i. Within such an informational context, in equilibrium, donors will rely on the average behaviour in the sector when taking their optimal decisions, and their expectations will thus be given by

$$\tau_{j,i} = \tau_j = \frac{\sum_{s=1}^{N} t_s}{N} \quad \text{for all firms } i = 1, 2, \ldots, N. \tag{7}$$

When (7) holds, the donation probability (6) boils down 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: $D_i = \Delta/N$. Social entrepreneur i then chooses m_i by solving

$$\max_{m_i \in [0,1]} : V_i(m_i) = \left[\left(\frac{\Delta}{N} - v_i m_i \right) m_i \right]^{1/2}, \quad \text{where} \quad v_i \in \{v_A, v_B\}. \tag{8}$$

This problem yields

$$m_i^* = \begin{cases} \dfrac{\Delta}{2v_i N} & \text{if } \Delta/2N < v_i, \\ 1 & \text{if } \Delta/2N \geq v_i. \end{cases} \tag{9}$$

The expression in (9) shows that monitoring intensity is (weakly) increasing in the level of aggregate donations, Δ. This is the result of social entrepreneurs intending to protect donations from being diverted away from the mission, while simultaneously trying not to sacrifice too much of the donations on costly monitoring. In addition, monitoring intensity is always (weakly) greater for firms with lower v_i. This is because the opportunity cost of a unit of monitoring intensity increases with v_i.

2.2. *Equilibrium with Fully Informed Donors*

We now study the case in which donors are fully informed about the level of monitoring effort in each non-profit present in the market. In this alternate informational context, in equilibrium, donor j will then set rent-seeking expectations for each of the non-profit firms in the market equal to the actual level of fund diversion. As a result,

$$\tau_{j,i} = t_i \quad \text{for all firms } i = 1, 2, \ldots, N. \tag{10}$$

Now using (6) together with (10), it follows that D_i is given by

$$D_i = \frac{m_i}{M}, \quad \text{where} \quad M \equiv m_i + \sum_{l \in \mathcal{N},\, l \neq i} m_l.$$

Consequently, a social entrepreneur i's optimisation problem is now

$$\max_{m_i \in [0,1]} : V_i(m_i, M) = \left[\left(\frac{m_i}{M} \Delta - v_i m_i \right) m_i \right]^{1/2}, \quad \text{where} \quad v_i \in \{v_A, v_B\}. \tag{11}$$

Recall that N is assumed to be a large number. Therefore, when solving (11), non-profit manager i takes M as given. This generates the following best-response functions:

$$m_i^{br}(M; \Delta, v_i) = \begin{cases} 0 & \text{if } \Delta/M < v_i, \\ [0,1] & \text{if } \Delta/M = v_i, \\ 1 & \text{if } \Delta/M > v_i. \end{cases} \tag{12}$$

The best-response functions elicited in (12) yield corner solutions for m_i. The level of monitoring effort in firm i 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 (M). Note that the level of M is itself endogenous, and will be determined by the Nash equilibrium of the best-response functions by all non-profit managers. Henceforth, we restrict the analysis to symmetric equilibria in pure strategies by types of firms.[13]

Figure 1 graphically depicts the equilibrium levels of monitoring effort as functions of the average level of donation per non-profit firm (Δ/N). We plot with solid lines the equilibrium monitoring efforts that prevail in the regime with fully informed donors. (The formal derivation of the results in Figure 1 for full information can be found in Online Appendix A.) For the sake of comparison, we use dashed lines for the equilibrium monitoring efforts under the regime with uninformed donors—these are given by the expressions in (9). To avoid cluttering, we split the figure into two panels: the panel on the left displays low-cost firms ($v_B = 1$), while the panel on right displays high-cost firms ($v_A = k$).

An interesting observation that emerges from Figure 1 is that, while the non-profits with monitoring cost $v_B = 1$ will always end up exerting higher monitoring effort in the regime with informed donors, this is no longer the case for those with $v_A = k$. In particular, we can observe that m_A^{IN} lies below m_A^{UN} for values of Δ/N below $\frac{2}{3}k$. Even more strikingly, when Δ/N is smaller than $\frac{1}{2}k$, monitoring effort by high-cost firms falls to zero, meaning that they cease to operate in equilibrium. The underlying reason for the asymmetric impact of transparency on monitoring effort is to do with the tension between two opposing strategic forces. On the one hand, transparency generates a *positive* competitive effect, which fosters monitoring effort so as to curb fund diversion, and thus attract more donors. On the other hand, fiercer competition for informed donors brings about a *negative* interaction effect across non-profits: stronger monitoring intensity by all other non-profits (materialised in a greater M) lowers, for a given non-profit, the marginal return from monitoring intensity in terms of its capacity to attract donations. Given the difference in monitoring cost across firms, those facing a higher cost become more sensitive to this negative interaction effect.

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[13] This restriction will be without loss of generality once we endogenise N in the next section. As it will become clear later on, once we allow for entry into the non-profit market, the model will always deliver equilibria where symmetric equilibria in pure strategies will be played by all types of firms.
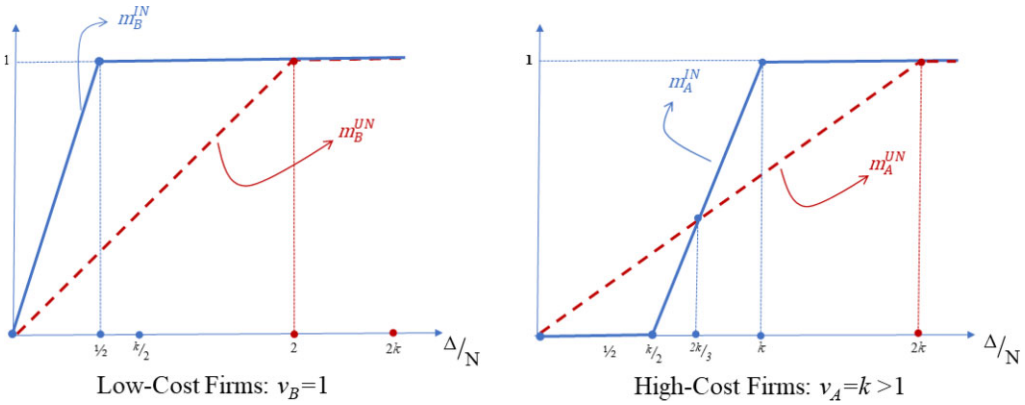
Fig. 1. *Equilibrium Monitoring Effort as a Function of Average Donation per Firm.*

The above result carries an important warning message: full transparency may fail to induce stronger efforts to curb rent seeking by *all* non-profits. In the presence of heterogeneity in monitoring costs, competition for donations may become so tough for the organisations with the higher monitoring cost that they may end up reducing their monitoring intensity (rather than increasing it). This strategic-substitution effect could in fact become so strong that such non-profits may end up abandoning their mission and exiting the market. This cleansing mechanism arguably has a positive aspect: it leads the entire non-profit market being catered to by firms less susceptible to funds misuse. Nevertheless, in a context of diverse social missions, it comes at the expense of leaving some social problems unserved.

