



**Small is Beautiful:  
Motivational Allocation in the Non-Profit Sector**

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# Small is Beautiful: Motivational allocation in the non-profit sector\*

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## Abstract

We build an occupational-choice general-equilibrium model with for-profit firms, non-profit organizations and endogenous private warm-glow donations. Lack of monitoring on the use of funds implies that an increase of funds of the non-profit sector (because of a higher income in the for-profit sector, a stronger preference for giving, or an inflow of foreign aid) worsens the motivational composition and performance of the non-profit sector. We also analyze the conditions under which donors (through linking donations to the motivational composition of the non-profit sector), non-profits themselves (through peer monitoring), or the government (using a tax-financed public funding of non-profits) can eliminate the low-effectiveness equilibrium. We present supporting case-study evidence from humanitarian emergencies and developing-country NGOs.

*Keywords:* non-profit organizations, charitable giving, altruism, occupational choice, foreign aid.

*JEL codes:* L31, D64, J24, D5.

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# 1 Introduction

One major recent global economic phenomenon has been the rising importance of non-profit and non-governmental organizations as providers of public goods (Brainard and Chollet, 2008). The massive increase in the number of international NGOs, from less than 5,000 in mid-1970s to more than 28,000 in 2013, attests to this (Union of International Associations, 2014; Werker and Ahmed, 2008). In developing countries, NGOs play a key role in the provision of public health and education services. They have also become fundamental actors in the empowerment of socially disadvantaged groups, such as women and ethnic/religious minorities (Brinkerhoff et al., 2007). In addition, NGOs contribute actively to monitoring adherence by multinational firms to environmental and labor standards (Yaziji and Doh, 2009).

The expansion of non-profit organizations as economic actors has not been restricted to the developing world. In the OECD countries they also play a major role as public good providers, especially in sectors such as health services, arts, education, and poverty relief (Bilodeau and Steinberg, 2006). Quite remarkably, non-profits represent a sizeable sector in terms of OECD countries' employment share: on average, 7.5 per cent of their economically active population is employed in the non-profit sector. For some countries (Belgium, Netherlands, Canada, U.K., and Ireland) this share exceeds 10 per cent (Salamon, 2010).

One distinctive feature concerning the provision of public goods by NGOs is their financing structure. Although a part of these organizations' operational costs is covered by government grants and by users fees, voluntary private donations also account for a major share of their budgets. Bilodeau and Steinberg (2006) report that for the 32 countries for which comparable data is available, on average, over 30 per cent of non-profits' financing comes from voluntary private giving. Moreover, above three-quarters of this amount consists of small donations. Given the public-good nature of the services typically provided by non-profits, this fact is particularly intriguing, since small donors could hardly expect their contributions to entail any meaningful effect on total public good provision.

A simple explanation of this fact is that private contributions to non-profits are partially motivated by *impure* altruism. Indeed, research in public and experimental economics has recurrently shown that rationalizing empirical regularities about altruism requires the explicit acknowledgment of private psychological benefits accruing to the donor from the act of giving.<sup>1</sup> This is the so-called

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<sup>1</sup>See, e.g. Andreoni and Miller (2002), Ribar and Wilhelm (2002), Korenok et al. (2013), and Tonin and Vlasopoulos (2010).

"warm-glow" motivation, first modelled by Andreoni (1989).

Impure altruism by donors means, in turn, that the link between the motivation to give to non-profit organizations and the ultimate provision of public-goods by them may be very weak (if any).<sup>2</sup> In addition, the very nature of the goods and services provided by non-profit organizations renders impossible to write contracts that condition their financing on their output, further weakening the link between donations and public-good provision.<sup>3</sup> These two features, combined with the fact that individuals' intrinsic motivation is private information, turn the non-profit sector particularly vulnerable to the misallocation of funds (i.e. diversion of funds towards projects or expenses that may increase the monetary or ego-utility of project managers but do not necessarily raise the welfare of beneficiaries).<sup>4</sup>

In a context where the scope for funds diversion is quite extreme, the size and the structure of financing of the non-profit sector may become major factors determining who enters this sector. This will in turn affect the level of intrinsic motivation of its managers, and consequently, the performance of the non-profit sector. Analyzing this key issue requires a general-equilibrium framework. When the non-profit sector is of non-negligible size (which is indeed the case in both developing and developed countries), policies that influence the behavior of non-profit managers will impact the returns in both the non-profit and for-profit sectors. In such a setting, a partial-equilibrium model will miss out important sources of market interactions and may, therefore, lead to misguided policy recommendations (for instance, concerning the desirability of more extensive state financing to non-profits or channeling foreign aid via NGOs).

This paper proposes a tractable occupational-choice general-equilibrium model with for-profit

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<sup>2</sup>In this paper, we mostly focus on the joy-of-giving (or *warm-glow*) motive for giving. However, an additional reason why people might be willing to donate is *social-signalling*, as modelled by Benabou and Tirole (2006). Social-signalling would complement and reinforce the joy-of-giving motive that we focus on in our model. An additional reason that would reinforce the act of giving, without any link to pure altruism, is tax incentives to giving (although we abstract from tax incentives, these should entail similar consequences as warm-glow giving motives).

<sup>3</sup>See Chapter 12 of Hansmann (1996) and Bilodeau and Slivinski (1996) for detailed discussions on the issue of incomplete contracts in non-profit organizations.

<sup>4</sup>The worst form of such misallocation is diversion of funds for private consumption (wage or perks). The non-distribution constraint, which legally bars the distribution of NGO's profits sets an institutional limit on the scope for such diversion. However, given the difficulty to control how the costs of non-profits' activities are calculated, this might lead to in-kind diversion via inflated and hidden overheads (Smillie, 1995: 151-153). Frumkin and Keating (2001) analyze the non-profit executive pay patterns and conclude that "CEO compensation is significantly higher in non-profit organizations where free cash flow is present". Fisman and Hubbard (2005) find, for the U.S., that weakening the oversight of non-profits is linked to high correlation between managerial compensation and donation flows, and to a smaller share of donations put into the non-profits' endowments.

firms, non-profit organizations and endogenous private donations. The model rests on four key assumptions. First, private donors give to non-profits because of warm-glow motives (i.e., with a weak link to the expected public-good output generated with their own donations). Second, individuals self-select either into the for-profit or non-profit sectors, whose returns are endogenous to the model, both because of aggregate occupational choices and endogenous donations. Third, monitoring the behavior and knowing the intrinsic motivation of the non-profit managers is inherently difficult. Fourth (also resulting from the non-measurability of non-profits' output), private donations are shared among the existing non-profits firms in a manner that is not strictly related to their performance.

The main mechanism in our model relies on the notion that motivational self-selection into the non-profit sectors may be altered by the level of donations received by non-profit firms. Imperfect monitoring of managers in the non-profit sector, together with warm-glow motives by private donors, implies that the scope for misallocation of funds in this sector expands when private giving rises. Therefore, in a context of asymmetric information, warm-glow altruism and self-selection interact in non-monotonic ways, possibly leading to equilibrium with severe misallocation of funds. Our model generates several important results concerning motivational allocation.

First, selfish motives can crowd out altruistic motivation from the non-profit sector. When this occurs, the non-profit sector ends up being managed by selfish agents who exploit the lack of monitoring to divert funds for project dimensions that are misaligned with the interests of the beneficiaries. Moreover, since the scope for misallocation of funds rises with the level of donations received by each non-profit firm, this problem is exacerbated in richer economies and in economies where private donors give more generously. Our model features thus a case where "small is beautiful": motivational allocation in the non-profit sector tends to be better when the overall financing of each non-profit remains small.

Second, foreign aid intermediation through the non-profit sector in a developing country may entail perverse effects: it may cause the economy to switch from an equilibrium with a good allocation to one with a bad allocation of pro-social motivation. One further implication of this result is that total output of the non-profit is non-monotonic in the amount of foreign aid. At low levels of foreign aid, a small increase in aid leads to higher total NGO output, as the motivational composition of the non-profit sector is unaltered. However, a large injection of foreign aid may lead to a motivational re-composition of the non-profit sector, attracting self-interested agents into it, and thereby leading to a decline in total non-profit output. Such non-monotonic relation, in turn,

can help explaining the micro-macro paradox observed by empirical studies of aid effectiveness (i.e., the absence of a positive effect of aid on output at the aggregate level, combined with numerous positive findings at the micro level).

Third, we analyze a number of mechanisms that might prevent the emergence of the low-effectiveness equilibrium. From the donors' side, if warm-glow motivation responds positively to the expected productivity of the non-profit sector, the pure low-effectiveness equilibrium disappears. However, our model shows that, even in this case, when the amount of donations is sufficiently large, selfish agents still end up constituting an important share of the pool of non-profit managers, thus hurting the aggregate provision of public goods.

On the non-profits' side, peer monitoring mechanisms (where non-profit managers imperfectly observe each others' actions and report on this to donors) can lead to multiple equilibria. In one equilibrium, the non-profit sector is managed by motivated agents and the quality of peer monitoring is high. In the second equilibrium, the sector is instead managed by selfish individuals and no peer monitoring takes place. The reason for the multiplicity of equilibria is that the quality of monitoring is itself endogenous to the occupational choice of agents, and it improves with the average level of motivation in the non-profit sector.

Finally, we show that a properly designed public financing policy of the non-profit sector may improve the motivational composition of the non-profit sector. Taxation alters the occupational choices via two channels: it reduces the returns in the private sector and it increases the aggregate transfers to the non-profit sector. Within a partial equilibrium setup, both channels would make the non-profit sector relatively more attractive to *all* agents. However, in our framework, the implicit general equilibrium re-allocations imply that, if public financing is able to raise the aggregate funding of the non-profit sector, while at the same time it sufficiently increases the number of non-profit managers (so that the funding that each non-profit firm obtains in the new equilibrium turns out to be actually lower), this policy will lead to the entry of motivated agents and the exit of selfish ones from the non-profit sector.

In addition to our theoretical analysis, we provide some case-study evidence that illustrates the real-life relevance of the mechanisms highlighted the model. In particular, we discuss the malfunctioning of international humanitarian efforts following two natural disasters (the 2004 tsunami in East Asia and the 2010 earthquake in Haiti), as well as misallocation problems (and possible solutions) that exist in the NGO sector in Uganda, using a detailed micro-level survey of NGOs.

Besides the aforementioned papers by Andreoni (1989) and Benabou and Tirole (2006), our

paper relates to several other key papers that study theoretically the implications of pro-social motivation for non-profit organizations: Lakdawalla and Philipson (1998), Glaeser and Shleifer (2001), François (2003, 2007), Besley and Ghatak (2005), and Aldashev and Verdier (2010).<sup>5</sup> We contribute to this line of research by endogenizing the returns of the different occupational choices available to individuals, and by exploring the general equilibrium implications of the level of financing of the non-profit sector.

The second related strand of literature is the one focusing on the self-selection of individuals into the public sector and politics. The insights from the theoretical research in this area, that mostly exploits occupational-choice models (e.g., Caselli and Morelli, 2004; Macchiavello, 2008; Delfgaauw and Dur, 2010; Bond and Glode, 2014; Jaimovich and Rud, 2014), have been confirmed by recent empirical studies. For instance, Georgellis et al. (2011) find, using the U.K. data, that individuals are attracted to the public sector by the intrinsic rather than the extrinsic incentives, and that (in the higher education and health sectors) higher extrinsic rewards reduce the propensity of intrinsically-motivated agents to enter into the public sector. We extend this line of ongoing research by (i) analyzing how the selection mechanisms apply to the non-profit/NGO sector within a context of endogenous voluntary donations, and (ii) studying the effectiveness of three mechanisms that potentially can improve the motivational selection into the non-profit sector.

Finally, there is growing literature that studies the effects of different modes and levels of foreign aid financing on its effectiveness – see, for example, the survey in Bourguignon and Platteau (2014). Among these studies, Svensson (2000) underlines how short-term increases in aid flows may trigger rent-seeking wars among competing elites. Another interesting contribution can be found in Bourguignon and Platteau (2013), which concentrates on moral hazard problems (in particular, it studies the effect of domestic monitoring on the ultimate use of aid flows). Our model studies a separate and novel channel: that of motivational adverse selection into the sector that intermediates foreign aid flows between outside donors and beneficiaries.

The rest of the paper is organized as follows. Section 2 builds our baseline model of occupational choice in the for-profit and non-profit sectors; it also analyzes the effects of foreign aid and public financing on the motivational allocation in the non-profit sector. Section 3 analyzed the functioning of three different oversight mechanisms: conditional warm-glow of donors, peer monitoring

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<sup>5</sup>On the empirical side, Gregg et al. (2011) find that individuals in the non-profit sector in the U.K. are significantly more likely to do unpaid overtime work as compared to their counterparts in the for-profit sector. Moreover, this differential willingness remain even when the former individuals move into the for-profit sector, strongly supporting theories based on self-selection (rather than sector-specific incentive structure).

institutions by non-profits, and tax-financed government grants to non-profits. Section 4 discusses the main premises and modelling choices, as well as the generalizability of our results. Section 5 presents case-study evidence for the mechanisms of the model. Section 6 explores several avenues for future work, and concludes. The Appendix contains two extensions of the basic model (one with an alternative setup with endogenous fundraising effort, and the second when allowing donations by private entrepreneurs to be related to their degree of altruism), as well as some of the proofs of propositions.

## 2 Basic model

Consider an economy populated by a continuum of agents with unit mass. There exist two occupational choices: an agent may become either a *private* entrepreneur in the for-profit sector or a *social* entrepreneur by founding a firm in the non-profit sector. Let's denote the choice of agent  $i$  with  $o_i \in \{\textit{private}, \textit{social}\}$ . We refer to the two types of firms as private and non-profit firms, respectively. Let  $N$  denote the total mass of non-profit entrepreneurs; thus,  $1 - N$  is the mass of private entrepreneurs.

All agents are identically skilled. They differ, however, in their level of pro-social motivation,  $m_i$ , which indicates to which extent an individual is genuinely motivated to help others (the beneficiaries of her projects). There exist two levels of  $m_i$ , which we refer to henceforth as *types*:  $m_H$  (motivated) and  $m_L$  (selfish) types, where  $m_H = 1$  and  $m_L = 0$ . A selfish type can also set up projects whose declared aim is helping the beneficiaries, but he cares only about the aspects of these projects that increase his own well-being (ego, perks, etc.). The type  $m_i$  is private information. In what follows, we assume that the population is equally split between  $m_H$ - and  $m_L$ -types.

The utility function of an agent has the following form:

$$W_i = \mathbb{I}(o_i) \left[ w_i^{1-m_i} g_i^{m_i} \frac{1}{m_i^{m_i} (1-m_i)^{1-m_i}} \right] + (1 - \mathbb{I}(o_i)) \left[ c^{1-\delta} d^\delta \frac{1}{\delta (1-\delta)^{1-\delta}} \right], \quad (1)$$

where  $\mathbb{I}(o_i)$  is the indicator function taking value 1 if  $o_i = \textit{social}$ .  $w_i$  and  $c$  denote her consumption in the non-profit and private sectors, respectively, whereas  $g_i$  and  $d$  stand for her warm-glow pro-social contribution in the non-profit and private sectors. Finally,  $\delta \in \{0, 1\}$  is a parameter measuring the relative importance of giving as compared to private consumption. The details of this structure are explained below.

## 2.1 For-profit sector

We assume that each private entrepreneur produces an identical amount of output. There are decreasing returns in the private sector, thus while the aggregate output is increasing in the mass of private entrepreneurs,  $1 - N$ , the output produced by each private entrepreneur is decreasing in  $1 - N$ . More precisely, we assume that each private entrepreneur produces

$$y = \frac{A}{(1 - N)^{1-\alpha}}, \quad \text{where } 0 < \alpha < 1 \text{ and } A > 0. \quad (2)$$

Aggregate output is thus given by  $Y = A(1 - N)^\alpha$ .<sup>6</sup>

Private-sector entrepreneurs derive utility from their own consumption ( $c$ ). In addition, they also enjoy warm-glow utility from donating to the non-profit sector ( $d$ ). The utility  $W_i$  of an entrepreneur in the private sector then reduces to:<sup>7</sup>

$$W_i = V_P(c, d) = c^{1-\delta} d^\delta \frac{1}{\delta (1 - \delta)^{1-\delta}}, \quad \text{where } 0 < \delta < 1. \quad (3)$$

Private-sector entrepreneurs maximize (3) subject to (2). This yields  $c^* = (1 - \delta)y$  and  $d^* = \delta y$ , which in turn implies that, at the optimum, their indirect utility function is equal to the income they generate as private entrepreneurs:

$$V_P^* = y. \quad (4)$$

From the optimization problem of private-sector entrepreneurs, it follows that the total amount of entrepreneurial donations to the non-profit sector is

$$D = \delta (1 - N)^\alpha A, \quad (5)$$

which increases with the productivity of the private sector ( $A$ ), the number of private firms ( $1 - N$ ), and the propensity to donate out of income ( $\delta$ ).<sup>8</sup>

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<sup>6</sup>Our assumption of decreasing marginal returns with respect to the *aggregate* mass of private entrepreneurs reflects the fact that, at a given point in time, there is a fixed factor (which we do not explicitly model) in the economy, which enters the production of goods in the private sector.