3. Entry into the Non-Profit Market

We now let N be endogenously determined as a result of equilibrium entry decisions by the set of *potential* social entrepreneurs. Social entrepreneurs face an opportunity cost of running a non-profit firm equal to 1. We 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 1, and each manager learns its value only *after* setting up the non-profit firm.[14]

We henceforth 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 must hold:

$$(V_A + V_B)/2 = 1. \tag{13}$$

Here V_i denotes the payoff of social entrepreneur i with monitoring cost $v_i \in \{v_A, v_B\}$. The left-hand side of (13) yields the expected value for the social entrepreneur of setting up a non-profit,

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[14] Our main results would qualitatively remain valid if social entrepreneurs knew their v_i, and differ in terms of their outside option value. In a sense, what is crucial to our model is that non-profits are founded by social entrepreneurs deeply motivated by some specific cause, regardless of how relatively costly it is to carrying it out, and hence will not choose their firm's mission based on the value of v_i attached to it.

while the right-hand side is equal to the cost of doing so.[15] To keep the analysis consistent with Section 2, we consider that condition (13) always leads to a large value of N in equilibrium.

3.1. *Equilibrium with Uninformed Donors*

From (8) and (9), it follows that in a regime with uninformed donors the payoff obtained by social entrepreneur with $v_i \in \{v_A, v_B\}$ will be

$$V_i^* = \begin{cases} \dfrac{\Delta}{2\sqrt{v_i N}} & \text{if } v_i > \dfrac{\Delta}{2N}, \\ (\Delta/N - v_i)^{1/2} & \text{otherwise.} \end{cases} \tag{14}$$

Using (14) while bearing in mind (13), we obtain the following result.

PROPOSITION 1. *When donors are uninformed, there exists a unique equilibrium satisfying condition (13). The equilibrium is characterised by a number of active non-profits $N^*(k)$, where $\partial N^*/\partial k < 0$ for all $k > 1$. In addition, in equilibrium, all non-profit managers with cost $v_i = v_A$ exert a level of monitoring effort $m_A^*(k) < 1$ with $\partial m_A^*/\partial k < 0$ for all $k > 1$, whereas all non-profit managers with cost $v_i = v_B$ exert monitoring effort $m_B^* = 1$, regardless of the level of k.*

Proposition 1 describes how the equilibrium number of non-profit firms varies with k. A greater value of k entails a higher monitoring cost for the high-cost firms, which in turn lowers the *expected* return of setting up a non-profit, thus making entry into the non-profit market less attractive. Proposition 1 also shows that firms facing the higher monitoring cost ($v_i = k$) set $m_A^* < 1$. On the other hand, non-profits facing the lower monitoring cost ($v_i = 1$) always set monitoring effort $m_B^* = 1$. Consequently, the regime with uninformed donors will always exhibit a positive level of fund diversion in equilibrium, which will take place in those non-profits facing the higher level of marginal cost of monitoring.

3.2. *Equilibrium with Informed Donors*

Figure 1 shows that, whenever Δ/N is greater than $k/2$, some social entrepreneurs who chose to found a non-profit will end up exerting zero monitoring effort in equilibrium. That means that some non-profits will ex post remain *inactive* in equilibrium. We henceforth denote by $\widehat{n} \leq N$ the number of non-profits that remain active after learning their monitoring cost parameter $v_i \in \{v_A, v_B\}$ in the regime with informed donors. The next proposition describes how the variety of *active* non-profits depends on the parameter driving the asymmetry of monitoring cost (k).

PROPOSITION 2. *When donors are fully informed, there exists a unique equilibrium whose main features in terms of the type of non-profits that remain active depends on the degree of cost asymmetry across firms (k). We state this more precisely as follows.*

(1) When the cost asymmetry is high enough ($k > 5$), the $N/2$ social entrepreneurs who draw $v_i = v_B$ set $\widehat{m}_B = 1$, while the $N/2$ who draw $v_i = v_A$ set $\widehat{m}_A = 0$. The number of non-profits

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[15] The equilibrium expressions for V_A and V_B in (13) will depend on the prevailing informational regime.

active in equilibrium is

$$\widehat{n} = \frac{\Delta}{5}.$$ (15)

(2) *When the cost asymmetry is not too high ($k \leq 5$), all the social entrepreneurs in the non-profit sector set $\widehat{m}_i = 1$. The number of non-profits active in equilibrium is*

$$\widehat{n} = \frac{16}{(k-5)^2 + 16k}\Delta.$$ (16)

Proposition 2 portrays two main results. Firstly, it shows that the number of active non-profits $\widehat{n}$ is non-increasing in k, which echoes our previous result regarding $N^*(k)$ in Proposition 1. Secondly, it shows that, unless the degree of cost asymmetry across firms is sufficiently narrow, the regime with full transparency will feature some non-profits remaining inactive in equilibrium. In particular, when $k > 5$, only those social entrepreneurs who receive a draw $v_i = v_B$ will end up (actively) running a non-profit and receiving positive donations in equilibrium.[16] This equilibrium switch contrasts quite drastically with the case with uninformed donors, where *all* potential social entrepreneurs will always remain active in equilibrium. The discrepancy between the equilibrium outcomes illustrates again the tension between a competitive effect and a strategic-interaction effect present in our model. The former tends to foster monitoring effort by all non-profits, whereas the latter depresses monitoring effort by non-profits that find it harder to rein in the diversion of funds. When cost asymmetries are sufficiently wide, the strategic-interaction effect ends up nullifying the competitive effect for high-cost non-profits, driving them out of the market.[17]

4. Equilibrium Comparison between Regimes

We are now ready to contrast 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 greater non-profit diversity means that a larger variety of social issues end up being addressed by social entrepreneurs. We then 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 each of the two regimes.

4.1. *Number of Active Non-Profits*

We use the results in Propositions 1 and 2 to compare the total number of non-profits operating in the market under the two regimes. The result in the next proposition is illustrated in Figure 2

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[16] The threshold for k splitting the two equilibrium cases in Proposition 2 is tied to the value of the sunk cost to enter the non-profit sector. If a social entrepreneur would incur a sunk cost $\phi > 0$ then case (1) in Proposition 2(i) would hold for $k < 1 + (2\phi)^2$, whereas case (2) would prevail when $k \geq 1 + (2\phi)^2$. When the sunk cost is $\phi = 1$, our model leads then to a threshold equal to 5. None of our main results depends on fixing the sunk cost equal to one.