<sup>7</sup>In principle, it may seem more reasonable to assume that agents who exhibit a higher degree of pro-social motivation should also be more prone to donating for social causes, and therefore display a larger value of  $\delta$  in (3). We stick to the simplest possible formulation in this basic model, to introduce in the stark way the idea that donations are endogenous, but shutting down additional effects. In the Appendix (Section 6.2), we present an analysis where we relax our assumption that warm-glow donations by private entrepreneurs are independent of their level of pro-social motivation by letting  $\delta$  be type-specific ( $\delta_i$ ), with  $\delta_L = 0$  and  $0 < \delta_H \leq 1$ . This introduces the additional complexity of making donations dependent on the degree of motivational heterogeneity in the for-profit sector, giving rise to the possibility of multiple equilibria.

<sup>8</sup>Although we model entrepreneurs as individuals and their donations as the outcome of their optimal consumption

## 2.2 Non-profit sector

The non-profit sector is composed by a continuum of non-profit firms with total mass  $N$ . Each non-profit firm is run by a social entrepreneur. We think of each single non-profit firm as a mission-oriented organization (as, for instance, in Besley and Ghatak, 2005) with a narrow mission targeting one particular social problem (e.g., child malnutrition, air pollution, fighting malaria, saving whales, etc.).

Each non-profit manager  $i$  collects an amount of donations  $\sigma_i$  from the aggregate pool of donations  $D$ . The collected donations  $\sigma_i$  can be allocated into two distinct dimensions of the project. One dimension, which absorbs a level of expenses equal to  $w_i$ , does not serve the ultimate needs of the beneficiaries, but might increase the well-being of the non-profit manager. Such self-serving dimensions may include his wages, in-kind perks such as a car with a driver, but can also be his pet projects or actions that might increase his ego utility. The second dimension uses the undistributed donations  $\sigma_i - w_i$  as an input for the production of the service towards the organization's mission and increases the well-being of beneficiaries. We measure the effectiveness/output of each specific non-profit firm by  $g_i$ , which is a function of the undistributed donations ( $\sigma_i - w_i$ ). We assume that the output generated by each specific non-profit firm exhibits decreasing returns with respect to the funds invested into the project, namely:

$$g_i = (\sigma_i - w_i)^\gamma, \quad \text{where } 0 < \gamma < 1. \quad (6)$$

A non-profit manager derives utility from the two dimensions noted above. The weight placed on each of two components of utility is given by the non-profit manager's level of pro-social motivation  $m_i$ . The utility  $W_i$  of a non-profit manager with motivation  $m_i$  reduces to:

$$W_i = U_i(w_i, g_i) = w_i^{1-m_i} g_i^{m_i} \frac{1}{m_i^{m_i} (1 - m_i)^{1-m_i}}, \quad \text{where } m_i \in \{m_H, m_L\}. \quad (7)$$

In line with the evidence discussed in the Introduction, we assume that the monitoring by donors of the non-profit sector is weak; in other words, donors cannot control how non-profit managers split the donations between the two dimensions. For simplicity, we take the extreme assumption that non-profit managers enjoy full discretion in deciding this allocation (subject to the feasibility constraint  $w_i \leq \sigma_i$ ). In addition, we assume that the pool of total donations  $D$  is equally shared

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choice, donations to the non-profit sector could also be interpreted more generally: total private donations could also be encompassing corporate donations. In addition, some of these donations could also respond to tax incentives. While we abstract from this issue, incorporating tax incentives would reinforce the warm-glow motives for donations we exploit in this paper.

by all non-profit firms.<sup>9</sup> Therefore, donations collected by each non-profit firm are given by:

$$\sigma_i = \frac{D}{N} = \frac{\delta A (1 - N)^\alpha}{N}.$$

Notice that  $\sigma_i$  is decreasing in  $N$  through two distinct channels. Firstly, because the level of aggregate donations  $D$  shrinks when the mass of private entrepreneurs  $(1 - N)$  gets smaller. Secondly, because a rise in the mass of non-profit firms  $N$  means that a given total pool of donations  $D$  must be split among a larger mass of non-profit firms.

Given that  $m_H = 1$ , motivated non-profit managers place all the weight in their utility function on the dimension that helps the beneficiaries  $g$ , and set accordingly  $w_H^* = 0$ . As a result, choosing to become a non-profit manager gives to a *motivated* agent the indirect utility equal to

$$U_H^* = \left(\frac{D}{N}\right)^\gamma = \left[\delta A \frac{(1 - N)^\alpha}{N}\right]^\gamma. \quad (8)$$

Analogously, given that  $m_L = 0$ , selfish non-profit managers disregard contributing to their organizations' mission, and allocate all the donations to the self-serving (unproductive) dimension,  $w_L^* = \sigma_i$ . This implies that choosing to become a non-profit manager gives to a *selfish* agent the level of utility

$$U_L^* = \frac{D}{N} = \delta A \frac{(1 - N)^\alpha}{N}. \quad (9)$$

We can now state the following single-crossing result:

**Lemma 1** *Let  $\widehat{N}$  denote the level of  $N$  at which  $D(\widehat{N}) = \widehat{N}$ . Then,*

$$U_H^* \gtrless U_L^* \text{ if and only if } N \gtrless \widehat{N};$$

where: (i)  $\delta A / (1 + \delta A) < \widehat{N} < 1$ , (ii)  $\widehat{N}$  is strictly increasing in  $A$  and  $\delta$ , and strictly decreasing in  $\alpha$ , (iii)  $\lim_{A \rightarrow \infty} \widehat{N} = 1$ , (iv)  $\lim_{\alpha \rightarrow 0} \widehat{N} = \delta A$  and  $\lim_{\alpha \rightarrow 1} \widehat{N} = \delta A / (1 + \delta A)$ .

**Proof.**  $U_H^* \gtrless U_L^*$  iff  $N \gtrless \widehat{N}$  follows immediately from (8) and (9). The rest of the results follow from noting that  $\delta A (1 - \widehat{N})^\alpha / \widehat{N} = 1$ , and differentiating this expression. ■

Lemma 1 states that a motivated individual obtains higher utility from becoming a non-profit manager, as compared to a selfish individual making the same choice, only when donations per non-profit are small enough, i.e.  $D/N < 1$ . Both  $U_H^*$  and  $U_L^*$  are strictly increasing in donations per non-profit,  $D/N$ . However, when the level of donations received by each non-profit rises above a certain

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<sup>9</sup>The Appendix (Section 6.1) presents a model in which we relax this equal-sharing assumption by endogenizing the fundraising effort.

threshold (which here is equal to 1),  $U_L^*$  surpasses  $U_H^*$ . The reason for this result essentially rests on the concavity of  $g_i$  in (6), combined with the altruism displayed by motivated non-profit managers in (7). These two features translate into a payoff function of motivated non-profit managers,  $U_H^*$ , that is concave in  $D/N$ . Conversely, selfish non-profit managers exhibit a payoff function,  $U_L^*$ , which is linear in  $D/N$ . This is because these agents only care about their perks or pet projects, and hence they exploit the lack of monitoring in the NGO sector in order to always set  $w_i = D/N$ .<sup>10</sup>

### 2.3 Equilibrium occupational choice

Let  $N_H$  and  $N_L$  denote henceforth the mass of non-profit managers of  $m_H$ - and  $m_L$ -type, respectively (the total mass of non-profit managers is then  $N = N_H + N_L$ ). In equilibrium, the following two conditions must be simultaneously satisfied:

1. Given the values of  $N_H$  and  $N_L$ , each individual chooses the occupation that yields the higher level of utility, with some agents possibly indifferent between occupations.
2. The allocation  $(N_H, N_L)$  must be feasible:  $(N_H, N_L) \in [0, \frac{1}{2}] \times [0, \frac{1}{2}]$ .

In this basic specification of the model, for a given parametric configuration, the equilibrium occupational choice will always be unique (except for one knife-edge case described below in footnote 10). Nevertheless, the type of agents (in terms of their pro-social motivation) who self-select into the non-profit sector will depend on the specific parametric configuration of the model. In what follows, we describe the main features of the two broad kinds of equilibria that may take place: an equilibrium where  $0 = N_H < N_L = N$  (which we refer to as low-effectiveness or L-equilibrium), and an equilibrium where  $0 = N_L < N_H = N$  (which we dub as high-effectiveness of H-equilibrium).<sup>11</sup>

<sup>10</sup>The result in Lemma 1 does not crucially depend on the extreme assumption that  $m_H = 1$ , and easily extends to any situation in which  $0 = m_L < m_H = m \leq 1$ . In that case, the  $m_H$ -type sets  $w_i^* = \sigma_i (1 - m) / (1 - m + \gamma m)$ , which in turn implies that at the optimum

$$U_m^* = \frac{\gamma^{\gamma m}}{m^{m(1-\gamma)} (1 - m + \gamma m)^{1-m(1-\gamma)}} \left(\frac{D}{N}\right)^{1-m(1-\gamma)} = \Upsilon(m, \gamma) \left(\frac{D}{N}\right)^{1-m(1-\gamma)}.$$

Therefore, noting that, for any vector  $(m, \gamma) \in (0, 1] \times (0, 1)$ , the function  $\Upsilon(m, \gamma)$  satisfies  $1 \leq \Upsilon(\cdot) \leq 2$ , it follows that whenever  $D/N \geq [\Upsilon(\cdot)]^{1/m(1-\gamma)}$ , then  $U_L^* \geq U_m^*$ .

<sup>11</sup>These two cases exclude the set of parametric configurations for which  $\hat{N} = N_0$ , where  $N_0$  is defined below in (10). When  $\hat{N} = N_0$ , all individuals in the economy will be indifferent in equilibrium across the two occupations. Moreover, because of that, there is actually equilibrium multiplicity, and the set equilibria is given by  $\{N_H^* + N_L^* = N_0, 0 \leq N_H^* \leq \frac{1}{2}, 0 \leq N_L^* \leq \frac{1}{2}\}$ . Hereafter, for the sake of brevity, we skip this knife-edge case.

## L-equilibrium

In a ‘low-effectiveness equilibrium’ the non-profit sector is populated exclusively by selfish individuals, and arises when payoffs are such that:  $U_H^*(N) < V_P^*(N) \leq U_L^*(N)$ , where  $V_P^*(N)$  is given by (4),  $U_H^*(N)$  by (8),  $U_L^*(N)$  by (9), and  $N = N_L \leq 1/2$ .

Lemma 1 implies that for  $U_H^*(N) < U_L^*(N)$  to hold, the number of non-profit firms should be sufficiently small (i.e.,  $N < \widehat{N}$ ), so that the donations received by each non-profit firm turn out to be sufficiently large. In addition, the condition  $V_P^*(N) \leq U_L^*(N)$  leads to:

$$N \leq N_0 \equiv \frac{\delta}{1 + \delta}. \quad (10)$$

From (10) we may observe that  $N_0 < 1/2$ . As a result, in a low-effectiveness equilibrium it must necessarily be the case that  $N = N_L = N_0$ , so that the selfish agents turn out to be indifferent between the for-profit and non-profit sectors. Indifference by  $m_L$ -types leads a mass  $1/2 - N_0$  of them to become private entrepreneurs, allowing thus "markets" to clear. Notice, finally, that  $U_H^*(N_0) < V_P^*(N_0)$  needs to be satisfied, hence the crucial parametric condition leading to an L-equilibrium boils down to  $N_0 < \widehat{N}$ .

## H-equilibrium

This type of equilibrium takes place when all selfish individuals prefer to found private firms, whereas all motivated ones prefer (weakly) to be social entrepreneurs:  $U_L^*(N) < V_P^*(N) \leq U_H^*(N)$ , where  $N = N_H \leq 1/2$ .

Lemma 1 states that for  $U_H^*(N) > U_L^*(N)$  to hold, the non-profit sector should have a sufficiently large number of non-profit firms:  $N > \widehat{N}$ . The condition  $U_L^*(N) < V_P^*(N)$  requires that  $N > N_0$ . Unlike the previous case, in the high-effectiveness equilibrium one cannot rule out the possibility of full sectorial specialization of the two motivational types of agents (i.e., in principle, an H-equilibrium may well feature  $N_L = 0$  and  $N_H = 1/2$ ).

For future reference, we denote with  $N_1$  the value of  $N$  that makes  $m_H$ -types indifferent between occupations. From (2) and (8) we can observe that  $N_1$  is implicitly defined by:

$$\frac{(1 - N_1)^{\frac{1-\alpha(1-\gamma)}{\gamma}}}{N_1} \equiv \frac{A^{\frac{1-\gamma}{\gamma}}}{\delta}. \quad (11)$$

## Equilibrium characterization

The following proposition characterizes the different kinds of equilibria that may arise, given the specific parametric configuration of the model.

**Proposition 1** *Whenever  $A(1 + \delta)^{1-\alpha} \neq 1$  the equilibrium is unique. When  $A(1 + \delta)^{1-\alpha} > 1$  the economy is in an L-equilibrium, whereas when  $A(1 + \delta)^{1-\alpha} < 1$  the economy is in an H-equilibrium. More formally:*

1. *Low-Effectiveness Equilibrium: if  $A(1 + \delta)^{1-\alpha} > 1$ , in equilibrium, there is a mass  $N^* = N_L^* = N_0$  of non-profit firms all managed by  $m_L$ -types. The mass of private entrepreneurs is equal to  $1 - N_0$ ; among these a mass  $\frac{1}{2}$  are  $m_H$ -types and a mass  $\frac{1}{2} - N_0$  are  $m_L$ -types.*
2. *High-Effectiveness Equilibrium: if  $A(1 + \delta)^{1-\alpha} < 1$ , in equilibrium, there is a mass  $N^* = N_H^* = \min\{N_1, \frac{1}{2}\}$  of non-profit firms all managed by  $m_H$ -types. The mass of private entrepreneurs is equal to  $\max\{1 - N_1, \frac{1}{2}\}$ ; among these a mass  $\frac{1}{2}$  are  $m_L$ -types and a mass  $\max\{0, \frac{1}{2} - N_1\}$  are  $m_H$ -types.*

Proposition 1 characterizes the main types of equilibria that may arise in the model. These cases are depicted in Figure 1 (panels A, B, and C). This figure portrays the indirect utilities of motivated and selfish agents in the non-profit sector ( $U_H$  and  $U_L$ , respectively) and that of individuals in the private sector ( $y$ ), all of them as functions of the size of the non-profit sector,  $N$ .

**[Insert Figure 1 about here]**

An implication of Proposition 1 is that more productive economies (i.e., those with a relatively large  $A$ ) tend to exhibit a low-effectiveness equilibrium. This result rests on the fact that a larger  $A$  entails greater profits to private entrepreneurs. Hence, in equilibrium, a larger amount of donations to any non-profit firm ( $\sigma_i$ ) are needed in order to compensate for the higher opportunity cost of managing a non-profit firm (i.e., the fact of *not* becoming a private entrepreneur). In turn, when  $\sigma_i$  is larger, the scope for rent-seeking in the non-profit sector is greater, which attracts more intensely selfish agents than motivated ones.

A similar intuition applies to the effect of a higher warm-glow utility from giving; that is, a greater  $\delta$ .<sup>12</sup> This yields a larger amount of total donations,  $D$ , for a given mass of non-profits  $N$ , making the non-profit sector relatively more attractive to selfish agents than to motivated ones.

## 2.4 Effect of foreign aid on the equilibrium allocation

So far, all donations in our model were generated (endogenously) within the economy. However, in the context of developing economies, foreign aid represents also a major source of revenue for

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<sup>12</sup>A rise in  $\delta$  could be caused, for instance, by the effects of stronger social norms of giving, or by an increase in the social prestige associated with observable giving by private-sector managers.

non-profits organizations. In fact, an ever growing share of foreign aid is being channeled via NGOs. For instance, data from the U.S. shows that over 40% of U.S. overseas development funds flows through NGOs (Barro and McCleary, 2008). International aid agencies have been increasingly choosing NGOs over public-sector channels as well: e.g., whereas between 1973 and 1988, only 6% of World Bank projects went through NGOs, by 1994 this share exceeded 50% (Hudock, 1999).<sup>13</sup>

What would be the effect of a rise in foreign aid on the motivational composition and performance of the non-profit sector of the recipient economy? In this subsection, we analyze this question by slightly modifying the above model to allow for an injection  $\Delta > 0$  of foreign aid into the economy.

Foreign aid represents an *exogenous* increase in the total amount of donations available to the national non-profit sector. Donations collected by a non-profit firm now become:

$$\frac{D}{N} = \frac{\delta A(1-N)^\alpha + \Delta}{N}. \quad (12)$$

As done above in Lemma 1, we first pin down the threshold  $\hat{N}$  such that, for all  $N > \hat{N}$  the utility obtained by selfish non-profit managers dominates that obtained by motivated non-profit managers.