[17] The interplay between these two opposing forces will also have non-monotonic implications regarding the monitoring-cost-to-donation ratio, $v_i m_i / D_i$. Under full transparency, the competitive effect will push to an increase of that ratio by encouraging firms to raise m_i. On the other hand, the strategic-interaction effect will lead, in equilibrium, to (positive) selection of firms in the non-profit sector: those with lower v_i tend to stay in the market. The selection effects dominate when k is sufficiently large.
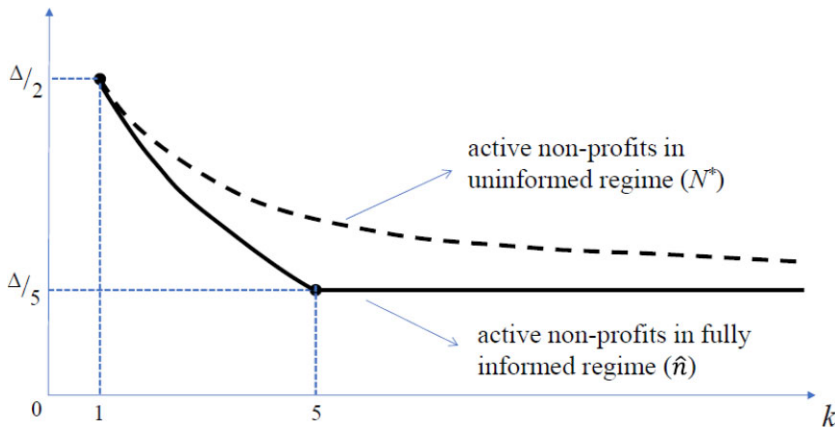
Fig. 2. *Equilibrium Number of Active Non-Profits.*

for different levels of k: the solid and dashed lines respectively indicate the numbers of active non-profits in informed and uninformed regimes.

PROPOSITION 3. *The number of active non-profits is always smaller under full transparency than in the regime with uninformed donors; that is, $\widehat{n} < N^*$.*

What are the reasons underlying $\widehat{n} < N^*$? When costs are sufficiently asymmetric (i.e., $k > 5$), this rests primarily on the fact that, under full transparency, the social entrepreneurs who receive a high-cost draw choose ex post to remain inactive. This changes when the asymmetry of costs, measured by k, falls below 5. In that range, all social entrepreneurs entering the non-profit market remain *active* after learning the value of v_i. There is, however, 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 fund 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.[18]

An interesting feature portrayed in Figure 2 is that the gap between the numbers of active firms in the uninformed regime (N^*) and the fully informed regime ($\widehat{n}$) is non-monotonic in the degree of cost asymmetry (k). The gap between N^* and $\widehat{n}$ grows with the cost asymmetry when $k < 5$, while it decreases with it when $k > 5$. Intuitively, as the cost asymmetry widens within the interval $k \in (1, 5)$, the rat-race distortion mentioned above becomes more severe to those social entrepreneurs with $v_i = k$, discouraging entry into the non-profit market. On the other hand, when $k > 5$, all high-cost non-profits remain inactive in the regime with full transparency, and thus the degree of cost asymmetry does not matter anymore for the number of entrants into the market. Conversely, in the regime with uninformed donors, all non-profits always remain active

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[18] A related rat race in the charitable market is present in Kratseva and Yildirim (2016). Different from our model, their rat race arises within a context with ex ante symmetric non-profits that play mixed strategies in terms of investment in productivity, and where only one firm ends up catering to the whole market of informed donors. In Kratseva and Yildirim (2016), as the size of informed donors rises, all non-profits always increase investment. In our model, the rat race in the non-profit market distorts the allocation of funds within non-profits between mission execution and monitoring. Furthermore, since non-profits are heterogeneous in their technologies, the rat race impacts non-profits unevenly, and not all them will necessarily end up raising their level of monitoring when information improves.
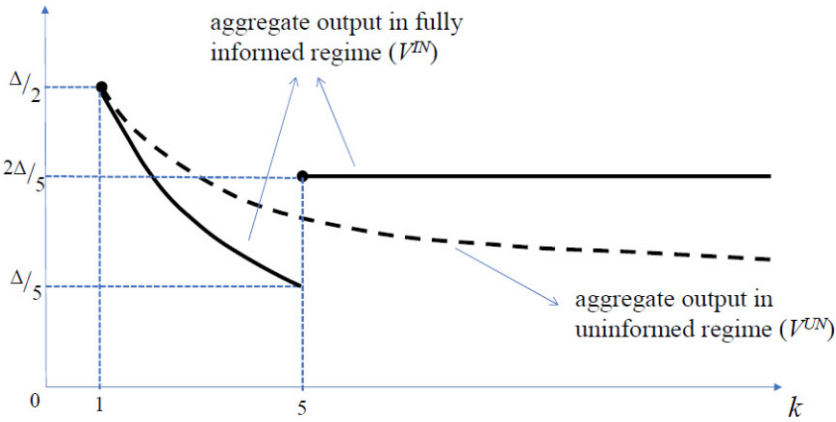
Fig. 3. *Aggregate Non-Profit Output.*

in equilibrium, and therefore the expected payoff of a social entrepreneur entering the market monotonically decreases with parameter k.

4.2. *Aggregate Output in the Non-Profit Sector*

We show now that the degree of cost asymmetry k is also key for determining which regime yields greater aggregate output, and that the output gap between the two regimes is non-monotonic in k.