**Lemma 2** (i) *Whenever  $0 \leq \Delta \leq 1$ , there exists a threshold  $\hat{N} \leq 1$  such that  $U_H^*(N) \geq U_L^*(N)$  iff  $N \geq \hat{N}$ ; the threshold  $\hat{N}$  is strictly increasing in  $\Delta$ , and  $\lim_{\Delta \rightarrow 1} \hat{N} = 1$ . (ii) *Whenever  $\Delta > 1$ ,  $U_H^*(N) < U_L^*(N)$  for all  $0 < N \leq 1$ .**

**Proof.** The first part follows from noting that  $\hat{N}$  must solve the following equality:  $\Delta = \hat{N} - \delta A(1 - \hat{N})^\alpha \equiv \Phi(\hat{N})$ , where  $\Phi'(\hat{N}) > 0$ , hence  $\partial \hat{N} / \partial \Delta > 0$ . Also, given that  $\Phi'(\hat{N}) > 0$  and  $\Phi(1) = 1$ , it follows that, for any  $0 \leq \Delta \leq 1$ , the solution of  $\Phi(\hat{N}) = \Delta$  must necessarily satisfy  $\hat{N} \leq 1$ . The second part follows directly from observing that when  $\Delta > 1$ , the right-hand side of (12) is strictly greater than unity for all  $0 < N \leq 1$ . ■

The first result in Lemma 2 essentially says that the set of values of  $N$  for which the inequality  $U_H^*(N) < U_L^*(N)$  holds –which is given by the interval  $(0, \hat{N})$ – expands as the amount of foreign aid  $\Delta$  increases. The second result states that when foreign aid is sufficiently large,  $U_H^*(N) < U_L^*(N)$  becomes valid for any feasible value of  $N$ .

The injection of foreign aid thus enlarges the set of parameters under which the economy features an equilibrium with selfish non-profit managers (‘L-equilibrium’). The proposition below formalizes

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<sup>13</sup>Kanbur (2006) argues that the rise of NGOs during the 1980s was one of the key changes in the functioning of the foreign aid sector.

this perverse effect of foreign aid. For brevity, we restrict the analysis only to the more interesting case, in which  $A(1 + \delta)^{1-\alpha} < 1$ .

For future reference, it proves useful to denote by  $\underline{N}$  the level of  $N$  for which  $y(N)$  in (2) equals one; that is,

$$\underline{N} \equiv 1 - A^{\frac{1}{1-\alpha}}. \quad (13)$$

In addition, in order to disregard situations in which  $\underline{N} \geq 0$  fails to exist, we henceforth set the following upper-bound on  $A$ :

**Assumption 1**  $A \leq 1$ .

Note that if  $A > 1$ , then the condition  $A(1 + \delta)^{1-\alpha} < 1$  for an ‘H-equilibrium’ in Proposition 1 could never hold, and the model would always deliver – by construction – an ‘L-equilibrium’.<sup>14</sup>

**Proposition 2** *Consider an economy where  $2^{-(1-\alpha)} < A < (1 + \delta)^{-(1-\alpha)}$ . In these cases, the fraction of motivated non-profit managers will depend non-monotonically on the level of foreign aid. More precisely, by defining  $\Delta_0 \equiv 1 - A^{\frac{1}{1-\alpha}}(1 + \delta)$ , where notice that  $\Delta_0 > 0$ , then:*

1. *When  $0 \leq \Delta < \Delta_0$ , all non-profit firms are managed by  $m_H$ -types.*
2. *There exists a finite threshold  $\Delta_A > \Delta_0$  such that, when  $\Delta_0 < \Delta \leq \Delta_A$ , all non-profit firms are managed by  $m_L$ -types.*
3. *When  $\Delta > \Delta_A$ , non-profit firms are managed by a mix of types, with  $m_L$ -type majority. In particular, there is a mass  $N_L^* = \frac{1}{2}$  of selfish non-profit managers and a mass  $0 < N_H^* < \frac{1}{2}$  of motivated managers, where  $N_H^*$  is strictly increasing in  $\Delta$ .*

Proposition 2 describes the effects of changes in the amount of foreign aid  $\Delta$  on the equilibrium allocation of an economy which, in the absence of any foreign donations, would display a high-effectiveness equilibrium. The proposition focuses on the case where  $A(1 + \delta)^{1-\alpha} < 1$ , but  $2^{1-\alpha}A > 1$ , which illustrates the non-monotonic effect of foreign aid on motivational composition in the non-profit sector in the cleanest possible way. However, in the Appendix we show that analogous results

<sup>14</sup>Another way to avoid this problem would be to assume that the production function of private entrepreneurs is given by  $y(N)$ , with  $y'(N) > 0$ ,  $y''(N) < 0$ ,  $y(1) = \infty$  and  $y(0) = 0$ . Note that all these properties are satisfied by (2), except for  $y(0) = 0$ . Intuitively, what is needed to give room for an ‘H-equilibrium’ is that  $y(N) \leq 1$  for some  $N \geq 0$ . Assumption 1 ensures this is always the case.

also arise for the case when  $2^{1-\alpha}A < 1$  (see Proposition 2(bis) therein)<sup>15</sup>.

According to Proposition 2, when foreign aid is not too large ( $\Delta < \Delta_0$ ), the non-profit sector remains managed by motivated agents. However, when the level of donations surpasses the threshold  $\Delta_0$ , selfish agents start being attracted into the non-profit sector due to the greater scope for rent extraction. Interestingly, for any  $\Delta_0 < \Delta \leq \Delta_A$ , the economy experiences a complete reversal in the equilibrium occupational choice: all  $m_H$ -types choose the private sector, while the non-profit sector becomes entirely managed by  $m_L$ -types. Finally, when  $\Delta > \Delta_A$ , foreign aid becomes so large that the non-profit sector starts attracting back some of the  $m_H$ -types in order to equalize the returns of motivated agents in the for-profit and non-profit sectors. Notice, however, that when  $\Delta > \Delta_A$  the mass of non-profits run by selfish agents is still larger than the mass of non-profits managed by  $m_H$ -types.

**[Insert Figure 2 about here]**

Figure 2 depicts the above-mentioned results. The solid lines represent  $U_H^*(N)$  and  $U_L^*(N)$  when  $\Delta = 0$ , the dashed lines shows non-profit managers' payoffs when  $\Delta_0 < \Delta \leq \Delta_A$ , and the dotted lines plots those payoffs when  $\Delta > \Delta_A$ . A gradual injection of foreign aid from  $\Delta = 0$  to  $\Delta = \Delta_0$  initially has no effect on the motivational composition of the non-profit sector, given that selfish agents' utility in the private sector still remains higher than their utility in the non-profit sector. Beyond the amount of aid  $\Delta = \Delta_0$ , this utility differential becomes positive for the selfish types, while it turns negative for the motivated ones. At that point, the motivational composition of the non-profit sector is completely reversed. Further increases in foreign aid have no effect on the non-profit sector's output, up to the point  $\Delta = \Delta_A$ . There, all the unmotivated agents have moved into the non-profit sector and thus its size equals  $\frac{1}{2}$ . From then on, further injections of aid (beyond  $\Delta_A$ ) start to attract back some motivated agents into the non-profit sector, and the motivational composition of the sector therefore improves.

A key corollary that stems from Proposition 2 refers to the total output of the non-profit sector,  $G$ , at different values of  $\Delta$ . Bearing in mind that *only* motivated non-profit managers devote the donations collected to the dimension that produces the mission-oriented output  $g_i$  (and, thus, contributes to the well-being of beneficiaries), an implication of Proposition 2 is that  $G(\Delta)$

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<sup>15</sup>The only major qualitative difference is that when  $2^{1-\alpha}A < 1$  the 'L-equilibrium' where all non-profit firms are managed by  $m_L$ -types will no longer arise. Instead, when  $2^{1-\alpha}A < 1$ , while the economy still exhibits an 'H-equilibrium' for levels of  $\Delta$  that are sufficiently low, beyond a certain threshold of  $\Delta$  the economy switches directly to a mixed-type equilibrium. In that respect, the fraction of motivated non-profit managers will still depend non-monotonically on the level of foreign aid when  $2^{1-\alpha}A < 1$ .

is *non-monotonic* in  $\Delta$ . In particular, non-profit output grows initially with the amount of foreign aid, up to the level when  $\Delta = \Delta_0$  when it reaches  $G(\Delta_0) = \underline{N}$ , which is the enhancing effect of foreign donations when the non-profits are managed by motivated managers. However, for  $\Delta_0 < \Delta \leq \Delta_A$ , the motivation in the non-profit sector gets completely "polluted" by the presence of selfish managers, and  $G(\Delta)$  drops suddenly to zero. Finally, when foreign donations rise beyond  $\Delta_A$ , non-profit output begins to grow again (starting off from  $G = 0$ ), as some of the donations will end up in the hands of  $m_H$ -types. This non-monotonicity of the total output of the non-profit sector is depicted by Figure 3.

**[Insert Figure 3 about here]**

Note that our mechanism is quite different from the several arguments previously raised concerning the perverse effects of foreign aid on the functioning of the public sector.<sup>16</sup> In fact, our model shows that even when foreign aid is channeled through the NGO sector (hence, by-passing the public bureaucracy) perverse effects might still arise, since massive aid inflows may end up worsening the motivational composition of the NGO sector in the recipient country.

Our results may also help shedding light on the so-called micro-macro paradox found in the empirical foreign aid literature (Mosley, 1986). On the one hand, at the microeconomic level, there are numerous studies that find the positive effect of foreign-aid financed projects on measures of welfare of beneficiaries. On the other hand, at the aggregate level most studies actually fail to find a significant positive effect. Our model rationalizes this paradox as follows: when aid inflows are small (or, alternatively, when you hold the motivational composition of the NGO sector constant) the general equilibrium effect described in our model becomes negligible (or, alternatively, disappears altogether). Under such circumstances, empirically, one may find a positive effect of aid projects. However, when aid inflows are sufficiently large (e.g. when the well-functioning micro-level projects are scaled up), the general equilibrium effects kick in, and the motivational adverse selection effect may neutralize the positive effect found at the micro level.

### **3 Eliminating low-effectiveness equilibrium**

The analysis of the previous section raises a natural question: Can the low-effectiveness equilibrium be avoided? If so, through which channels? In this section, we explore three possible safeguard

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<sup>16</sup>For example, Svensson (2000) suggests that foreign aid channelled through the public sector may lead to higher bureaucratic corruption, break-up of accountability mechanisms of elected officials, and the ignition of ethnic-based rent-seeking behavior.

mechanisms that might prevent this equilibrium from emerging. The first focuses on the donors' behavior and relaxes the assumption of donors being completely unaware of the motivational problems in the non-profit sector. The second exploits the idea that managers in the non-profit sector might have an informational advantage about the quality of the sector's output and thus there may be scope for creating non-profit watchdog organizations. Finally, the third focuses on government policies, in particular on taxes and public financing of the non-profit sector.

### 3.1 Donors' preferences: Conditional warm glow

So far, we have assumed that entrepreneurs donate a fraction of their income simply because they enjoy the act of giving. Such disconnection between donations and their use may sound a bit too extreme. One may expect that motivated entrepreneurs will be unwilling to donate money when the non-profit sector is entirely run by selfish types.<sup>17</sup>

In this subsection, we relax the assumption of fully naive warm-glow giving by motivated entrepreneurs. In particular, we modify the basic model presented in Section 2 in two ways. First, we let the propensity to donate be type-specific ( $\delta_i$ ) and increasing in  $m_i$ . More precisely, assume that  $\delta_i = \delta_H \in (0, 1]$  when  $m_i = m_H$ , whereas  $\delta_i = \delta_L = 0$  when  $m_i = m_L$ . Second, we let warm-glow weight rise with the fraction of motivated non-profit managers, by postulating that  $m_H$ -type private entrepreneurs have the following utility function:

$$V_H(c, d) = \left[ \tilde{\delta}_H (1 - \tilde{\delta}_H)^{1 - \tilde{\delta}_H} \right]^{-1} c^{1 - \tilde{\delta}_H} d^{\tilde{\delta}_H}, \quad \text{where } \tilde{\delta}_H = f \delta_H \text{ and } f \equiv \frac{N_H}{N_H + N_L}. \quad (14)$$

The utility function (14) displays *conditional* warm glow altruism, in the sense that the intensity of the warm-glow weight ( $\tilde{\delta}_H$ ) is linked to the likelihood that the donation ends up in the hands of a motivated non-profit manager.

When pro-socially motivated private entrepreneurs are characterized by (14), the level of donations obtained by a non-profit firm will be given by:

$$\frac{D}{N} = \frac{\delta_H A \left( \frac{1}{2} - N_H \right) N_H}{(1 - N_H - N_L)^{1 - \alpha} (N_H + N_L)^2}. \quad (15)$$

**Proposition 3** *Let the warm-glow weight be given by  $\tilde{\delta}_i = f \delta_i$ , where  $\delta_H \in (0, 1]$ ,  $\delta_L = 0$  and  $f \equiv N_H / (N_H + N_L)$ . Then, defining  $\Lambda \equiv [(2 + \delta_H) / (2 + 2\delta_H)]^{1 - \alpha}$ :*

<sup>17</sup>In a recent study, Metzger and Günther (2015) test, in a laboratory experiment, whether private donors seek information, before giving, about the impact of their donations to international NGOs. Interestingly, they find that only a small fraction of donors makes a well-informed donation decision and that demand for information mostly concerns the recipient type (and not the impact of donation). They also find that the information about the impact of donations does not change average donation size.

1. If  $A \leq \Lambda$ , in equilibrium,  $N_H^* = \eta_H(A)$  and  $N_L^* = 0$ , where  $\partial\eta_H/\partial A < 0$ .
2. If  $\Lambda < A \leq 1$ , in equilibrium,  $0 < N_H^* < \frac{1}{2}$  and  $0 < N_L^* < \frac{1}{2}$ , with  $N_H^* + N_L^* = [1 - A^{1/(1-\alpha)}]$ .  
In particular,  $N_H^* = n_H(A)$  and  $N_L^* = n_L(A)$ , where:

$$\begin{aligned} n_H(A) &= \frac{1}{4} - \sqrt{\frac{1}{16} - \frac{[1 - A^{1/(1-\alpha)}]^2}{\delta_H}}, \\ n_L(A) &= [1 - A^{1/(1-\alpha)}] - n_H. \end{aligned}$$

Moreover, the fraction of motivated non-profit managers decreases with  $A$ :  $\partial f/\partial A < 0$ .

Proposition 3 states that when warm glow weights depend on the fraction of motivated agents within the pool of non-profit managers, the purely low-effectiveness equilibrium ceases to exist. The responsiveness of  $\tilde{\delta}_H$  to  $f$  in (14) counterbalances the effect that a larger mass of  $m_H$ -type entrepreneurs has on total donations, and thus neutralizes the source of interaction that leads to the rise of L-equilibrium. In other words, conditional warm glow altruism removes the possibility that the non-profit sector is managed fully by selfish agents, since in those cases motivated private entrepreneurs would refrain from donating any of their income. Nevertheless, conditional warm glow altruism does not preclude the fact that the non-profit sector may end up being *partly* managed by  $m_L$ -types. This occurs when  $A$  is sufficiently large, which is in line again with the results of the baseline model in Proposition 1. Furthermore, Proposition 3 shows that the fraction of selfish non-profit managers is monotonically increasing in  $A$ .

### 3.2 Non-profits: Peer monitoring by watchdog organizations

Our benchmark model assumed that non-profit managers are able to divert any amount of funds they receive away from the dimension that actually helps the ultimate beneficiaries. This crude assumption intends to reflect the idea that monitoring the behavior of non-profit managers (or knowing their intrinsic motivation) is an inherently difficult task for donors. In real life, cognizant of such pitfalls (and to ensure the credibility of the sector as a whole), non-profits that care about the collective reputation of the sector often try to create peer-monitoring institutions, so as to discourage misbehavior within the sector. Examples of such institutions are the CFB quality label in the Netherlands and the Fundraising Standards Board in Britain (see Similon 2015 for a detailed description). In this section, we explore the consequences of peer-monitoring in the non-profit sector on the equilibrium occupational choices of motivated and selfish agents.

To incorporate peer-monitoring, we amend the basic model of Section 2 in the following simple way. We assume that, after the decision by each non-profit manager of how to split donations

between the two dimensions (i.e. pro-beneficiary and perks), each non-profit gets randomly matched together with another non-profit. During this matching process, they may get to know each other's accounts. In particular, with probability  $0 < \rho < 1$ , a non-profit observes the budget structure of its matching partner. We assume that only the motivated non-profit managers care about the governance structure of their sector. Thus, if they realize that their matching partner has been diverting funds for perks or allocating the funds to projects useless for beneficiaries, they will make this information public. Publicizing this information leads to a penalty  $\chi > 0$  for the selfish agent ( $\chi$  can reflect a reputation cost, disutility related to public shaming, or the cost of legal punishment meted out to the selfish non-profit manager).

With these assumptions, the expected utility of a *selfish* non-profit manager becomes:

$$U_L^*(N, N_H) = \frac{D}{N} - \frac{N_H}{N} \rho \chi = \delta A \frac{(1-N)^\alpha}{N} - \frac{N_H}{N} \rho \chi. \quad (16)$$

The second term in (16) reflects the fact that, when a selfish non-profit manager is matched with a motivated one (with occurs with probability  $N_H/N$ ), he suffers a loss equal to  $\chi$  with probability  $\rho$ . Regarding motivated non-profit managers, given that the matching process does not affect them, their indirect utility in the non-profit sector remains as described by equation (8).<sup>18</sup>

This formulation intends to capture a number of relevant features of the monitoring aspect of the development non-profit sector. First, on the motivational side, motivated agents clearly have an intrinsic motivation to also care about the public-good nature of having a well-functioning non-profit sector. Relatedly, they may as well feel concerned about the general reputation of the sector.<sup>19</sup> Second, in terms of information acquisition, because of contacts and information-sharing between different NGOs on the terrain and operations (Meyer 1997), insiders are more likely to have access to information about the behavior of other members of the non-for-profit sector. In turn, this implies that the quality of monitoring is likely to depend on the degree of motivation of peers in the non-for-profit sector.