PROPOSITION 4. *Let V^{UN} and V^{IN} denote the aggregate level of non-profit output in the equilibrium with uninformed and informed donors, respectively. Then the following statements hold.*

(i) *We have $V^{IN} < V^{UN}$ for all $k \in (1, 5)$. Furthermore, $\partial(V^{UN} - V^{IN})/\partial k > 0$ for all $k \in (1, 5)$.*
(ii) *We have $V^{IN} > V^{UN}$ for all $k \geq 5$. Furthermore, $\partial(V^{IN} - V^{UN})/\partial k > 0$ for all $k \geq 5$.*

Figure 3 displays the results of Proposition 4. The non-monotonicity of the difference between the aggregate level of social output in the uninformed regime (V^{UN}) and the fully informed regime (V^{IN}) may at first seem counter-intuitive. This is, however, the result of an implicit trade-off that arises, in the presence of heterogeneities in monitoring costs, between the rat-race distortion in monitoring spending induced by transparency and the fact that informed donors channel their donations to cleaner non-profits.[19]

For relatively low levels of cost asymmetry, $V^{UN} > V^{IN}$. In those cases, non-profits with $v_i = v_A = k$ will find it worthwhile to keep fund diversion at relatively low levels, even when donors remain uninformed about the level of diversion. As a result, the main effect of transparency will be felt on the rat race for donors, leading to a level of aggregate spending on monitoring that is unnecessarily high. The severity of the rat-race distortion worsens when k is greater,

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[19] Note that, when $k = 1$, aggregate output is equal for both informational regimes. This means that our results rest on the interplay between information available to donors and asymmetries in monitoring costs across non-profits.

which is why the gap between V^{UN} and V^{IN} widens with k while $k < 5$. The situation changes drastically once the degree of cost asymmetry becomes large enough ($k \geq 5$). In those cases, only the social entrepreneurs with $v_i = v_B = 1$ remain active in the non-profit market, and thus the rat-race distortion vanishes completely. The sudden switch to an equilibrium, where all the donations are managed by non-profits with $v_i = v_B = 1$, leads to the result $V^{IN} > V^{UN}$ when $k = 5$. 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 increases further.

Our analysis suggests that, when considering promoting institutions that increase transparency in the 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, 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, transparency also comes at a low cost of variety loss, while it substantially increases aggregate non-profit output by cleansing the sector of firms suffering from high levels of fund diversion. It is for *intermediate* levels of monitoring cost asymmetries that the trade-off between enhanced transparency and output/variety loss becomes hardest to resolve. In those situations, variety loss owing to transparency tends to be largest, while aggregate output behaviour becomes especially sensitive to whether high-cost non-profits stay and increase monitoring, or simply give up on their missions altogether.

4.3. *Donors' Welfare*

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

If a donor (situated behind the veil of ignorance) could freely choose the informational regime, he would be confronted with a trade-off. On the one hand, the regime with informed donors induces the set of *active* firms to exert stronger monitoring over grassroot workers. This, in turn, raises donors' utility by reducing the expected misuse of donations $\tau_{j,i}$ in (5). On the other hand, since the regime with informed donors leads to a smaller number of active non-profits, it will offer a narrower variety of social missions to choose from. As a consequence, informed donors will end up giving (in expectation) to non-profits with a smaller realisation 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 m_i (i.e., either no monitoring, $m_i = 0$ or monitoring at full intensity, $m_i = 1$). Thus, from donor j's viewpoint, the utility he expects to obtain from giving to his selected non-profit is given by

$$\mathrm{E}_{IN}(U_j) = \int_0^\infty \sigma_{j,IN}^{\max} d\widetilde{F}(\sigma_{j,IN}^{\max}) \, d\sigma_{j,IN}^{\max},$$
(17)

$$\text{where} \quad \sigma_{j,IN}^{\max} \equiv \max\{\sigma_{j,1}, \sigma_{j,2}, \ldots, \sigma_{j,\widehat{n}}\} \quad \text{and} \quad \widetilde{F}(\sigma_{j,IN}^{\max}) = e^{-\widehat{n}(\sigma_{j,IN}^{\max})^{-1}}.$$

In (17) $\widetilde{F}(\sigma_{j,IN}^{\max})$ is the CDF of the extreme value $\sigma_{j,IN}^{\max}$, and its shape follows from the Fréchet distribution (4). In a regime with informed donors, all *active* non-profits (which amount to $\widehat{n}$) will

set in equilibrium $m^* = 1$. As a result, a generic donor j will choose to give his unit donation to the non-profit carrying the highest taste shock ($\sigma_{j,IN}^{\max}$). Donors also know that no rent seeking will ever take place in equilibrium in this regime, so their expected utility in (17) attaches no discount on the donation.

Consider now the regime with uninformed donors. Since donors are *symmetrically* uninformed about the exact level of fund 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, social entrepreneurs with $v_i = v_A = k$ choose interior solutions for m_A^* (thus allowing for positive rent seeking in equilibrium). Then, the *expected* utility that a generic uninformed donor j obtains is

$$\mathrm{E}_{UN}(U_j) = \frac{1}{2} \int_0^\infty (m_A^* \sigma_{j,UN}^{\max} + m_B^* \sigma_{j,UN}^{\max}) \, d\widetilde{F}(\sigma_{j,UN}^{\max}),$$

$$(18)$$

where $\quad \sigma_{j,UN}^{\max} \equiv \max\{\sigma_{j,1}, \sigma_{j,2}, \ldots, \sigma_{j,N^*}\} \quad$ and $\quad \widetilde{F}(\sigma_{j,UN}^{\max}) = e^{-N^*(\sigma_{j,UN}^{\max})^{-1}}.$

In the case of (18), $\widetilde{F}(\sigma_{j,UN}^{\max})$ is the CDF of the extreme value $\sigma_{j,UN}^{\max}$, while m_A^* and m_B^* are defined in Proposition 1. Note that j knows that his donation will go to a non-profit with $v_i = v_A$ ($v_i = v_B$) with probability $\frac{1}{2}$, in which case the warm-glow utility received from the donation is $m_A^* \sigma_{j,UN}^{\max}$ ($m_B^* \sigma_{j,UN}^{\max}$).

LEMMA 1. *The expected utility of a donor j in the two regimes compares as*

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

$$(19)$$

where N^* and m_A^* are defined in Proposition 1, and $\widehat{n}$ is defined in Proposition 2.

Condition (19) showcases 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 $(1 + m_A^*)/2$—is lower than one, 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 condition (19) to the degree of asymmetry of monitoring costs (k).

PROPOSITION 5. *There exist thresholds $\widetilde{k} \in (1, 5)$ and $\widehat{k} > 5$ such that the following statements hold.*

(i) *Donors' welfare is higher in the regime with full transparency for $k \in (1, \widetilde{k})$ and $k > \widehat{k}$.*
(ii) *Donors' welfare is higher in the regime with uninformed donors for $k \in (\widetilde{k}, \widehat{k})$.*
(iii) *Donors are indifferent between the two regimes when $k = \widetilde{k}$ and $k = \widehat{k}$.*