The fact that the expected utility of selfish non-profit managers in (16) is decreasing in the share of motivated managers opens up the possibility of multiple equilibria. Intuitively, a non-profit sector that is mainly run by intrinsically motivated agents enjoys also high levels of monitoring and sanctioning of misbehavior in the sector. This, in turn, discourages selfish agents from entering the

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<sup>18</sup>Motivated agents do not report anything in these matches while selfish agents do not care about reporting. We disregard the unplausible case where selfish agents would make false reports concerning motivated agents, which seems rather far-fetched.

<sup>19</sup>One could also rationalize these reputational concerns from a dynamic perspective as ensuring that the sector maintains its credibility vis-a-vis the donors.

non-profit sector as they expect a low probability of success in their intended diversion of funds. Conversely, when the non-profit sector is relatively poor in terms of motivation, selfish agents feel more attracted to it given the larger scope for successful rent extraction that poor monitoring allows. The next proposition fully characterizes the possible motivational equilibrium allocations in the non-profit sector under the possibility of peer monitoring.

**Proposition 4** *The equilibrium allocation of motivation in the non-profit sector with peer-monitoring non-profits depends on the parametric configuration in the following way:*

1. If  $A(1 + \delta)^{1-\alpha} > 1$ , there exists a threshold value  $\bar{\Phi} > 0$  of the expected cost of monitoring  $\rho\chi$  such that:
  - a) If  $\rho\chi < \bar{\Phi}$ , only the ‘L-equilibrium’ prevails (with  $N^* = N_0 = N_L^* < 1/2$ )
  - b) If  $\rho\chi > \bar{\Phi}$ , the model exhibits multiple equilibria with three possible equilibrium outcomes:
    - i) an ‘L-equilibrium’ (with  $N^* = N_0 = N_L^* < 1/2$ ), ii) an ‘H-equilibrium’ (with  $N^* = N_1 = N_H^* < 1/2$ ), iii) a ‘mixed-type equilibrium’ (with  $N^* = N_1 = N_H^* + N_L^* < 1/2$  and  $N_H^*$  and  $N_L^* > 0$ ).
2. If  $A(1 + \delta)^{1-\alpha} < 1$ , only the ‘H-equilibrium’ prevails (with  $N^* = N_H^* = \min\{N_1, \frac{1}{2}\}$ ).

It is interesting to compare the above results to those in Proposition 1. When  $\rho\chi > \bar{\Phi}$  (that is, when the expected punishment upon detection is high enough), peer monitoring by motivated agents in the non-profit sector allows the possibility of a high-effectiveness equilibrium when  $A(1 + \delta)^{1-\alpha} > 1$ . These are parameter configurations that led to an ‘L-equilibrium’ as a unique equilibrium in Proposition 1. However, peer monitoring by non-profit managers does not ensure that such improved motivational allocation will necessarily emerge when  $A(1 + \delta)^{1-\alpha} > 1$ . In fact, multiple equilibria are possible in that range. The reason for this is that the quality of monitoring is itself endogenous to the occupational choice of agents. This negative externality from motivated non-profit managers to selfish ones naturally creates a scope for expectation-driven multiple equilibria.

### 3.3 Policies: Taxes and public financing of non-profit sector

In most economies, an important part of non-profits’ revenues comes from public grants financed by taxes. This raises two main questions. First, what is the effect of partial public financing on the motivational composition and size of the non-profit sector? Second, can public financing generate an improvement in the composition of the non-profit sector, as compared to the decentralized

equilibrium? In this section, we address these questions by adding a set of public policy variables into our basic model.

We let the government impose a proportional tax on income in the for-profit sector and use its proceeds to distribute (unconditional) grants to non-profit firms. Thus, the payoffs of individuals in the private sector now becomes:

$$V_P^* = (1 - t)y, \quad (17)$$

where  $y$  is still given by (2). The level of donations collected by each non-profit in this case are equal to:

$$\sigma_i = \frac{D}{N} = \frac{\overbrace{\delta(1-t)(1-N)y}^{\text{private donations}} + \overbrace{t(1-N)y}^{\text{public grant}}}{N}. \quad (18)$$

Public financing via such a tax/grant system alters occupational choices of individuals via two distinct channels. First, we can see in (17) that taxation lowers returns in the private sector. Second, since the public sector distributes back all the taxes it collects while the private sector only gives a fraction  $\delta$  of its net income,  $\sigma_i$  in (18) increases with the tax rate  $t$ . Both channels, *ceteris paribus*, turn the non-profit sector more attractive to all individuals. However, within our general equilibrium framework, the key issue is whether public financing increases the attractiveness of the non-profit sector relatively more for motivated or for selfish individuals.

To study the more interesting case, let us focus on a setting where our basic economy (without public financing) would give rise to a low-effectiveness equilibrium:  $A(1 + \delta)^{1-\alpha} > 1$ .

**[Insert Figure 4 about here]**

Consider now an increase in taxes, with the transfer of all the proceeds to non-profits as grants. For such policy to induce a motivational improvement in the non-profit sector, it is crucial that, in the new equilibrium (after taxes), the selfish individuals who were initially managing the non-profit sector switch occupations and move to the private sector. This will occur only if the policy attracts enough motivated agents from the private sector into the non-profit sector, so that this entry sufficiently dilutes the amount of funds per non-profit organization, even after taking into account the larger total funding of the non-profit sector as a whole. The proposition below formally proves that such a tax/grant policy exists.

**Proposition 5** *For  $A(1 + \delta)^{1-\alpha} = 1 + \epsilon$ , where  $0 < \epsilon < \bar{\epsilon}$ , there exist a feasible range of tax rates  $[\underline{t}, \bar{t}]$ , where  $\underline{t} > 0$  and  $\bar{t} \equiv (1 - \delta)/(2 - \delta)$ , such that when  $t \in [\underline{t}, \bar{t}]$  an ‘H-equilibrium’ arises.*

Figure 4 plots the equilibrium regions for different combinations of values of  $A$  and  $t$  (see Appendix for the derivation of the equilibrium regions). There are four different regions. For combinations of relatively low values of  $A$  and  $t$ , the model features an ‘H-equilibrium’ where the non-profit sector is fully managed by motivated agents. On the other hand, given a certain level of  $t$ , for sufficiently high levels of  $A$  we have an ‘L-equilibrium’. Notice that when  $t = 0$ , the boundary between these two regions is given by  $A = 1/(1 + \delta)^{1-\alpha}$ , as previously stated in Proposition 1. In addition, with public financing, two new equilibrium regions arise: one with a mixed-type equilibrium with a fraction of motivated agents in the non-profit sector larger than one half ( $f > 0.5$ ), and one with a mixed-type equilibrium with  $f < 0.5$ . These two types of equilibria occur when the tax rate is sufficiently large, while the former also requires that  $A$  is sufficiently small and the latter that  $A$  takes intermediate values.

A crucial feature of Figure 4 is that the threshold level of  $A$  splitting the high-effectiveness and low-effectiveness equilibrium regions is increasing in  $t$  (up to the point in which  $t = \bar{t}$ ). As a consequence of this, there are situations in which introducing public funding of non-profits via (higher) taxes on private incomes can make the economy switch from an ‘L-equilibrium’ to an ‘H-equilibrium’. This is depicted in Figure 4 by the dashed line arrow.

This result rests on a subtle general equilibrium interaction. Consider an economy with no taxes that is on the low-effectiveness equilibrium region, located at point  $Z$ . At  $Z$ , all  $m_H$ -types prefer the private sector, while  $m_L$ -types are indifferent between both sectors.<sup>20</sup> Since a higher tax rate makes the non-profit sector more attractive, by sufficiently raising  $t$  we can make  $m_H$ -types prefer non-profit sector as well. However, when all motivated agents switch to the non-profit sector, the value of  $N$  will rise and the returns in this sector will accordingly decrease. When  $t$  lies within the interval  $[\underline{t}, \bar{t}]$ , the new equilibrium allocation induced by the higher  $t$  leads to an increase in total funding of the non-profit sector, while simultaneously reducing the value of per-organization funding ( $\sigma_i$ ) enough so that only motivated agents are ultimately attracted to the non-profit sector.<sup>21</sup>

A well-designed tax/grant public policy must then increase the variety (number) of non-profit firms enough so as to be able to lower the per-organization financing, despite the fact that aggregate funding grows. Notice that, when trying to achieve this goal, the policy-maker here is subject to the same asymmetric information as the donors regarding the type of each specific agent. However, the

<sup>20</sup>Hence, at  $Z$ , one part of the  $m_L$ -types choose the private sector and the other part choose non-profit firms.

<sup>21</sup>Notice that all this implies that, in the new equilibrium, the total mass of non-profit firms must necessarily be larger than in  $Z$ , since from (18) it follows that  $\sigma_i$  will grow with  $t$  for a given level of  $N$ . In other words, after  $t$  is raised to a level within  $[\underline{t}, \bar{t}]$ , a mass  $N_L^*$  of selfish non-profit managers will be replaced by a mass  $N_H^*$  of motivated non-profit managers, where  $N_H^* > N_L^*$ .

policy-maker is able to change the relative returns in the two sectors so as to induce the motivational "cleansing" of the non-profit sector by scaling-up funding through expanding the extensive margin (i.e., inducing a greater number of non-profit organizations), while simultaneously shrinking the intensive margin (i.e., reducing per-organization funding level). In other words, our setting is a further example where "small is beautiful": starting from a low-effectiveness equilibrium, the policy-maker should make sure that the funding received by each non-profit firms decreases. In our general equilibrium framework, this is achieved by inducing a massive entry of new non-profit managers.

In terms of actual implementation, our result implies that it may be advisable to give starting grants to new non-profits. For instance, consider the recent proposals to do "philanthropy through privatization" (Salamon, 2013), which consists in returning part of proceeds from the privatization of public sector assets to foundations and charities. Our analysis suggests that this policy would work correctly only if the way these proceeds are used is such that they are scattered through a multitude of small organizations, rather than concentrating them on a few large non-profits. In fact, while the latter risks worsening the motivational composition of the sector by attracting selfish agents, the former ensures that the returns in the non-profit sector remain low enough to attract only motivated managers.

## 4 Discussion

In this section, we proceed to discuss some of the key assumptions and modelling choices of our baseline framework. We also provide some discussion regarding the robustness of our results to relaxing these assumptions.

### 4.1 Decreasing returns in the non-profit sector

One key assumption is the decreasing returns in the non-profit sector ( $0 < \gamma < 1$ ).<sup>22</sup> This assumption underlies the single-crossing result (Lemma 1), which is, in turn, crucial for characterizing the different types of equilibria that may arise (Proposition 1). The nature of the functioning of the non-profit sector makes this assumption seem appropriate in the context of our model. Two distinct reasons motivate our choice of decreasing returns at the level of single non-profit organizations: *i*) the fact that motivated agents may become a scarce input unable to grow at the same speed as

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<sup>22</sup>This assumption was dispensed, though, in the model presented in the Appendix (Section 6.1), where we used a linear production function for each single non-profit firm.

donations ; *ii*) the fact that non-profits tend to face increasingly difficult tasks to accomplish as their effort within their mission boundaries deepens.

Non-profit organizations are entities crucially defined by their missions (that is, the specific social problems that these organizations aim to address). A fundamental scarce resource from the viewpoint of these organizations is then mission-oriented motivated labor, i.e. individuals who are aligned with the mission of a particular non-profit.<sup>23</sup> The practitioners of the sector, in fact, underline that finding such people and expanding the staff of the organization is often extremely difficult, mainly because of the existing variety of missions and organizations.<sup>24</sup> In this respect, a fundamental operational difference between non-profit and for-profit firms is that, while (individually) the latter can easily purchase the required inputs in the market at the given market price, the former tends to face an often binding constraint on the amount of 'mission-oriented motivation' it can acquire. Thus, as funding expands, if the non-profit motivated labor cannot grow at the same pace, some form of diminishing returns of those funds will eventually kick in. For instance, Robinson (1992, p. 38) notes about non-profits working in rural areas that "ambitious attempts to expand or replicate successful projects can founder on the paucity of appropriately trained personnel who are experienced in community development". Similarly, Hodson (1992) states that

"Upgrading the management capability [of a development non-profit] usually implies new talent. Unfortunately, the story-book scenario under which the original team continues to develop its management capability at a rate sufficient to cope with rapid growth rarely comes true..." (p. 132)

Concerning the second reason that motivates our assumption, the type of tasks that a non-profit organization typically carries out tends to change along its expansion path. The first activities tend to concentrate on some form of emergency: saving individuals from imminent physical danger or starvation, helping to avoid some irreversible health problem, etc. In this sense, the marginal returns are extremely high at the beginning. However, the next activities of the non-profit's project involve usually tasks which are less emergency-driven and more oriented towards making the livelihoods of beneficiaries sustainable (e.g. putting children to school, providing economic activities

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<sup>23</sup>Although our model has treated pro-socially motivated agents as identical (hence, without displaying heterogeneity in their type of pro-social motivation), the idea that each NGO manager operates a different non-profit firm implicitly reflects the underlying notion that motivated agents also differ in the social mission they most strongly align with.

<sup>24</sup>This has also been highlighted by the matching-to-mission model of Besley and Ghatak (2005).

so that beneficiaries can earn their living). Smillie (1995) argues that these types of tasks are much harder to accomplish successfully and involve a much longer period of time to realize. Such long-run perspective also implies that many organizations prefer to concentrate on the emergencies; however, the resulting competition among them for "saving lives" limits their expansion, as has been underlined by observers of large-scale humanitarian emergencies such as the 2004 tsunami (Mattei, 2005). In our case, this implies that, for a given non-profit organization, the slope of its production function is fairly steep at low levels of funding (when it first deals with emergency activities), while becomes flatter at higher levels of funding (as the non-profit moves its focus to sustainable development activities).

## 4.2 Informational asymmetries and lack of contractibility

Throughout the paper we have assumed that motives for giving are unrelated to the performance of non-profit firms.<sup>25</sup> This assumption would become untenable if motivated non-profit managers could find a way to signal their motivation to donors. One possibility for such signalling would result from allowing non-profit managers to "burn money". In such case, a separating equilibrium where motivated types engage in "burning" enough money (so as to discourage self-interested types from joining the non-profit sector) could arise. It is hard to envision, however, a practical way of carrying out these sort of actions. One possibility could be allowing for self-imposed restrictions on overheads. Yet, to be credible, such a scheme would require a third-party certification of such restrictions (for example, by the government). In any case, assuming away such credibility issue, the possibility of self-imposed restrictions should not fully destroy our main insights, although it will shrink the parametric space in which a low-effectiveness equilibrium arises.<sup>26</sup>

More generally, our model has implicitly assumed that non-profits' output is completely unobservable or unverifiable. This assumption underlies the severe non-contractability of managers' allocation decisions in the non-profit sector, which are only constrained by the level of donations received. The existence of such severe contractual problems means that motivation serves as a substitute for contracts in our model. However, it is exactly this non-contractibility problem that

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<sup>25</sup>Note, however, that Section 3.1 deals with the case where donations respond to the average motivation in the non-profit sector, but the level of donations received by each non-profit there is still assumed to be proportional to aggregate donations.

<sup>26</sup>Another form of signalling is possible if conditionally warm-glow donors differ in size, and large donors can obtain information (even if noisy) about the non-profit managers' types at some cost. The models by Vesterlund (2003) and Andreoni (2006), where obtaining a large leadership donation serves as a credible signal of quality, can serve as a microfoundation for this type of analysis.

attracts selfish individuals into non-profits when this sector is flooded with large amounts of donations. Clearly, some degree of output measurability would ease the problem of adverse selection. However, it is exactly those sectors where output is poorly measured where the role of non-profits is greater, as has been argued by Glaeser and Shleifer (2001). In fact, in sectors where output can be measured relatively well the production could be fully taken care of by for-profit firms.

### **4.3 Absence of non-pecuniary incentives**

In this paper, we have assumed away any form of non-pecuniary incentives, such as those that have been studied in the organizational economics literature (Besley and Ghatak, 2008; Bradler et al., 2015). This seems quite relevant in our context, since non-pecuniary incentives could well be heterogeneously valued by agents with different levels of intrinsic motivation.

If social prestige associated with working in the non-profit sector is valued relatively more by motivated types (for example, because altruistic agents care more about the social signalling built around contributing to the production of public goods) this would enlarge the range of parameters displaying an H-equilibrium. However, it could be that social prestige is valued more strongly by self-interested agents (if there are large indirect pecuniary benefits that social prestige can deliver), and the range of parameters with an H-equilibrium would thus shrink. Lastly, there could also be non-pecuniary externalities associated to the presence of monetary rewards, as those in Benabou and Tirole (2006); when this is the case, large scope for earnings in the non-profit sector may lead to the crowding out of pro-socially motivated non-profit managers who fear being (incorrectly) perceived as monetarily driven.