Proposition 5 (which is portrayed visually in Figure 4) shows that donors would prefer to remain uninformed for intermediate levels of cost asymmetry ($\widetilde{k} < k < \widehat{k}$). The intuition for this result is clear if one recalls Figure 2. The loss of non-profit variety in the full-transparency regime is widest when $k = 5$. As a result, for intermediate levels of k (i.e., for values of k around 5), the loss of variety in the regime with informed donors does not compensate for the lower levels of rent seeking that it features. As the asymmetry of monitoring costs declines, the welfare loss resulting from the loss of non-profit variety shrinks faster than the decline in the ratio of
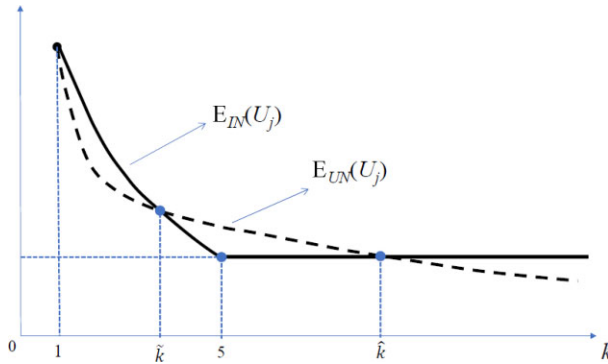
Fig. 4. *Donors' Welfare as a Function of Cost Asymmetry (k).*

monitoring efforts by *active* non-profits, implying that $E_{IN}(U_j) > E_{UN}(U_j)$ when $k < \tilde{k}$. On the other hand, for values of $k > \hat{k}$, the equilibrium level of monitoring effort m_A^* becomes too low to compensate for the larger variety of non-profits that donors can choose from in the uninformed regime.

Our results on donors' welfare rest on a general equilibrium consideration. A generic donor may prefer a regime where all donors remain uninformed about fund diversion, *not* because ignorance is intrinsically appealing. In fact, any rational donor who is offered the option to observe (or not) the level of fund diversion would always choose observability, if facing this choice *individually*. However, full transparency offers observability to *all* the donors at the same time. In such a situation, a generic donor may turn out to be better off when *no one* can observe the level of fund diversion, as 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.

4.4. *Social Planner: Constrained Optimal Donors' Welfare*

The previous subsection has shown that donors are not necessarily better off in a regime where full information becomes available to *all* of them. We now study whether a social planner who is able to observe firms' monitoring efforts may be able to raise donors' welfare above that achieved by the previous two regimes. We consider a setup in which the social planner can impose the levels of monitoring efforts $\{m_i\}_{i=1,...,N}$ on each non-profit i in the sector. We restrict, however, the planner's intervention capacity in two dimensions. First, although he may impose a specific m_i for each firm, those firm-specific effort levels remain unobservable to donors (i.e., the social planner has no technology to credibly communicate m_i to donors). Second, entry decisions will be determined by condition (13), given the effort levels that will optimally be imposed by the social planner. We can interpret this framework as one in which a social planner may influence a non-profit's monitoring effort, but cannot run the non-profit by himself, and hence must abide by the equilibrium entry condition.

In the optimum, the social planner will choose the same effort level for each firm facing identical monitoring costs. He may wish, however, to discriminate across firms with different monitoring costs. We denote henceforth by m_A^{sp} and m_B^{sp} the level of monitoring effort chosen for each type of non-profit. The social planner will solve

$$\max_{m_A^{sp},m_B^{sp} \in [0,1]} : N^{sp} \cdot (m_A^{sp} + m_B^{sp})/2, \tag{20}$$

$$\text{subject to} \quad \frac{V_A^{sp}(m_A^{sp}, N^{sp}) + V_B^{sp}(m_B^{sp}, N^{sp})}{2} = 1, \tag{21}$$

$$km_A^{sp} \le \Delta/N^{sp} \quad \text{and} \quad m_B^{sp} \le \Delta/N^{sp}. \tag{22}$$

The function to be optimised by the social planner in (20) stems from an underlying problem with analogous structure as that in the uninformed regime in (18), except for the number of active firms N^{sp} and monitoring effort levels m_A^{sp} and m_B^{sp}. This is because donors will still remain ignorant about whether a given non-profit has exerted monitoring effort m_A^{sp} or m_B^{sp}. Each donor will then optimally choose to give their gifts to the non-profit with the highest idiosyncratic preference shock, and assign a probability of 1/2 to monitoring effort levels m_A^{sp} and m_B^{sp}. Constraint (21) will pin down equilibrium entry decisions by social entrepreneurs, given the levels of effort that the social planner will impose to each type of firm.[20] Finally, the constraints in (22) are feasibility constraints: the social planner cannot impose on a firm a level of monitoring effort whose monetary cost is greater than the donations received by the firm.[21]

PROPOSITION 6. *The social planner problem yields* $m_B^{sp} = 1$ *for any* $k > 1$ *and*

$$m_A^{sp} = \begin{cases} 1 & \text{for any } k < \underline{k}, \\ \varphi(k) & \text{for any } k \ge \underline{k}, \end{cases}$$

where $\underline{k} \in (1, \widetilde{k})$ *and* $\varphi(k)$ *satisfies the following properties:*[22]

(i) $\varphi(\underline{k}) = 1$;
(ii) $\varphi'(k) < 0$;
(iii) $\lim_{k \to \infty} \varphi(k) = 0$;
(iv) $m_A^*(k) < \varphi(k) < 1$ *for all* $k > \underline{k}$, *where* $m_A^*(k)$ *is the equilibrium level of monitoring effort by high-cost firms in the informed regime as defined in Proposition 1.*

To interpret Proposition 6 note that the social planner is seeking to strike a balance between mission variety and (average) monitoring effort. The planner will do so by leveraging on the monitoring effort of high-cost firms. The trade-off faced by the planner rests on the fact that imposing a level of m_A above the level consistent with profit maximisation comes at a cost in terms of entry (and variety) in the non-profit market. As the degree of cost asymmetry (k) grows, the cost of raising m_A above the payoff-maximising level worsens in terms of its impact on entry. As a result, the optimal level of m_A dictated by the social planner will be non-increasing in k (and strictly decreasing in it for $k \ge \underline{k}$).

Contrasting the results in Proposition 6 vis-à-vis those in Proposition 2, it follows that the regime with fully informed donors turns out to deliver the social planner's (constrained) optimal solution when $k \le \underline{k}$. However, when k lies above $\underline{k}$, the social planner can actually raise donors'

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[20] Note that the equilibrium entry decision (21) keeps the assumption that social entrepreneurs do not know the exact monitoring cost function of their missions before choosing to set up their non-profits.

[21] The feasibility constraints in (22) do not need to be explicitly laid out when firms optimally choose their own m_i, as they will always be satisfied by firms' optimum plans.