## **5 Case studies**

In this section, we present three detailed case studies that illustrate the applications of our model to large-scale recent real-life phenomena in international development efforts. The first focuses on international NGO humanitarian effort following the disaster caused by the December 2004 tsunami in the Indian Ocean. The second discusses the dynamics of post-reconstruction efforts by international NGOs following the January 2009 earthquake in Haiti. Finally, the third presents the analysis of the NGO sector in Uganda and its governance problems.

## 5.1 The 2004 tsunami

On December 26, 2004, a tsunami of unprecedented power, triggered by the Sumatra-Andaman undersea earthquake, hit the coastal areas of 14 countries in Asia and Africa (with Indonesia and Sri Lanka receiving the strongest impact). It was one of the deadliest natural disasters in recent history, killing close to 230 000 people and displacing over 1.75 million people. The scale of the disaster, coinciding with it happening right after Christmas and fed by a large-scale international media coverage, led to a massive humanitarian response, both through public and private channels. The amount of private donations to international NGOs was huge: for example, Save the Children USA received over 6 million USD in just four days, whereas Catholic Relief Services collected over 1 million USD in three days. In total, U.S.-based charities raised about 1.6 billion USD for tsunami relief (Wallace and Wilhelm 2005), whereas total international response (both public and private) amounted to 17 billion USD (Jayasuriya and McCawley 2010).

The evolution of the resulting humanitarian relief activity presents an interesting story. It started off with early successes: for instance, Inderfurth et al. (2005) write:

"The tsunami will be remembered as a model for effective global disaster response... Because of the speed and generosity of the response, its effectiveness compared to previous (and even subsequent) disasters, and its sustained focus on reconstruction and prevention, we give the overall aid effort a grade of 'A'... "

However, quite soon, numerous problems in relief activities started to emerge. These included inefficiencies in the distribution of funds, unsatisfactory plans for the rebuilding of houses, cost escalations, and coordination failures (Jayasuriya and McCawley 2010: 4). This is summarized by the Joint Evaluation Report of the Tsunami Evaluation Coalition:

" Exceptional international funding provided the opportunity for an exceptional international response. However, the pressure to spend money quickly and visibly worked against making the best use of local and national capacities... Many efforts and capacities of locals and nationals were marginalised by an overwhelming flood of well-funded international agencies (as well as hundreds of private individuals and organisations), which controlled immense resources" (Telford et al. 2006: 18-19).

The observers underline several mechanisms behind this failure, one of which is the rush of too many NGOs to carry out highly visible activities in disaster-prone areas:

"One of the striking features of the relief effort was the presence of a horde of small, often newly formed, foreign organizations with little if any experience in disaster relief but motivated by a strong humanitarian impulse that 'something had to be done'. Throughout the tsunami affected areas small groups and individuals from a wide range of countries were active in all sorts of activities. For instance, a Slovakian organization was engaged in boatbuilding, while an Austrian NGO assisted in constructing houses. Neither had any previous experience of South Asia or disaster relief. Similarly individuals from Europe, North America and Asia whose only prior knowledge of Sri Lanka came from news bulletins arrived in the country and proceeded to do whatever they thought useful" (Stirrat 2006: 14)

Our model helps to explain this dynamics. A sudden natural disaster creates a sharp increase in the willingness to give of individual donors (an increase in  $\delta$ ) and/or a large increase in foreign aid (a big increase in  $\Delta$ ). This attracts a mass of agents in the for-profit sector to enter the non-profit sector (here, founding new NGOs). However, given that many of these agents were mostly driven by ego-utility obtained from high visibility, our model would predict that a large fraction of the donations will end up being spent in projects that do not necessarily help the beneficiaries (or possibly help them only in the short run, but prove to be useless in the medium run).

## 5.2 The 2010 Haiti earthquake

On January 12, 2010, a 7.0-magnitude earthquake hit Haiti, the poorest country of the Western hemisphere. This also was an extremely violent natural disaster, killing more than 200 000 people in a very short period of time, and destroying most of the administrative capacity of the state. Similarly to the case of 2004 tsunami, the international humanitarian response to this disaster was massive. Between 2010 and 2012, the total amount over 8 billion USD (of which 3 billion came through international NGOs) was given by the international community for the post-earthquake reconstruction activities. One of the largest French NGOs, Medecins Sans Frontieres (MSF), noted that its Haiti intervention was the largest in the long history of this organization (Biquet 2013: 130).

This rush in international humanitarian efforts fuelled by generous donations, made NGOs key players in the reconstruction efforts. The presence of NGOs, already considerable before the earthquake, became so massive as for Haiti being dubbed in international circles as "the Republic of NGOs" (Klarreich and Polman 2012). Similar to the post-tsunami reconstruction, early successes

were followed by disappointing outcomes later on: the lack of coordination between NGOs and the complex overlapping system of aid actors that emerged became a problem rather than a solution. This was made most apparent during the cholera epidemics that hit Haiti in October 2010. Biquet (2013) reports that more than 80 per cent of patients in the three months following the outbreak of the epidemics were taken care of by two actors (Cuban medical brigades and the MSF) acting outside the 'Health Cluster' which concentrated all the other NGOs with health-related activities (there were more than 600 international organizations in this cluster).

One key explanation proposed for the failure of international humanitarian assistance in Haiti is the lack of accountability of organizations carrying out interventions, coupled with massive budgets. Klarreich and Polman (2012) argue that this resulted in a complete disconnection from the needs of the local population and exclusion of local civil society, more knowledgeable about the local conditions and needs, from the reconstruction effort:

"From the very beginning, NGOs followed their own agendas and set their own priorities, largely excluding the Haitian government and civil society... The money that did reach Haiti has often failed to seed projects that truly respond to Haitians' needs. The problem is not exactly that funds were wasted or even stolen, though that has sometimes been the case. Rather, much of the relief wasn't spent on what was most needed... [As a result] the recovery effort has been so poorly managed as to leave the country even weaker than before." (Klarreich and Polman 2012)

As in the case of 2004 tsunami, the massive increase in the number of NGOs carrying out activities was driven by donors' willingness to give, in the absence of any - even minimal - certification of NGOs. Haver and Foley (2011) state that "the response to the Haiti earthquake of 2010 [was one] in which thousands of NGOs, many of them unqualified 'cowboy NGOs', rushed in to help". The authors argue that instituting a certification scheme would have curbed (at least in part) this drive; however, they also acknowledge that such a scheme would have been quite difficult to implement (for instance, it would have turned away many local or regional NGOs for whom the paperwork related to such certification would have been prohibitively complicated or costly).

### **5.3 Ugandan NGO sector**

The above two cases might lead one to think that the problems that we have highlighted in our analysis are confined to humanitarian disasters. However, similar issues arise also in "normal times". For instance, there is substantial narrative evidence for several developing countries that generous

financing by foreign aid has led to perverse effects by triggering opportunistic behavior and elite capture in these local NGO projects (see, e.g., Platteau and Gaspart, 2003; Platteau, 2004; the contributions in Bierschenk et al., 2000; Gueneau and Leconte, 1998, for Chad; and Bano, 2008, for Pakistan). Here, we discuss the detailed analysis of the NGO sector in Uganda, conducted by a team of development economists at Oxford University's Center for Study of African Economies (see Barr et al. 2003, 2005; Fafchamps and Owens 2009; Burger and Owens 2010, 2013).

This analysis is based on a unique representative national survey of NGOs, collected by Abigail Barr, Marcel Fafchamps, and Trudy Owens in 2002, and financed by the World Bank and the Japanese government. The aim of the study was to collect information about Ugandan NGOs' activities, their sources of funding, and their personnel. The surveys were conducted with about 300 NGOs (out of about 3500 registered ones), and the main descriptive findings were published as a CSAE report to the Government of Uganda in December 2003 (Barr et al. 2003).

Several interesting facts emerge from this study. The bulk of funding of Ugandan NGOs comes from international NGOs. These latter often conduct their own monitoring, but despite this, the authors argue that it is difficult to exclude that there are "crooks" in the sector. The authors note:

"It is possible 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... There is indeed a suspicion among policy circles that not all Ugandan NGOs genuinely take public interest to heart. [Some] accounts speak of crooks and swindlers *attracted to the sector by the prospect of securing grant money...* In a context where most charity funding comes from international benefactors, new incentive problems emerge. One is that of opportunistic NGOs whereby talented Ugandans initiate a local NGO not so much because they care about public good but because they hope to attract external funding to pay themselves a wage" (Barr et al. 2003: 4-7).

In a companion paper, Barr et al. (2005) write:

"According to respondents, per diems to staff and beneficiaries account for less than 2% of the total expenditures for the sample as a whole (slightly more for small NGOs). However, we suspect these data are not fully accurate and that there may be additional per diems included in program and miscellaneous costs. Ugandan NGOs are well aware that they are scrutinized by members and donors for excessive salary and per diem payments. They may therefore be tempted to hide these payments in

other costs, or to simply misreport them. Given the poor quality of financial accounts provided by surveyed NGOs, it is difficult to determine the extent to which NGO profits are redistributed to staff via the payment of per diems. What is clear, however, is that most surveyed NGOs do not have transparent accounts" (Barr et al. 2005: 667)

If the Ugandan NGO sector is facing a serious problem of fraud, why is it unable to create institutions that screen or limit such behavior? The report provides some answers to this:

"Developed countries all have instituted sophisticated legislation regulating charities. This is because unscrupulous individuals may solicit funds from the public without actually serving the public good they are supposed to serve. Hit-and-run crooks may take the money and disappear. More sophisticated crooks may set up an organization that partly serves its stated objective, but at the same time either divert funds directly to their pocket or spend part of the money on perks, allowances, and excess salaries. This kind of behaviour is damaging to charitable organizations at large because it undermines the public's trust in them and reduces funding. It is therefore in the interest of bona fide charities to regulate the industry so as to weed out crooks... Reporting requirements, however, impose an additional burden of work in charities. Moreover, they are useless unless they are combined with the Charities Commission's capacity to investigate the veracity of the reports provided. Crooks smart enough to defraud granting agencies are also smart enough to produce a fake report for the Charities Commission" (Barr et al. 2003: 7)

Would peer monitoring be a solution to this problem? The report indicates that certain Ugandan NGOs tried to create such institutions, but they do not seem to function:

"While some NGO networks have actively sought to promote good governance among their member organizations, to our knowledge, none has sought to set up a formal certification system. Instead, networks and umbrella organizations have sought to be inclusive and have welcomed new members with little or no attempt at quality control" (Barr et al. 2005: 675).

The only mechanism that limits the misbehavior of NGOs seems to be donors' (imperfect) control. In fact, the international NGOs seem to concentrate most of their financing in a few Ugandan NGOs. The authors argue that "one possible explanation is that foreign donors cannot

identify the most promising NGOs and therefore concentrate their activities on a small number of trusted NGOs. Another possibility is that many sampled NGOs are engaged in a ‘rent seeking’ process by which they seek self-employment by attracting grants. Donors may have correctly identified them as undeserving and denied them funding" (Barr et al. 2003: 27).

## 6 Conclusion

We built a tractable general equilibrium model of private provision of public goods via endogenous voluntary contributions to the non-profit sector. Our model shows that rent-seeking or ego-utility seeking motives may attract selfish individuals to the non-profit sector, which in turn may end up crowding out intrinsically motivated agents from this sector. Selfish motives and the possibility of motivational crowding out become increasingly severe as economies get richer and give more generously to the non-profit sector. The main applications of our theory belong to two domains.

The first is foreign aid intermediation by NGOs. Aid is being increasingly channelled via NGOs. This is to a large extent the result of the growing disillusionment in government-to-government project aid, often considered to be politicized and easily corruptible (see, for instance, Alesina and Dollar (2000) and Kuziemko and Werker (2006)). The rise of NGO intermediation has meant an increasing emphasis of project ownership, decentralization, and participatory development. However, no theoretical analysis has been conducted so far concerning the general-equilibrium implications of such massive channelling of aid via NGOs.<sup>27</sup> The application of our theory to foreign aid sheds light on these issues. In particular, a key implication of our results is that, as the NGO channel of aid expands, the investment into better accountability in the NGO sector becomes increasingly important, so as to curb self-interested motives. In other words, optimal aid delivery through NGOs requires harder controls accompanying the scaling-up of aid efforts.

The second application pertains to the recent debates on the accountability and performance-based pay in the non-profit sector in developed countries. The existing literature recognizes that firms in the non-profit sector are often prone to agency problems, due to the inherent difficulty of measuring their performance. Understanding the conditions under which these problems are most salient is an open issue in the public economics literature. Our analysis contributes to this debate by indicating that the role of (endogenously determined) outside options of selfish and motivated individuals inside the non-profit sector is crucial. In particular, what matters is whether

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<sup>27</sup>In a partial-equilibrium framework, this issue has been studied in the contributions mentioned in the introduction and in a recent review by Mansuri and Rao (2013).

it is motivated or selfish agents that exit more intensively the non-profit sector when donations from the private sector decrease. If selfish agents exit more intensively, then recessions can have a cleansing effect regarding the motivational composition of the non-profit sector. This is, in our view, an interesting hypothesis that could be tested empirically in future work.

Two further promising avenues for future research are worth mentioning. The first is the role of specific public policy instruments towards the non-profit sector. Several recent studies on the economic of charities and non-profits have explored the effectiveness of direct versus matching grants (Andreoni and Payne (2003, 2011); Karlan et al. (2011)). Our analysis indicates that matching grants might have an additional effect that operates through the motivational composition of the non-profit sector: such financing induces non-profits to engage more actively in fundraising (and thus to reduce their internal resources devoted to working on their projects), and this might induce the motivated individuals to quit the non-profit sector. A more complete analysis of the effectiveness of matching grants as compared to direct ones, that takes into account these various effects, looks very promising.

The second relates to the disconnection between who finances and who benefits from the activity of the non-profit sector. The resulting monitoring problems create the need to coordinate the scaling up of financing with investment into improved monitoring. As suggested by Ruben (2012), evaluation of aid effectiveness may generate social benefits even when one can learn relatively little from the evaluation exercise. This is because the very fact of being evaluated makes the misallocation of aid resources more difficult and thus help improve the motivational composition in the non-profit sector. Our framework may allow to study these indirect effects of evaluation of development projects.

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## Appendix

### 6.1 Endogenous fundraising effort

Our benchmark model assumed that total donations are equally split (quite mechanically) between all non-profit firms. It is well known, however, that non-profits actively compete quite intensely for donations via fundraising activities.<sup>28</sup> Here we relax the assumption of fixed division of donations by incorporating the endogenous fundraising choice by non-profits. In terms of the private sector, we keep the same structure described in Section 2.1. The main difference is that now non-profit managers can influence the share of funds they obtain from the pool of total donations by exerting fundraising effort.

We assume that each non-profit manager  $i$  is endowed with one unit of time, which she may split between fundraising and working towards the mission of her non-profit organization (project implementation). Fundraising effort allows the non-profit manager to attract a larger share of donations (from the pool of aggregate donations) to her own non-profit. Implementation effort is required in order to make those donations effective in addressing the non-profit's mission. We denote henceforth by  $e_i \geq 0$  the effort exerted in fundraising and by  $\varsigma_i \geq 0$  the implementation effort. The time constraint means that  $e_i + \varsigma_i = 1$ .

As before, the non-profit manager collects an amount of donations  $\sigma_i$  from the aggregate pool of donations  $D$ . One part of  $\sigma_i$ , equal to  $w_i$ , is allocated for the perks, while  $\sigma_i - w_i$  is used as input for the non-profit's production. In this section, in the sake of algebraic simplicity, we assume that the output of a non-profit firm is linear in undistributed donations, namely:

$$g_i = 2(\sigma_i - w_i)\varsigma_i. \quad (19)$$

An important feature of  $g_i$  in (19) is the fact that undistributed donations ( $\sigma_i - w_i$ ) and implementation effort ( $\varsigma_i$ ) are complements in the production function of the non-profit.

We assume that *aggregate* fundraising effort does not alter the *total* pool of donations channeled to the non-profit sector,  $D$ . However, the fundraising effort exerted by each specific non-profit manager affects the division of  $D$  among the mass of non-profit firms  $N$ . In other words, we model fundraising as a zero-sum game over the division of a given  $D$ . Formally, we assume that

$$\sigma_i = \frac{D}{N} \times \frac{e_i}{\bar{e}} = \frac{\delta A (1 - N)^\alpha}{N} \times \frac{e_i}{\bar{e}}, \quad (20)$$

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<sup>28</sup>See, for example, De Waal (1997) and Hancock (1989) for some poignant recounts of the fundraising effort spent by non-profit organizations by using the social media both in the developed and developing world.

where  $\bar{e}$  denotes the *average* fundraising effort in the non-profit sector as a whole.

Again, non-profit managers derive utility from the two dimensions, with weights on each of two sources of utility determined by the agent's level of pro-social motivation,  $m_i$ . In addition, we assume the *total* effort exerted by non-profit managers entails a level of disutility which depends on the agent's intrinsic pro-social motivation:

$$U_i(w_i, g_i) = \frac{w_i^{1-m_i} g_i^{m_i}}{m_i^{m_i} (1-m_i)^{1-m_i}} - (1-m_i)(e_i + \varsigma_i), \quad \text{where } m_i \in \{m_H, m_L\}.$$

Since  $m_H = 1$ , in the optimum, motivated non-profit managers will always set  $w_H^* = 0$  and  $e_H^* + \varsigma_H^* = 1$ . The exact values of  $e_H^*$  and  $\varsigma_H^*$  are determined by the following optimization problem

$$e_H^* \equiv \arg \max_{e_i \in [0,1]} : g_i = 2 \frac{D}{N} \frac{e_i}{\bar{e}} (1 - e_i),$$

with  $\varsigma_H^* = 1 - e_H^*$ . The above problem yields,

$$e_H^* = \varsigma_H^* = \frac{1}{2}, \tag{21}$$

which in turn implies that an  $m_H$ -type non-profit manager obtains a level of utility given by

$$U_H^* = \frac{1}{2\bar{e}} \frac{D}{N} = \frac{1}{2\bar{e}} \frac{\delta A (1-N)^\alpha}{N}. \tag{22}$$

With regards to selfish non-profit managers, again, they will always set  $w_L^* = \sigma_i$ . In addition, since selfish agents care only about their private consumption and  $\varsigma_i$  is only instrumental to producing non-profit output, in the optimum, they will always set  $\varsigma_i^* = 0$ . As a consequence, the level of  $e_L^*$  will be determined by the solution of the following maximization problem

$$e_L^* \equiv \arg \max_{e_i \in [0,1]} : w_i = \frac{D}{N} \frac{e_i}{\bar{e}} - e_i,$$

which, given the linearity of both the benefit and the cost of effort, trivially yields

$$e_L^* = \begin{cases} 0, & \text{if } \bar{e}^{-1} D/N < 1, \\ 1, & \text{if } \bar{e}^{-1} D/N \geq 1. \end{cases} \tag{23}$$

The utility that a selfish agent obtains from becoming a non-profit manager is thus:

$$U_L^* = \max \left\{ \frac{D}{N} \frac{1}{\bar{e}} - 1, 0 \right\}. \tag{24}$$

Note that the indirect utility of the selfish agent decreases, as before, with the size of the non-profit sector. However, it now reaches zero at an interior value, whereas in the basic model that occurred only when  $N = 1$ . The reason for this is that donations must now be obtained through

exerting effort, which is costly to  $m_H$ -types. For a sufficiently large size of the non-profit sector, the level donations per non-profit firm that can be obtained through fundraising effort is just too small to justify their effort cost. This means that a selfish agent will choose to stop competing for donations if the number of non-profits firms  $N$  reaches a certain critical level (beyond such critical level of  $N$  selfish managers would optimally choose to exert no effort and collect zero donations, which accordingly yields  $U_L^* = 0$ ).

### **H-equilibrium**

In an H-equilibrium all non-profit managers are of  $m_H$ -type and set  $e_H^* = 0.5$ . This implies that each non-profit manager ends up raising

$$\sigma_H^* = \frac{\delta A (1 - N_H^*)^\alpha}{N_H^*}. \quad (25)$$

Recalling (4), (22) and (24), we can observe that an H-equilibrium exists if and only if  $\sigma_H^* \leq 1$ .

### **L-equilibrium**

In an L-equilibrium all non-profit managers are of  $m_L$ -type and set  $e_L^* = 1$ . In this case, each non-profit manager raises

$$\sigma_L^* = \frac{\delta A (1 - N_L^*)^\alpha}{N_L^*}. \quad (26)$$

Using again (4), (22) and (24), it follows that an L-equilibrium exists if and only if  $\sigma_L^* > 2$ .

### **Mixed-type equilibrium**

In a mixed-type equilibrium all agents are indifferent across occupations and the non-profit sector is managed by a mix of  $m_H$ - and  $m_L$ -types. That is, a mixed-type equilibrium is characterized by  $U_H^*(N^*) = U_L^*(N^*) = V_P^*(N^*)$ , where  $N^* = N_L^* + N_H^*$  and  $0 < N_L^*, N_H^* \leq 1/2$ . Equality among (22) and (24) requires that average fundraising effort satisfies  $\bar{e}_{mixed} = 0.5 \times (D/N)$ , which in turn means that  $U_H^*(N^*) = U_L^*(N^*) = 1$ . The returns in the private sector must then also equal to one, which, using (4), implies that  $N^* = 1 - A^{\frac{1}{1-\alpha}}$ . In addition, since  $e_H^* = 0.5$  and  $e_L^* = 1$ , then  $\bar{e}_{mixed} = 0.5 \times (D/N)$ , together with  $N^* = 1 - A^{\frac{1}{1-\alpha}}$ , pin down the exact values of  $N_L^*$  and  $N_H^*$ .

### **Equilibrium characterization with fundraising effort**

We now fully characterize the type of equilibrium that arises in the model with fundraising effort.

**Proposition 6** *The equilibrium allocation that arises is always unique and depends on the specific parametric configuration of the model.*

1. *If  $A \leq 1/(1 + \delta)^{1-\alpha}$ , the economy exhibits an ‘H-equilibrium’ with  $N^* = N_H^* = \delta/(1 + \delta)$ . All non-profit managers exert the same level of fundraising and project implementation effort:  $e_H^* = \zeta_H^* = 0.5$ .*
2. *If  $A \geq [2/(2 + \delta)]^{1-\alpha}$ , the economy exhibits an ‘L-equilibrium’ with  $N^* = N_L^*$ , where  $\delta/(2 + \delta) < N_L^* < \delta/(1 + \delta)$ . All non-profit managers exert the same level of fundraising and project implementation effort:  $e_L^* = 1$  and  $\zeta_L^* = 0$ .*
3. *If  $1/(1 + \delta)^{1-\alpha} < A < [2/(2 + \delta)]^{1-\alpha}$ , the economy exhibits a mixed-type equilibrium with a mass of non-profit firms equal to  $N_{mixed}^* = 1 - A^{\frac{1}{1-\alpha}}$ , where*

$$N_H^* = 2 \left[ 1 - A^{\frac{1}{1-\alpha}} (1 + \delta/2) \right], \quad \text{and} \quad N_L^* = A^{\frac{1}{1-\alpha}} (1 + \delta) - 1. \quad (27)$$

*Motivated non-profit managers set  $e_H^* = \zeta_H^* = 0.5$ , while  $m_L$ -types set  $e_L^* = 1$  and  $\zeta_L^* = 0$ .*

The result of an ‘H-equilibrium’ when  $A \leq 1/(1 + \delta)^{1-\alpha}$  is the analogous to that one previously obtained in the basic model. Similarly, when  $A \geq [2/(2 + \delta)]^{1-\alpha}$  the model features a pure ‘L-equilibrium’. One novelty of this alternative setup is that for the intermediate range of  $A$  there exists a "mixed-type" equilibrium. Intuitively, the necessity of competition for donations reduces the utility of the unmotivated agents. As a consequence, this creates parameter configurations under which, in the absence of fundraising competition the non-profit sector would be populated only by selfish agents, whereas in the presence of competition a fraction of them moves into the private sector (and are in turn replaced by a fraction of motivated agents).<sup>29</sup>

## 6.2 Altruism-dependent private donations

The model presented in Section 2 assumes that all private entrepreneurs (regardless of their pro-social motivation) donate an identical fraction of their income to the non-profit sector. However,

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<sup>29</sup>It is interesting to compare these findings to those of Aldashev and Verdier (2010), where more intense competition for funds actually leads to higher diversion of donations by non-profit managers. This occurs because when agents have to spend more time raising funds, then less time is left for working towards the non-profit mission, and thus the opportunity cost of diverting money for private consumption falls. In that model, all agents are intrinsically identical, and thus the issue of more intense competition lies in *aggravating* a moral hazard problem. Here, instead, the existence of motivationally heterogeneous types implies that the main problem is one of adverse selection, and a more intense competition for funds *mitigates* the severity of this adverse selection problem.

if warm-glow giving is driven by (impure) altruism, it is reasonable to expect the propensity to donate to be increasing in the degree of pro-social motivation of an individual. Here, we modify the utility function in (3) by letting the propensity to donate be type-specific ( $\delta_i$ ) and increasing in  $m_i$ . In particular, we now assume that  $\delta_i = \delta_H \in (0, 1]$  when  $m_i = m_H$ , whereas  $\delta_i = \delta_L = 0$  when  $m_i = m_L$ .<sup>30</sup>

The key difference that arises when  $\delta_i$  is an increasing function of  $m_i$  is that, for a given value of  $1 - N$ , the total level of donations will depend positively on the ratio  $(1 - N_H)/(1 - N)$ . Intuitively, the fraction of entrepreneurial income donated to the non-profit sector will rise with the (average) level of warm-glow motivation displayed by the pool of private entrepreneurs.

To keep the analysis simple, we abstract from fundraising effort, and assume that the mass of total donations is equally split between the mass of non-profits. In addition, we let the payoff functions by motivated and selfish non-profit entrepreneurs be given again by (8) and (9), respectively. Donations collected by a non-profit are now given by:

$$\frac{D}{N} = \frac{\delta_H A \left(\frac{1}{2} - N_H\right)}{(1 - N_H - N_L)^{1-\alpha} (N_H + N_L)}. \quad (28)$$

When the total amount of donations to the non-profit sector depends positively on the fraction of pro-socially motivated private entrepreneurs, the model gives room to multiple equilibria. The main reason for equilibrium multiplicity is that, when  $\delta_i$  is increasing in  $m_i$ , the ratio between  $U_H^*$  and  $U_L^*$  does not depend *only* on the level of  $N$ , as it was the case with (8) and (9) in Section 2. Instead, observing (28), one sees that it *also* depends on how  $N$  breaks down between  $N_H$  and  $N_L$ . Such dependence on the ratio  $N_H/N_L$  generates a positive interaction between the incentives by  $m_L$ -types to self-select into the non-profit sector and the self-selection of  $m_H$ -types into the private sector. The next proposition deals with this issue in further detail.

**Proposition 7** *Let  $\delta_i = \delta_H \in (0, 1]$  for  $m_i = m_H$  and  $\delta_i = \delta_L = 0$  for  $m_i = m_L$ . Then,*

1. *Unique ‘H-equilibrium’: If  $A < (1 - \delta_H/2)^{1-\alpha}$ , the equilibrium in the economy is unique, and characterized by  $\delta_H / (2 + 2\delta_H) < N_H^* < \frac{1}{2}$  and  $N_L^* = 0$ .*
2. *Unique ‘L-equilibrium’: If  $A > [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ , the equilibrium in the economy is unique, and characterized by  $N_L^* = \delta_H/2$  and  $N_H^* = 0$ .*

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<sup>30</sup>Notice that, in the specific case in which  $\delta_H = 1$ , the utility functions in the private sector and the non-profit sector would display the same structure for both  $m_H$ - and  $m_L$ -types: for the former, all the utility weight is being placed on pro-social actions (either warm-glow giving or producing  $g_i$ ); for the latter, all the utility weight is being placed on private consumption.

3. *Multiple equilibria: If  $(1 - \delta_H/2)^{1-\alpha} < A < [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ , there exist three equilibria in the economy,<sup>31</sup>*
- a) *an ‘H-equilibrium’ where  $\delta_H / (2 + 2\delta_H) < N_H^* < \frac{1}{2}$  and  $N_L^* = 0$ ;*
  - b) *an ‘L-equilibrium’ where  $N_L^* = \delta_H/2$  and  $N_H^* = 0$ ;*
  - c) *a ‘mixed-type equilibrium’ where  $N_H^* = \frac{1}{2} - \frac{1-A^{1/(1-\alpha)}}{\delta_H}$  and  $N_L^* = \frac{[1-A^{1/(1-\alpha)}](1+\delta_H)}{\delta_H} - \frac{1}{2}$ .*

Proposition 7 shows that for  $A$  sufficiently small the economy will exhibit a high-effectiveness equilibrium, whereas when  $A$  is sufficiently large the economy will fall into a low-effectiveness equilibrium. These two results are in line with those previously shown in Proposition 1.

However, Proposition 7 also shows that there exists an intermediate range,  $(1 - \delta_H/2)^{1-\alpha} < A < [1 - \delta_H / (2 + 2\delta_H)]^{1-\alpha}$ , in which the economy displays multiple equilibria. For those intermediate values of  $A$ , the exact type of equilibrium that takes place will depend on the coordination of agents’ expectations. If agents expect a large mass of  $m_H$ -types to choose the non-profit sector (case *a*), then the total mass of private donations (for a given  $N$ ) will be relatively small, stifling the incentives of  $m_L$ -types to become non-profit managers. Conversely, if individuals expect a large mass of  $m_H$ -types to become private entrepreneurs (case *b*), the value of  $D$  (for a given  $N$ ) will turn out to be large, which will enhance the incentives of  $m_L$ -types to enter into the non-profit sector more than it does so for  $m_H$ -types. Notice that the range of productivity  $A$  for which multiple equilibria occur increases with the (relative) generosity of the motivated individuals,  $\delta_H$ .<sup>32</sup>

Finally, Proposition 7 also shows that, within the range of multiple equilibria, there is also the possibility of intermediate consistent expectations (case *c*). When this happens, both motivated and selfish agents are indifferent across occupations, and a mix of  $m_L$ - and  $m_H$ -types will end up populating the non-profit sector.

### 6.3 Proofs of propositions

**Proof of Proposition 1. Part (i).** First of all, notice that by replacing  $N = N_0$  into (9), it follows that  $A(1 + \delta)^{1-\alpha} > 1$  implies  $U_L^*(N_0) > 1$ . Hence, since  $U_L^*(\hat{N}) = 1$ , it must necessarily be the case that  $N_0 < \hat{N}$ . Because of Lemma 1, this also means that  $U_L^*(N_0) > U_H^*(N_0)$ . Now, since  $U_L^*(N_0) = y(N_0)$ , then  $y(N) < U_L^*(N_0)$  for any  $N < N_0$ , meaning that whenever  $N < N_0$  the mass of non-profit managers must *at least* be equal to 0.5 (the total mass of  $m_L$ -types). But this

<sup>31</sup>In the specific cases where  $A = (1 - \delta_H/2)^{1-\alpha}$  or  $A = [1 - \delta_H / (2 + 2\delta_H)]^{1-\alpha}$ , the ‘mixed-type equilibrium’ described below disappears, while the other two equilibria remain.

<sup>32</sup>The range of values of  $A$  subject to multiple equilibria vanishes as  $\delta_H$  approaches zero.

contradicts the fact that  $N_0 < 0.5$ ; hence an equilibrium with  $N < N_0$  cannot exist. Moreover, an equilibrium with  $N > N_0$  cannot exist either, because whenever  $N > N_0$  holds,  $y(N) > U_H^*(N)$  and  $y(N) > U_L^*(N)$ , contradicting the fact that there is a mass of individuals equal to  $N > 0$  choosing to become non-profit managers. As a result, when  $A(1 + \delta)^{1-\alpha} > 1$ , an allocation with  $N^* = N_L^* = N_0$  represents the unique equilibrium. Since  $U_H^*(N_0) < U_L^*(N_0) = y(N_0)$ , in the equilibrium, all  $m_H$ -type become private entrepreneurs, and a mass  $0.5 - N_0$  of  $m_L$ -type agents (who are indifferent between the two occupations) also become private entrepreneurs.

**Part (ii).** Since  $A(1 + \delta)^{1-\alpha} < 1$  implies  $U_L^*(N_0) < 1$ , when the former inequality holds,  $N_0 > \widehat{N}$ . Moreover, notice that an equilibrium with  $N \leq N_0$  cannot exist, as it would contradict the fact that  $N_0 < 0.5$ . In turn, because the equilibrium must necessarily verify  $N > N_0 > \widehat{N}$ , only motivated agents will become non-profit managers, while all selfish agents will self-select into the for-profit sector. Now, by the definition of  $N_1$  in (11), it follows that if  $N_1 \leq 0.5$ , then  $N^* = N_H^* = N_1$  represents the unique equilibrium allocation (notice that  $A(1 + \delta)^{1-\alpha} < 1$  ensures  $N_1 > N_0$ ). In this situation, the  $m_H$ -types are indifferent across occupations (and there is a mass  $0.5 - N_1$  of them in the private sector), while when  $N < N_1$  all motivated agents wish to become non-profit managers contradicting  $N < 0.5$ , and when  $N > N_1$  nobody would actually choose the non-profit sector, contradicting  $N > 0$ . With a similar reasoning, it is straightforward to prove that when  $N_1 > 0.5$ , the unique equilibrium allocation is given by  $N^* = N_H^* = 0.5$ , as in that case the condition  $U_L^*(\frac{1}{2}) < y(\frac{1}{2}) < U_H^*(\frac{1}{2})$  holds, whereas for  $N < 0.5$  all  $m_H$ -types intend to become non-profit managers, and when  $N > 0.5$  there is either nobody or only a mass one-half of agents who wish to go the non-profit sector. ■

**Proof of Proposition 2. Part (i).** First of all, recalling (13), notice  $2^{1-\alpha}A > 1$  implies  $\underline{N} < \frac{1}{2}$ . Using the results in Proposition 1, it then follows that when  $A(1 + \delta)^{1-\alpha} < 1 < 2^{1-\alpha}A$  and  $\Delta = 0$ , in equilibrium,  $N^* = N_H^* = N_1$ , where recall that  $N_1$  is implicitly defined by (11). Let now  $\mathcal{N}_H$  be implicitly defined by the following condition:

$$\mathcal{N}_H^{-\gamma} [\delta A (1 - \mathcal{N}_H)^\alpha + \Delta]^\gamma (1 - \mathcal{N}_H)^{1-\alpha} \equiv A; \quad (29)$$

in raw words,  $\mathcal{N}_H$  denotes the level of  $N$  that equalizes (2) and the utility obtained by a motivated non-profit manager when  $D/N$  is given by (12). From (29), it is easy to observe that when  $\Delta = 0$ ,  $\mathcal{N}_H = N_1$ . In addition, differentiating (29) with respect to  $\mathcal{N}_H$  and  $\Delta$ , we obtain that  $\partial \mathcal{N}_H / \partial \Delta > 0$ . Let now

$$\Delta_0 \equiv 1 - A^{\frac{1}{1-\alpha}} (1 + \delta), \quad (30)$$

and, using (13), notice that  $[\delta A(1 - \underline{N})^\alpha + \Delta_0]/\underline{N} = 1$ ; hence  $\mathcal{N}_H(\Delta_0) = \underline{N}$ . As a consequence of all this, when  $A(1 + \delta)^{1-\alpha} < 1 < 2^{1-\alpha}A$ , for all  $0 \leq \Delta < \Delta_0$ , in equilibrium,  $N^* = N_H^* = \mathcal{N}_H(\Delta)$ , where  $\partial\mathcal{N}_H/\partial\Delta > 0$ , and  $\mathcal{N}_H(\Delta) : [0, \Delta_0] \rightarrow [\underline{N}_1, \underline{N}]$ .