[22] Recall that $\widetilde{k} \in (1, 5)$ is the threshold characterised in Proposition 5, such that equilibrium expected donors' welfare equalise under the two informational regimes (i.e., $E_{IN}(U_j) = E_{UN}(U_j)$).

welfare above the level that arises under the informed regime. The reason behind the potential inefficiency (from the donor's viewpoint) of the regime with full transparency lies in that high-cost firms swing amongst two extreme reactions in the equilibrium with transparency. When k is small (i.e., below 5), they set monitoring effort at maximum so as to compete for the pool of informed donors. Instead, when k is large (i.e., above 5), they completely give up on their missions as the cost to keep up with low-cost firms' efforts proves too high to them. The social planner is able to raise donors' welfare by 'smoothing out' those two extreme reactions. In particular, by choosing an interior level of m_A^{sp} when $k > \underline{k}$, the social planner can avoid the strong negative effects on mission variety caused by the extreme reactions that arise in the equilibrium with informed donors whenever $k > \underline{k}$.[23]

Lastly, Section 4.3 has shown that the uninformed regime is preferable by donors to the regime with full transparency for intermediate levels of cost asymmetry. Proposition 6, however, implies that the social planner's solution will always yield higher welfare to donors than the uninformed regime. The reason is that, in the uninformed regime, high-cost firms will under-provide monitoring effort because they do not internalise the positive impact that reducing diversion of funds has on donors' utility. Instead, relative to the equilibrium with uniformed donors, the social planner will optimally choose to sacrifice some degree of mission variety in order to raise the average level of monitoring effort in the sector.

5. Conclusion

We have analysed the implications of transparency policies in the non-profit sector in a context of imperfect monitoring and fund diversion. Increasing transparency regarding the use of funds has an ambiguous effect on the total public good provision and on donors' welfare. On the one hand, transparency encourages non-profits to devote more resources to curbing rent seeking inside the organisation. On the other hand, it makes it harder for non-profits facing higher costs of monitoring to withstand fiercer competition for donors, which may in turn drive them out of the market and leave some social missions unserved. From the donor's perspective, there are also two corresponding opposing effects: transparency is desirable because of the reduction in diversion for the non-profits active in the market, but it leads to a narrower set of charitable causes among which they can choose.

Starting with the observation that the cost of monitoring is differentially determined by the technological or natural characteristic of the context in which non-profits have to operate, our analysis suggests several policy implications concerning the regulation and funding of the non-profit sector. A first takeaway is that policies encouraging or imposing transparency in the use of funds in the non-profit sector have to be evaluated taking into account their full general equilibrium impacts. These policies will have, to a certain extent, the desired effect of generating more output among some non-profits. However, this positive effect may be significantly mitigated, as the unintended strategic-interaction effect starts to play out, and the output by non-profits in areas with a high cost of monitoring may also decline. The welfare effect of such a policy may be then lopsided, and the distortion gets strongest when the cost asymmetry is intermediate.

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[23] In a sense, from the donor's viewpoint, the rat race that arises under transparency generates two externalities with opposite effects. On the positive side, it induces active firms to over-spend in lowering the diversion of funds. On the negative side, such over-spending will hurt firms' payoffs, which in turn reduces entry and mission variety. When the asymmetry of costs across firms lies above $\underline{k}$, the extreme reactions in the regime with full transparency fail to strike the optimal balance between those two externalities.

These insights specifically fit into the broader debate about the new architecture of foreign aid that features more reliance on NGOs and community-driven development (e.g., Smillie, 1995; Platteau and Gaspart, 2003; Easterly, 2008; Mansuri and Rao, 2013). In spite of their very good motives, development transparency initiatives may end up hurting the provision of public goods in sectors/areas where exerting monitoring is more costly. This is crucial, for example, when 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). For the same reasons, transparency may end up deviating resources away from missions whose final beneficiaries are located in geographically remote rural areas of under-developed countries, favouring instead recipients based in the more accessible rich world. As a result, evaluations of transparency initiatives that do not consider resulting changes in the donation/NGO market structure are likely to over-estimate the welfare gains of this type of initiative.

Lastly, our results should not be read as stating that transparency initiatives should be avoided, but rather that these initiatives should be paired with increased public funding towards projects with a higher cost of monitoring. For instance, some public funds can be earmarked for such sectors as empowerment of minorities, long-run reconstruction projects (as compared to emergency relief) and development education. These supplementary policies can help to avoid the loss of project diversity that more intense competition under transparency might trigger.

Appendix: Omitted Proofs

PROOF OF PROPOSITION 1. Suppose that the equilibrium with uninformed donors satisfies $1 \leq \Delta/2N^* < k$. In that case, in equilibrium, we have $m_A^* < m_B^* = 1$. From this, using (13) and (14), it follows that N^* will stem from the condition

$$\frac{1}{2}\left[\left(\frac{\Delta}{N} - 1\right)^{1/2} + \frac{\Delta}{2\sqrt{k}N}\right] = 1. \tag{23}$$

Solving (23), we obtain the following expression for the equilibrium level of N:

$$N^*(k) = \frac{k + 2k^{1/2} + (k^2 + 4k^{3/2} - k)^{1/2}}{10k}\Delta. \tag{24}$$

Next, note that $\Delta/2N^* < k$ holds for any $k > 1$ when N^* is given by (24). In addition, it can be observed that $N^*(k)$ is strictly decreasing in k. As a consequence, it follows that the condition $\Delta/2N^* \leq 1$ will also always hold for any $k > 1$. Thus, for any $k > 1$, the equilibrium must always necessarily verify $m_A^* < m_B^* = 1$ as initially stated, where, using the appropriate expression in (9), we can show that m_A^* is given by

$$m_A^*(k) = \frac{5}{k + 2k^{1/2} + (k^2 + 4k^{3/2} - k)^{1/2}}, \tag{25}$$

from where it finally follows that $m_A^*(k) < 1$ and $\partial m_A^*/\partial k < 0$ for all $k > 1$. □

PROOF OF PROPOSITION 2. Firstly, recall that there cannot be an equilibrium where $\widehat{m}_A = 1$ and $\widehat{m}_B = 0$. Secondly, note that the equilibrium entry condition (13) entails that there cannot exist an equilibrium with endogenous entry in which firms with $v_i = v_B = 1$ play mixed strategies between $m_B = 0$ and $m_B = 1$. Hence, we can focus the rest of the proof on all the other possible combinations that may arise in equilibrium.

To prove the first part of the proposition, note that, when the Nash equilibrium entails $\widehat{m}_A = 0$ for all i with $v_i = k$ and $\widehat{m}_B = 1$ for all i with $v_i = 1$, the value of $\widehat{n}$ will stem from $\widehat{V}_B(\widehat{m}_B = 1) = 2$, with $\widehat{V}_B(\widehat{m}_B = 1) = (\Delta/\widehat{n} - 1)^{1/2}$, from which (15) immediately follows. For this to be a Nash equilibrium, it must be the case that $\widehat{V}_A(m_A = 1) < 0$ when $\widehat{n}$ is given by (15). Substituting (15) into $\widehat{V}_A(m_A = 1) = (\Delta/\widehat{n} - k)^{1/2}$, we can indeed observe that $\widehat{V}_A(m_A = 1) < 0$ when $k > 5$.