**Part (ii)** Using again the fact that  $[\delta A(1 - \underline{N})^\alpha + \Delta_0]/\underline{N} = 1$ , from (12) it follows that, for all  $\Delta > \Delta_0$ , the utility achieved as non-profit managers by  $m_L$ -types must be strictly larger than that obtained by  $m_H$ -types. Let now

$$\Delta_A \equiv 2^{-\alpha}A \left[ (2^{1-\alpha}A)^{\frac{1-\gamma}{\gamma}} - \delta \right]. \quad (31)$$

Using (2) and (12), notice that when  $N = \frac{1}{2}$  and  $\Delta = \Delta_A$ , the utility obtained by motivated non-profit managers is equal to  $y(\frac{1}{2})$ . All this implies that, when  $A(1 + \delta)^{1-\alpha} < 1 < 2^{1-\alpha}A$ , for all  $\Delta_0 \leq \Delta < \Delta_A$ , in equilibrium,  $N^* = N_L^* = \mathcal{N}_L(\Delta) \leq \frac{1}{2}$ , where  $\mathcal{N}_L(\Delta)$  is non-decreasing in  $\Delta$ . In particular, for all  $\Delta_0 \leq \Delta \leq 2^{-\alpha}A(1 - \delta)$  the function  $\mathcal{N}_L(\Delta)$  is implicitly defined by

$$\left[ \frac{\delta A(1 - \mathcal{N}_L)^\alpha + \Delta}{\mathcal{N}_L} \right] (1 - \mathcal{N}_L)^{1-\alpha} \equiv A, \quad (32)$$

while for all  $2^{-\alpha}A(1 - \delta) < \Delta < \Delta_A$ ,  $\mathcal{N}_L(\Delta) = \frac{1}{2}$ . Lastly, when  $\Delta = 2^{-\alpha}A(1 - \delta)$ , the expression in (32) implies  $\mathcal{N}_L = \frac{1}{2}$ , proving that  $\mathcal{N}_L(\Delta) : (\Delta_0, \Delta_A] \rightarrow (\underline{N}, \frac{1}{2}]$  is continuous and weakly increasing.

**Part (iii)** First, note that when  $\Delta > \Delta_A$ , the expression in (29) delivers a value of  $\mathcal{N}_H > \frac{1}{2}$ . As a result, motivated agents must necessarily be indifferent in equilibrium between the two occupations, since some of them must choose to actually work as non-profit managers to allow  $\mathcal{N}_H > \frac{1}{2}$ . In addition, since by definition of  $\Delta_A$  in (31),  $\delta A[(1 - N)^\alpha + \Delta_A]/N > y(N)$  when  $N = \frac{1}{2}$ , all selfish agents must be choosing the non-profit sector when  $\Delta > \Delta_A$ . Let thus  $\mathcal{N}_{LH}$  be implicitly defined by the following condition:

$$\mathcal{N}_{LH}^{-\gamma} [\delta A(1 - \mathcal{N}_{LH})^\alpha + \Delta]^\gamma (1 - \mathcal{N}_{LH})^{1-\alpha} \equiv A. \quad (33)$$

Differentiating (33) with respect to  $\mathcal{N}_{LH}$  and  $\Delta$ , we can observe that  $\partial\mathcal{N}_{LH}/\partial\Delta > 0$ . From (33), we can also observe that  $\lim_{\Delta \rightarrow \Delta_A} \mathcal{N}_{LH} = \frac{1}{2}$  and  $\lim_{\Delta \rightarrow \infty} \mathcal{N}_{LH} = 1$ . As a result, we may write  $\mathcal{N}_{LH}(\Delta) : (\Delta_A, \infty) \rightarrow (\frac{1}{2}, 1)$ , with  $\partial\mathcal{N}_{LH}/\partial\Delta > 0$ . Moreover, since  $N_L^* = \frac{1}{2}, \forall \Delta > \Delta_A$ , it must be the case that in equilibrium  $N_H^* = \mathcal{N}_{LH}(\Delta) - \frac{1}{2}$ .

**Proposition 2 (bis):** If  $2^{1-\alpha}A < 1$ , there exists a threshold level  $\Delta_B \in (0, \Delta_0)$ , such that: i) when  $0 \leq \Delta \leq \Delta_B$ , all non-profit firms are managed by  $m_H$ -types; ii) when  $\Delta_B < \Delta \leq \Delta_0$ , non-profit firms are managed by a mix of types with  $m_H$ -type majority; iii) when  $\Delta > \Delta_0$ , non-profit firms are managed by a mix of types with  $m_L$ -type majority.

**Proof. (i)** Because of Proposition 1, when  $\Delta = 0$ , in equilibrium,  $N_H^* \leq \frac{1}{2}$  and  $N_L^* = 0$ . Next, let  $\Delta_B \equiv 2^{-\alpha}A(1 - \delta)$ , and note that:

$$2 \left[ \delta A \left( \frac{1}{2} \right)^\alpha + \Delta_B \right] = 2^{1-\alpha}A, \quad (34)$$

and note that the right-hand side of (34) equals  $y(\frac{1}{2})$ , while its left-hand side equals  $D/N$  when  $N = \frac{1}{2}$  and  $\Delta = \Delta_B$ . Furthermore, notice that  $2[\delta A (\frac{1}{2})^\alpha + \Delta]$  is strictly increasing in  $\Delta$ . As a consequence, it follows that in equilibrium,  $N_L^* = 0$  for any  $0 \leq \Delta \leq \Delta_B$ . In addition, denoting by  $\mathfrak{N}_H(\Delta) = \min\{\frac{1}{2}, \chi\}$ , where  $\chi$  is the solution of  $[\delta A (1 - \chi)^\alpha + \Delta]/\chi = A/(1 - \chi)^{1-\alpha}$ , the result,  $N_H^* = \mathfrak{N}_H(\Delta)$  for any  $0 \leq \Delta \leq \Delta_B$  obtains. ■

(ii) This part of the proof follows from the definition of  $\Delta_0$  in (30), together with the fact that  $2[\delta A (\frac{1}{2})^\alpha + \Delta] > 2^{1-\alpha}A$ , for all  $\Delta > \Delta_B$ . As a result, we may implicitly define the function  $\mathfrak{N}_{HL}(\Delta)$  by

$$\left[ \frac{\delta A (1 - \mathfrak{N}_{HL})^\alpha + \Delta}{\mathfrak{N}_{HL}} \right] (1 - \mathfrak{N}_{HL})^{1-\alpha} \equiv A,$$

and observe that  $\partial \mathfrak{N}_{HL} / \partial \Delta > 0$ . Noting that, whenever  $N = \mathfrak{N}_{HL}(\Delta)$ ,  $m_L$ -types are indifferent across occupations completes the proof of this part.

(iii) This part of the proof follows again from the definition of  $\Delta_0$  in (30), which implies that for all  $\Delta > \Delta_0$ , the expression in (12) yields  $D/N > 1$  when  $N = \underline{N}$ . For this reason, whenever  $\Delta > \Delta_0$ , the  $m_H$ -types must be indifferent across occupations in equilibrium, while all  $m_L$ -types will strictly prefer the non-profit sector. We can then implicitly define the function  $\mathfrak{N}_{LH}(\Delta)$  by

$$\mathfrak{N}_{LH}^{-\gamma} [\delta A (1 - \mathfrak{N}_{LH})^\alpha + \Delta]^{-\gamma} (1 - \mathfrak{N}_{LH})^{1-\alpha} \equiv A,$$

and observe that  $\partial \mathfrak{N}_{LH} / \partial \Delta > 0$  to complete the proof. ■

**Proof of Proposition 3.** First of all, from (15), it is straightforward to observe that neither  $N_H = 0.5$ , nor  $0 = N_H < N_L$  can possibly hold in equilibrium, as both situations would imply  $D/N = 0$ , and no agent would thus choose the non-profit sector.

Second, set  $N_L = 0$  into (15), and take the limit of the resulting expression as  $N_H$  approaches zero, to obtain

$$\lim_{N_H \rightarrow 0} \frac{D}{N} \Big|_{N_L=0} = \frac{\delta_H A}{2} \frac{N_H}{(N_H)^2} = \infty.$$

The above result in turn implies that  $0 = N_H = N_L$  cannot hold in equilibrium either, as in that case the non-profit would become infinitely appealing to  $m_H$ -types.

Third, suppose  $0 < N_H < N_L = \frac{1}{2}$ . Using (2) and (15), for this to be an equilibrium, it must necessarily be the case that

$$\frac{\delta_H A \left(\frac{1}{2} - N_H\right) N_H}{\left(\frac{1}{2} - N_H\right)^{1-\alpha} \left(\frac{1}{2} + N_H\right)^2} \geq \frac{A}{\left(\frac{1}{2} - N_H\right)^{1-\alpha}}. \quad (35)$$

However, the condition (35) cannot possibly hold, since it would require  $\delta_H (0.5 - N_H) N_H \geq (0.5 + N_H)^2$ , which can never be true.

Because of the previous three results, the only possible equilibrium combinations are: (i)  $N_L^* = 0$  and  $0 < N_H^* < 0.5$ , (ii)  $0 \leq N_L^* \leq 0.5$  and  $0 < N_H^* < 0.5$ , will all types indifferent across occupations.

Case (i). For this case to hold in equilibrium, condition (51) must be verified, which following the same reasoning as before in the proof of Proposition 7 leads to the condition  $A < [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ .

Case (ii). For this case to hold in equilibrium, the following equalities must all simultaneously hold:

$$\frac{D}{\bar{N}} = \frac{\delta_H A \left(\frac{1}{2} - N_H\right) N_H}{(1 - N_H - N_L)^{1-\alpha} (N_H + N_L)^2} = y(N) = \frac{A}{(1 - N_H - N_L)^{1-\alpha}} = 1. \quad (36)$$

Taking into account the definition of  $\bar{N}$  in (13), it follows that  $y(N) = 1$  requires  $N_H + N_L = 1 - A^{\frac{1}{1-\alpha}}$ . As a result, (36) boils down to the following condition:

$$\delta_H \left(\frac{1}{2} - N_H\right) N_H - \left(1 - A^{\frac{1}{1-\alpha}}\right)^2 = 0 \quad (37)$$

The expression in (37) yields real-valued roots if and only if

$$A \geq \left(1 - \sqrt{\delta_H/4}\right)^{1-\alpha}. \quad (38)$$

When (38) is satisfied, the solution of (37) is given by:

$$N_H = \begin{cases} r_0 \equiv \frac{1}{4} - \sqrt{\frac{1}{16} - \frac{[1 - A^{1/(1-\alpha)}]^2}{\delta_H}}, \\ r_1 \equiv \frac{1}{4} + \sqrt{\frac{1}{16} - \frac{[1 - A^{1/(1-\alpha)}]^2}{\delta_H}}. \end{cases} \quad (39)$$

Note now that the roots  $r_0$  and  $r_1$  are not necessarily equilibrium solutions for  $N_H$ . More precisely, since  $N_L = [1 - A^{\frac{1}{1-\alpha}}] - N_H$ , then  $N_L \geq 0 \Leftrightarrow N_H \leq [1 - A^{\frac{1}{1-\alpha}}]$ . As a consequence, for  $N_H = r_1$  in (39) to actually be an equilibrium solution, it must then be the case that  $r_1 \leq 1 - A^{\frac{1}{1-\alpha}}$ . But this inequality is true *only* in the specific case when  $A = (1 - \sqrt{\delta_H/4})^{1-\alpha}$  and  $\sqrt{\delta_H} = 1$ , which in turn also implies that  $r_1 = r_0$  in (39). Without any loss of generality, we may thus fully disregard  $r_1$ , and check under which conditions  $r_0 \leq 1 - A^{\frac{1}{1-\alpha}}$ .

Using (39), and letting  $x \equiv 1 - A^{\frac{1}{1-\alpha}}$ , an equilibrium with  $N_L \geq 0$  when  $N_H = r_0$  requires the following condition to hold:

$$\Psi(x) \equiv \frac{1}{4} - \sqrt{\frac{1}{16} - \frac{x^2}{\delta_H}} \leq x, \quad (40)$$

Now, notice  $\Psi(x) = x$  when  $A = [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ . In addition, noting that  $\Psi'(x) > 0$  and  $\Psi''(x) > 0$ , it then follows that: i)  $\Psi(x) < x$ , for all  $A > [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ ; while  $\Psi(x) > x$ , for all  $(1 - \sqrt{\delta_H}/4)^{1-\alpha} < A < [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ . Consequently, when  $A \geq [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ , there is an equilibrium with  $N_H = r_0$  and  $N_L = [1 - A^{\frac{1}{1-\alpha}}] - r_0$ .

Lastly, to prove that  $\partial f / \partial A < 0$ , note that  $f = \Psi(x)/x$ , hence

$$\frac{\partial f}{\partial A} = \frac{1}{4x^2} \frac{\partial x}{\partial A} - \frac{1}{16x^3} \left( \frac{1}{16} - \frac{x^2}{\delta_H} \right)^{-\frac{1}{2}} \frac{\partial x}{\partial A},$$

from where  $\partial f / \partial A < 0$  stems from noting that  $\partial x / \partial A < 0$  and that

$$1 - \frac{1}{4x} \left( \frac{1}{16} - \frac{x^2}{\delta_H} \right)^{-\frac{1}{2}} > 0,$$

because of (39). ■

#### Proof of Proposition 4.

The conditions for an ‘L-equilibrium’, ‘H-equilibrium’ and a ‘mixed-type equilibrium’ are, respectively, as follows:

$$\left[ \delta A \frac{(1 - N_L)^\alpha}{N_L} \right]^\gamma < \frac{A}{(1 - N_L)^{1-\alpha}} \leq \delta A \frac{(1 - N_L)^\alpha}{N_L}, \quad \text{with } N_L \leq 1/2. \quad (41)$$

$$\delta A \frac{(1 - N_H)^\alpha}{N_H} - \rho\chi < \frac{A}{(1 - N_H)^{1-\alpha}} \leq \left[ \delta A \frac{(1 - N_H)^\alpha}{N_H} \right]^\gamma, \quad \text{with } N_H \leq 1/2. \quad (42)$$

$$\delta A \frac{(1 - N_H - N_L)^\alpha}{N_H + N_L} - \frac{N_H}{N_H + N_L} \rho\chi = \frac{A}{(1 - N_H - N_L)^{1-\alpha}} = \left[ \delta A \frac{(1 - N_H - N_L)^\alpha}{N_H + N_L} \right]^\gamma, \quad (43)$$

with  $N_H \leq 1/2$  and  $N_L \leq 1/2$ .

First of all, note that the condition for a low-effectiveness equilibrium (41) is identical to that in Proposition 1, hence when  $A(1 + \delta)^{1-\alpha} > 1$  there must still exist a low-effectiveness equilibrium in the model with peer monitoring. Notice also that the condition for existence of a high-effectiveness equilibrium without peer monitoring is identical to condition (42), except for the term  $-\rho\chi$  in the first argument of the condition. This implies that, whenever the condition for existence an ‘H-equilibrium’ without peer monitoring is satisfied, then it must also be satisfied when there is peer monitoring. As a consequence, when  $A(1 + \delta)^{1-\alpha} < 1$  there must still exist an ‘H-equilibrium’ in the model with peer monitoring.

Next, recalling the definition of  $N_1$  in (11), from (42) it follows that, even when  $A(1 + \delta)^{1-\alpha} > 1$ , an H-equilibrium will exist if the condition

$$\frac{A(1 - N_1)^\alpha}{N_1} \left[ \delta - \frac{N_1}{1 - N_1} \right] < \rho\chi \quad (44)$$

holds true. Given that, when  $A(1 + \delta)^{1-\alpha} > 1$ ,  $N_1 < N_0$ , then condition (44) requires that  $\rho\chi$  is sufficiently large.