For the second part, note that, when the Nash equilibrium entails $\widehat{m}_i = 1$ for all i, the value of $\widehat{n}$ stems from replacing $\widehat{V}_A = (\Delta/\widehat{n} - k)^{1/2}$ and $\widehat{V}_B = (\Delta/\widehat{n} - 1)^{1/2}$ in (13), leading to

$$(\Delta/\widehat{n} - 1)^{1/2} + (\Delta/\widehat{n} - k)^{1/2} = 2,$$

from where (16) follows after some algebra. For this to be a Nash equilibrium, we must have $\widehat{V}_A(m_A = 1) \geq 0$ when $\widehat{n}$ is given by (16) and $1 < k \leq 5$, which is indeed the case.

Finally, note that there cannot exist an equilibrium with endogenous entry in which firms with $v_i = v_A = 1$ play mixed strategies between $m_A = 0$ and $m_A = 1$. This is because, according to (23), firms playing $m_A = 1$ in such a mixed-strategy equilibrium would be making a positive (ex post) profit while those playing $m_A = 0$ would be making zero (ex post) profit, contradicting the equality of the (ex post) profit for both actions required to play mixed strategies in equilibrium. $\square$

PROOF OF PROPOSITION 3. For $k > 5$, the proof follows by noting from (24) that $\lim_{k \to \infty} N^* = \Delta/5$, together with $\partial N^*/\partial k < 0$. For $k \in (1, 5]$, the proof follows from noting that, in that range, using (16) and (24), we have

$$\frac{N^*}{\widehat{n}} = \Psi(k) \equiv \frac{[k + 2k^{1/2} + (k^2 + 4k^{3/2} - k)^{1/2}][(k - 5)^2 + 16k]}{160k}, \tag{26}$$

where from (26) we can observe that $\Psi(k = 1) = 1$ and $\Psi'(k) > 0$ whenever $k > 1$. $\square$

PROOF OF PROPOSITION 4. Note first that the equilibrium entry condition (13) implies that $V^{UN} = N^*$ and $V^{IN} = \widehat{N}$. From this, the fact that $V^{UN} - V^{IN} > 0$ for all $k \in (1, 5)$, together with $\partial(V^{UN} - V^{IN})/\partial k > 0$ in that interval and $\lim_{k \to 1}(V^{UN} - V^{IN}) = 0$, follows directly from (16) and (24). To prove the second part of the proposition, note from (24) that $N^*(k = 5) < 2\Delta/5$, and recall that $\widehat{N} = 2\Delta/5$ for all $k > 5$. Given that $\partial N^*/\partial k < 0$, it then follows that $N^* < \widehat{N}$ for all $k > 5$, implying in turn that $V^{UN} < V^{IN}$ for all $k > 5$. Lastly, the fact that $\partial(V^{IN} - V^{UN})/\partial k > 0$ for all $k > 5$ follows directly from $\partial N^*/\partial k < 0$ and the fact that $\widehat{N} = 2\Delta/5$ for all $k > 5$. $\square$

PROOF OF LEMMA 1. Using the properties of the Fréchet distribution, we can obtain

$$\frac{\mathrm{E}_{IN}(U_j)}{\mathrm{E}_{UN}(U_j)} = \frac{\widehat{n}}{N^*(m_A^*/2 + m_B^*/2)},$$

where $\widehat{n}$ is given by (15) and (16), N^* by (24), m_A^* by (25) and $m_B^* = 1$, leading to (19). $\square$

PROOF OF PROPOSITION 5. Let first $k > 5$. Substituting (15), (24) and (25) into (19), it follows that $\mathrm{E}_{IN}(U_j) > \mathrm{E}_{UN}(U_j)$ if and only if the following condition holds:

$$\Upsilon(k) \equiv \frac{5}{4k} + \frac{k + 2k^{1/2} + (k^2 + 4k^{3/2} - k)^{1/2}}{4k} < 1. \tag{27}$$

Now note from $\Upsilon(k)$ in (27) that (i) $\Upsilon'(k) < 0$ for all $k \geq 5$, (ii) $\Upsilon(5) > 1$, (iii) $\lim_{k \to \infty} \Upsilon(k) = \frac{1}{2}$. Thus, by continuity, there must exist some finite threshold $\widehat{k} > 5$ such that $\Upsilon(\widehat{k}) = 1$, $\Upsilon(k) > 1$ for all $5 < k < \widehat{k}$ and $\Upsilon(k) < 1$ for all $k > \widehat{k}$.

Let now $1 < k < 5$. Substituting (16), (24) and (25) into (19), it follows that $E_{IN}(U_j) > E_{UN}(U_j)$ if and only if the following condition holds:

$$\widetilde{\Upsilon}(k) \equiv \frac{\Upsilon(k)}{5}\left[\left(\frac{k-5}{4}\right)^2 + k\right] < 1 \tag{28}$$

with $\Upsilon(k)$ defined in (27). Note now that $\widetilde{\Upsilon}(k)$ in (28) satisfies the following conditions: *(i)* $\widetilde{\Upsilon}(5) > 1$, *(ii)* $\widetilde{\Upsilon}(1) = 1$, *(iii)* there exists a $k_{\min} \in (1, 5)$ such that $\widetilde{\Upsilon}(k)$ reaches a global minimum within the interval $[1, 5]$. Thus, by continuity, there must exist some threshold $\widetilde{k} \in (k_{\min}, 5)$ such that $\widetilde{\Upsilon}(\widetilde{k}) = 11$, $\widetilde{\Upsilon}(k) > 1$ for all $\widetilde{k} < k < 5$ and $\widetilde{\Upsilon}(k) < 1$ for all $1 < k < \widetilde{k}$. □

PROOF OF PROPOSITION 6. Consider first the solution of (20), subject to (21) and (22), when $k = 1$. In that specific case, condition (21) yields $N^{sp} = \Delta m^{sp}/[(m^{sp})^2 + 1]$, which is non-decreasing in m^{sp} whenever $m^{sp} \in [0, 1]$. This, in turn, implies that the product $N^{sp} \cdot m^{sp}$ will be maximised when $m^{sp} = 1$, and hence the solution of the social planner's problem when $k = 1$ will be $m_A^{sp} = m_B^{sp} = 1$. Next, it should be straightforward to note that, when $k > 1$, it will never be optimal to set $m_A^{sp} > m_B^{sp}$. Note also that this in turn implies that $m_B^{sp} < 1$ cannot hold with $k > 1$. To prove this, suppose that $v_B = v_A = k > 1$. In that case, we would have $N^{sp} = \Delta m^{sp}/[(m^{sp})^2 k + 1]$, implying that the product $N^{sp} \cdot m^{sp}$ will be maximised when $m^{sp} = 1$. But, then, $m_B^{sp} < 1$ cannot be optimal if $v_B < k$.

Setting $m_B^{sp} = 1$, we can observe that (21) yields in this case, for $m_A \in [0, 1]$,

$$N^{sp}(k, m_A) = \frac{5 + 3m_A - km_A^2 + km_A^3 + 4(5m_A - m_A^2(1 + k) + km_A^3)^{1/2}}{k^2m_A^4 + 6km_A^2 + 25}, \tag{29}$$

provided $m_A \leq 5/k$, so as to satisfy the relevant (22) when (29) holds. The social planner will then aim at solving

$$\max_{m_A \in [0,1]} : N^{sp}(k, m_A) \cdot (1 + m_A)/2 \quad \text{such that} \quad km_A^{sp} \leq \frac{\Delta}{N^{sp}(k, m_A)} \tag{30}$$

with $N^{sp}(k, m_A)$ given by (29).

Given that $V_A(m_A) = [(\Delta/N)m_A - km_A^2]^{1/2}$ and $V_B(m_B = 1) = [(\Delta/N) - 1]^{1/2}$, it can be shown that $N^{sp}(k, m_A)$ will reach a maximum at some $m_A = \widetilde{m}_A(k)$, where $0 < \widetilde{m}_A(k) < 5/k$.[24] In addition, we can observe that $\widetilde{m}'_A(k) < 0$, since $\partial(\partial V_A/\partial m_A)/\partial k < 0$ whenever $\partial V_A/\partial m_A \geq 0$. As a result, it follows that the solution of (30) must have a unique maximum in $m_A^{sp} = \min\{\varphi(k), 1\}$, where $\varphi(k)$ is a continuous function of k and it verifies $\varphi(k) > \widetilde{m}_A(k)$.

As a next step, note that a necessary and sufficient condition for $m_A^{sp} = 1$ would be

$$2\frac{\partial N^{sp}(k, m_A)}{\partial m_A}\bigg|_{m_A=1} + N^{sp}(k, m_A = 1) \geq 0, \tag{31}$$

_____

[24] To see this, note that, since $N^{sp}(k, m_A)$ stems from (21), its derivative with respect to m_A will be given by

$$\frac{\partial N^{sp}(k, m_A)}{\partial m_A} = -\frac{\partial V_A/\partial m_A}{\partial V_A/\partial N + \partial V_B/\partial N},$$

from where it follows that $sg\{\partial N^{sp}(k, m_A)/\partial m_A\} = sg\{\partial V_A/\partial m_A\}$. Note also that *(i)* $\partial V_A/\partial m_A > 0$ for $m_A \to 0$, *(ii)* $V_{m_A,m_A}'' < 0$, *(iii)* $V_A = 0$ for $m_A = 0$ and $m_A = \Delta/Nk$. Furthermore, when $V_A = 0$, (21) entails $N^{sp} = \Delta/5$, which in turn implies that $V_A = 0$ when $m_A = 5/k$. All this together means that V_A must reach a maximum at some $m_A = \widetilde{m}_A \in (0, 5/k)$. Lastly, note that $\partial N^{sp}(k, m_A)/\partial m_A|_{m_A=\widetilde{m}_A} = -V_{m_A,m_A}''/[(\partial V_A/\partial N) + (\partial V_B/\partial N)] < 0$ means that $N^{sp}(k, m_A)$ must also reach a maximum at $m_A = \widetilde{m}_A$.

where the left-hand side of (31) stems from differentiating (30) with respect to m_A, and compute it at $m_A = 1$. To verify for which k (31) holds, it proves easier to differentiate $\ln N^{sp}(k, m_A) + \ln(1 + m_A)$ and evaluate it at $m_A = 1$, which yields

$$\Xi(k) \equiv \frac{1}{8}k + \frac{7}{8} - \frac{4k^2 + 12k}{k^2 + 6k + 25} \geq 0. \tag{32}$$

It can be verified that $\Xi(1) > 0$, $\Xi'(1) < 0$, and that there exists $\underline{k} > 1$ such that $\Xi(\underline{k}) = 0$ and $\Xi'(\underline{k}) < 0$. As a result, (32) will hold for all $k < \underline{k}$. Also, it must be that $\underline{k} \leq \widetilde{k}$, as otherwise it would contradict $E_{UN}(U_j) > E_{IN}(U_j)$ for $k \in [\widetilde{k}, \widehat{k}]$, and the social planner is replicating the informed-donors regime whenever $k < \underline{k}$. Next, by continuity, it follows that the solution of (20) must be such that $m_A^{sp} \to 1$ when k approached $\underline{k}$ from the right. In addition, since $\Xi'(\underline{k}) < 0$, it must thus be the case that $\partial m_A^{sp}/\partial k$ for $k = \underline{k} - \epsilon$, with $\epsilon > 0$ and sufficiently small. It can also be shown that, whenever $m^{sp} < 1$, we have $m^{sp} = \varphi(k)$ with $\varphi'(k) < 0$—see a formal proof of this in Lemma A.2 of Online Appendix A.

To complete the rest of the proof, note now that $\varphi(k) > m_A^*$, where m_A^* is given by (25), follows from the fact that $m_A = m_A^*$ maximises V_A given N; hence, at $m_A = m_A^*$ it must be that $\partial V_A/\partial m_A = 0$. On the other hand, the solution of (30) when the solution is interior yields a value of m_A for which $\partial V_A/\partial m_A < 0$, since $\partial V_A/\partial m_A \geq 0$ would contradict the FOC in the case of an interior solution. Lastly, $\lim_{k \to \infty} \varphi(k) = 0$ follows straightforwardly from the fact that, as $k \to \infty$, the function $V_A(m_A) = [(\Delta/N)m_A - km_A^2]^{1/2}$ will collapse to $V_A = 0$ with $m_A \to 0$. $\qquad\square$

ECARES, SBS-EM, Université libre de Bruxelles (ULB), Belgium
University of Surrey, UK
Paris School of Economics, Ecole des Ponts-ParisTech, PUC Rio & CEPR, France

Additional Supporting Information may be found in the online version of this article:

Online Appendix

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