Lastly, consider the specific case when  $A(1 + \delta)^{1-\alpha} > 1$  and condition (44) holds true. In a mixed-type equilibrium we must have that:

$$A(1 - N)^\alpha \left[ \delta - \frac{N}{1 - N} \right] = \rho\chi(N - N_L). \quad (45)$$

Notice now that when condition (44) holds true, then there must necessarily exist some value  $0 < N_L < N < N_0$ , with  $N > N_L$ , satisfying condition (45). This implies that when  $A(1 + \delta)^{1-\alpha} > 1$  and condition (44) holds true there also exists a mixed-type equilibrium satisfying (43). ■

**Derivation of equilibrium regions in Figure 4.** *i) H-equilibrium region:* This type of equilibrium arises when  $\sigma_i < 1 < V_p^*$  for any  $0 \leq N \leq \frac{1}{2}$ , where  $V_p^*$  is given by (17) and  $\sigma_i$  by (18). For  $\sigma_i < V_p^*$  to hold for any  $0 \leq N \leq \frac{1}{2}$  it suffices to pin down when it holds for  $N = \frac{1}{2}$ , which in turn leads to

$$t < \bar{t} \equiv (1 - \delta) / (2 - \delta). \quad (46)$$

Next, for  $\sigma_i < V_p^*$  we need that

$$N < \frac{\delta(1 - t) + t}{1 + \delta(1 - t)}. \quad (47)$$

Therefore, plugging the RHS of (47) into (18), leads to the condition that  $\sigma_i < 1$  whenever

$$A < \frac{1}{(1 - t)^\alpha [1 + \delta(1 - t)]^{1-\alpha}}. \quad (48)$$

As a result, the region bounded by (46) and (48) features a high-effectiveness equilibrium.

*ii) L-equilibrium region:* This type of equilibrium needs, first, that condition (48) fails to hold. Second, it also needs that  $(\sigma_i)^\gamma < V_p^*$  holds, so that  $m_H$ -types choose the private sector. For  $(\sigma_i)^\gamma < V_p^*$  to obtain, it must be that

$$A > \frac{[t + \delta(1 - t)]^{\frac{\gamma}{1-\gamma}}}{2^{1-\alpha} (1 - t)^{\frac{1}{1-\gamma}}}. \quad (49)$$

Notice now that the RHS of (48) is equal to the RHS of (49) when  $t = \bar{t}$ , while the former lies above (below) the latter when  $t < \bar{t}$  (when  $t > \bar{t}$ ). As a consequence, the region exhibiting an

‘L-equilibrium’ is given by  $A > (1 - t)^{-\alpha} [1 + \delta (1 - t)]^{\alpha-1}$  whenever  $t \leq \bar{t}$  and by (49) whenever  $t > \bar{t}$ .

iii) *Mixed-type equilibrium region with  $f > \frac{1}{2}$* : From the previous results it follows that when (48) holds and  $t > \bar{t}$ , we must necessarily have an equilibrium in which all  $m_H$ -types choose the non-profit sector, while  $m_L$ -types lie indifferent between the two sectors, and a fraction of them choose the non-profit sector as well.

iv) *Mixed-type equilibrium region with  $f < \frac{1}{2}$* : From the previous results it also follows that when both (48) and (49) fail to hold and  $t > \bar{t}$ , we must necessarily have an equilibrium in which  $m_L$ -types choose the non-profit sector, while  $m_H$ -types lie indifferent between the two sectors, and a fraction of them choose the non-profit sector as well. ■

**Proof of Proposition 6. Part (i).** First, recall that in an H-equilibrium  $\bar{e} = \frac{1}{2}$ . Second, using (25) and (4) when  $N = N_H^*$ , we have that

$$\frac{\delta A (1 - N_H^*)^\alpha}{N_H^*} = \frac{A}{(1 - N_H^*)^{1-\alpha}} \Leftrightarrow N_H^* = \frac{\delta}{1 + \delta} < \frac{1}{2}.$$

Therefore, an H-equilibrium must necessarily feature  $N_H^* = \delta / (1 + \delta)$ , with  $m_H$  types indifferent across the two occupations. In such an equilibrium, they obtain a level of utility equal to  $A(1 + \delta)^{1-\alpha}$ . Third, from (23) it follows that this solution is a Nash equilibrium, as the best response by  $m_L$ -type non-profit managers would be  $e_L = 0$  when  $2A(1 + \delta)^{1-\alpha} < 1$ , while  $e_L = 1$  otherwise. In both cases,  $A(1 + \delta)^{1-\alpha} \leq 1$  implies that selfish agents should prefer the private sector to the non-profit sector. Moreover, this must be the unique Nash equilibrium solution, since the incentives for an  $m_L$ -type agent to start a non-profit will decline with the average level of  $\bar{e}$ , which in equilibrium will never be below 0.5 as implied by (21).

**Part (ii).** Preliminarily, let first define  $\tilde{N} \equiv \delta / (2 + \delta)$ . Note then that, when  $\bar{e} = 1$ , the payoff functions (22) and (4) are equalized when  $N = \tilde{N}$ ; namely,  $U_H^*(\tilde{N}) = V^*(\tilde{N})$ . Next, notice that, for a given  $\bar{e}$ , both (22) and (24) are strictly decreasing in  $N$ , while they grow to infinity as  $N$  goes to zero. Hence, to prove that a low-effectiveness equilibrium exists, it suffices to show that the condition  $A \geq [2 / (2 + \delta)]^{1-\alpha}$  implies  $U_H^*(\tilde{N}) \leq U_L^*(\tilde{N})$ . To prove that the low-effectiveness equilibrium is unique, notice first that an H-equilibrium is incompatible with  $A \geq [2 / (2 + \delta)]^{1-\alpha}$ . Therefore, the only other alternative would be a mixed-type equilibrium with all agents indifferent between the private and non-profit sector. Yet, for (22) and (24) to be equal, it must be that  $D/N = 2\bar{e}$ . This equality, in turn, implies that all activities must yield a payoff equal to 1,

however, when  $A \geq [2/(2 + \delta)]^{1-\alpha}$ , this would be inconsistent with  $\bar{e} < 1$ , therefore a mixed-type equilibrium cannot exist either.

**Part (iii).** First of all, following the argument in the proof of part (i) of the proposition, notice that an H-equilibrium cannot exist, since when  $A(1 + \delta)^{1-\alpha} > 1$  selfish agents would like to deviate to the non-profit sector and set  $e_L = 1$ . Secondly, notice that a necessary condition for an L-equilibrium to exist is that  $U_H^* > 1$  when  $N = \tilde{N}$  and  $\bar{e} = 1$ , but replacing  $N = \tilde{N}$  and  $\bar{e} = 1$  into (22) yields a value strictly smaller than 1 when  $A < [2/(2 + \delta)]^{1-\alpha}$ . As a result, when  $A(1 + \delta)^{1-\alpha} < A < [2/(2 + \delta)]^{1-\alpha}$  the equilibrium must necessarily be of mixed-type, with all agents indifferent across occupations. This requires that  $U_H^*(N^*) = U_L^*(N^*) = V_P^*(N^*) = 1$ . From (4) we obtain that  $V_P^*(N^*) = 1$  implies  $N_{mixed}^* = 1 - A^{\frac{1}{1-\alpha}}$ . In addition,  $U_H^*(N^*) = U_L^*(N^*)$  requires that  $2\bar{e}_{mixed} = D/N$ , which using  $N_{mixed}^* = 1 - A^{\frac{1}{1-\alpha}}$  leads to

$$\bar{e}_{mixed} = \frac{1}{2} \frac{\delta A^{\frac{1}{1-\alpha}}}{1 - A^{\frac{1}{1-\alpha}}}. \quad (50)$$

Therefore, using the facts that  $e_H^* = 0.5$  and  $e_L^* = 1$ , the levels of  $N_H^*$  and  $N_L^*$  in (27) immediately obtain. Lastly, to prove that this equilibrium is unique, notice that  $e_{mixed}^*$  in (50) lies between 0.5 and 1, thus there must exist only one specific combination of  $N_H^*$  and  $N_L^*$  consistent with a mixed-type equilibrium. ■

**Proof of Proposition 7.** First of all, notice that  $N_H = 0.5$  cannot hold in equilibrium, as (28) implies that in that case  $D/N = 0$ , no agent would choose the non-profit sector. We can then focus on three equilibrium cases: (i)  $N_L^* = 0$  and  $0 < N_H^* < 0.5$ , with  $m_L$ -types strictly preferring the private sector, (ii)  $N_L^* \leq 0.5$  and  $N_H^* = 0$ , with  $m_H$ -types strictly preferring the private sector, and (iii)  $0 \leq N_L^* \leq 0.5$  and  $0 \leq N_H^* < 0.5$ , will all types indifferent across occupations.

Case (i). For this case to hold in equilibrium, the following condition must be verified:

$$\underbrace{\frac{\delta_H A (\frac{1}{2} - N_H)}{(1 - N_H)^{1-\alpha} N_H}}_{U_L^*(N_H, 0)} < \underbrace{\frac{A}{(1 - N_H)^{1-\alpha}}}_{y(N_H, 0)} = \underbrace{\left[ \frac{\delta_H A (\frac{1}{2} - N_H)}{(1 - N_H)^{1-\alpha} N_H} \right]^\gamma}_{U_H^*(N_H, 0)}. \quad (51)$$

For  $U_L^*(N_H, 0) < y(N_H, 0)$  in (51) to hold,  $N_H > \delta_H/(2 + 2\delta_H)$  must be true. Next, since  $U_L^*(N_H, 0) < U_H^*(N_H, 0) \Leftrightarrow U_L^*(N_H, 0) < 1$ , and  $y(N_H, 0)$  is strictly increasing in  $N_H$  while  $U_H^*(N_H, 0)$  is strictly decreasing in it and  $U_H^*(\frac{1}{2}, 0) = 0$ , a sufficient condition for (51) to hold in equilibrium is that

$$\frac{\delta_H A (\frac{1}{2} - N_H)}{(1 - N_H)^{1-\alpha} N_H} < 1 \text{ when } N_H = \frac{\delta_H}{2 + 2\delta_H},$$

which in turn leads to the condition  $A < [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ .

Case (ii). This case occurs when the following condition holds:

$$\underbrace{\left[ \frac{\frac{1}{2}\delta_H A}{(1 - N_L)^{1-\alpha} N_L} \right]^\gamma}_{U_H^*(0, N_L)} < \underbrace{\frac{A}{(1 - N_L)^{1-\alpha}}}_{y(0, N_L)} \leq \underbrace{\frac{\frac{1}{2}\delta_H A}{(1 - N_L)^{1-\alpha} N_L}}_{U_L^*(0, N_L)}. \quad (52)$$

Using the expressions in (52), notice that for  $U_L^*(0, N_L) > y(0, N_L)$  to hold,  $N_L < \delta_H/2$ . But, since  $0 < \delta_H \leq 1$ ,  $N_L < \delta_H/2$  and  $U_L^*(0, N_L) > y(0, N_L)$  cannot possibly hold together. As a consequence, in equilibrium,  $U_L^*(0, N_L) = y(0, N_L)$  must necessarily prevail, implying in turn that  $N_L = \delta_H/2$ . Next, since  $U_L^*(N_H, 0) > U_H^*(N_H, 0) \Leftrightarrow U_L^*(N_H, 0) > 1$ , a sufficient condition for (52) to hold in equilibrium is that

$$\frac{\frac{1}{2}\delta_H A}{(1 - N_L)^{1-\alpha} N_L} > 1 \text{ when } N_L = \frac{\delta_H}{2},$$

which in turn leads to the condition  $A > (1 - \delta_H/2)^{1-\alpha}$ .

Case (iii). Keeping in mind that  $U_L^*(N_H, 0) = U_H^*(N_H, 0) \Leftrightarrow U_L^*(N_H, 0) = 1$ , this case will arise when the following equalities hold:

$$\underbrace{\frac{A}{(1 - N_H - N_L)^{1-\alpha}}}_{y(N_H, N_L)} = \underbrace{\frac{\delta_H A \left(\frac{1}{2} - N_H\right)}{(1 - N_H - N_L)^{1-\alpha} (N_L + N_H)}}_{U_L^*(N_H, N_L)} = 1. \quad (53)$$

Recalling the definition of  $\underline{N}$  in (13),  $U_L^*(N_H, N_L) = 1$  leads to  $[\delta_H (0.5 - N_H)] / [1 - A^{1/(1-\alpha)}] = 1$ , from where we obtain:

$$N_H = \frac{1}{2} - \frac{1 - A^{\frac{1}{1-\alpha}}}{\delta_H}. \quad (54)$$

Next, using again the definition of  $\underline{N}$  in (13), we may obtain  $N_L = [1 - A^{1/(1-\alpha)}] - N_H$ , which using (54) yields:

$$N_L = \left(1 - A^{\frac{1}{1-\alpha}}\right) \frac{1 + \delta_H}{\delta_H} - \frac{1}{2}. \quad (55)$$

Lastly, (54) implies that  $N_H > 0 \Leftrightarrow A > (1 - \delta_H/2)^{1-\alpha}$ , while (55) means that  $N_L > 0 \Leftrightarrow A < [(2 + \delta_H) / (2 + 2\delta_H)]^{1-\alpha}$ , completing the proof. ■

Figure 1A. Low-effectiveness equilibrium

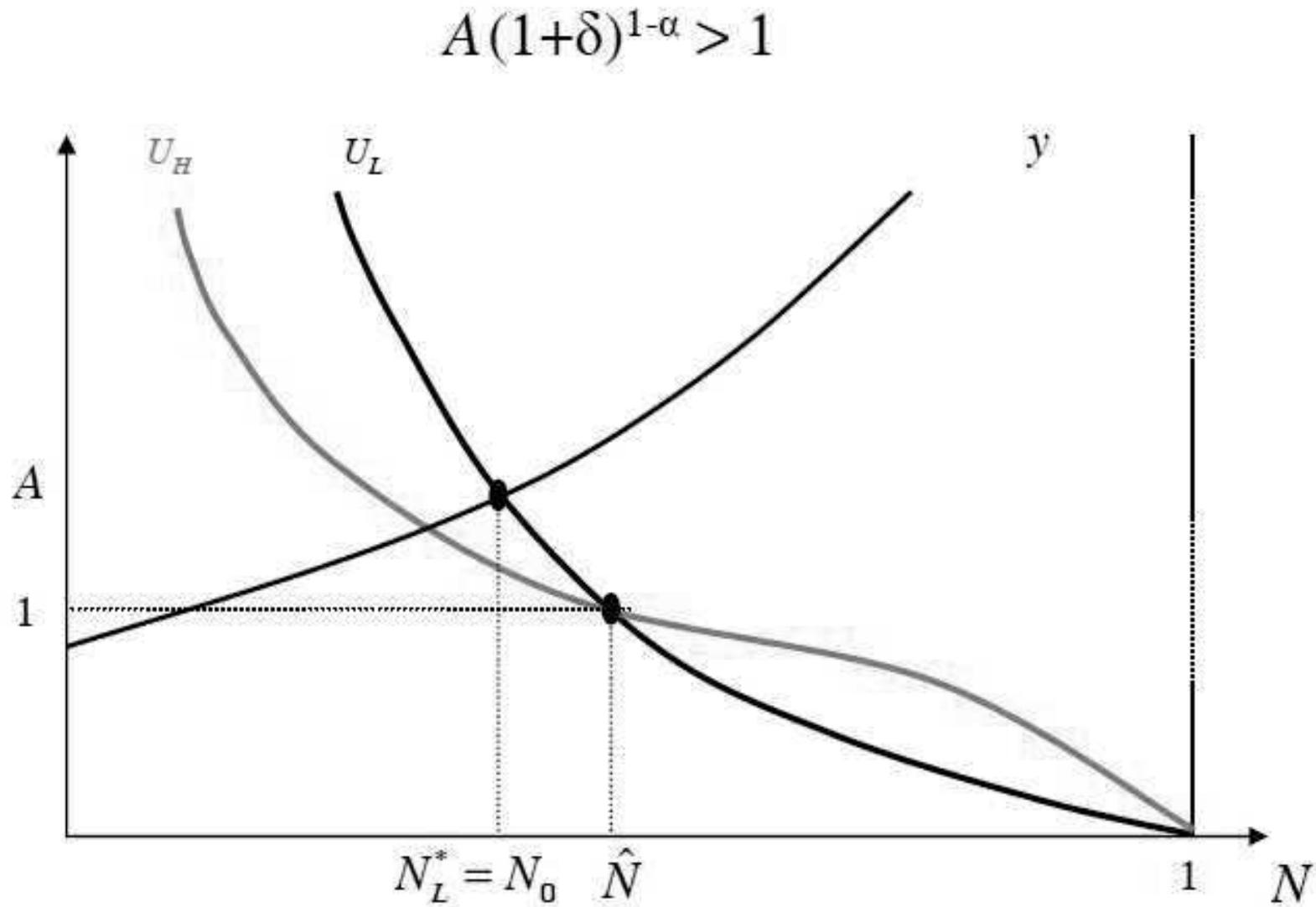


Figure 1B. High-effectiveness equilibrium with incomplete sorting

$$A(1+\delta)^{1-\alpha} < 1 \text{ and } N_1 < 0.5$$

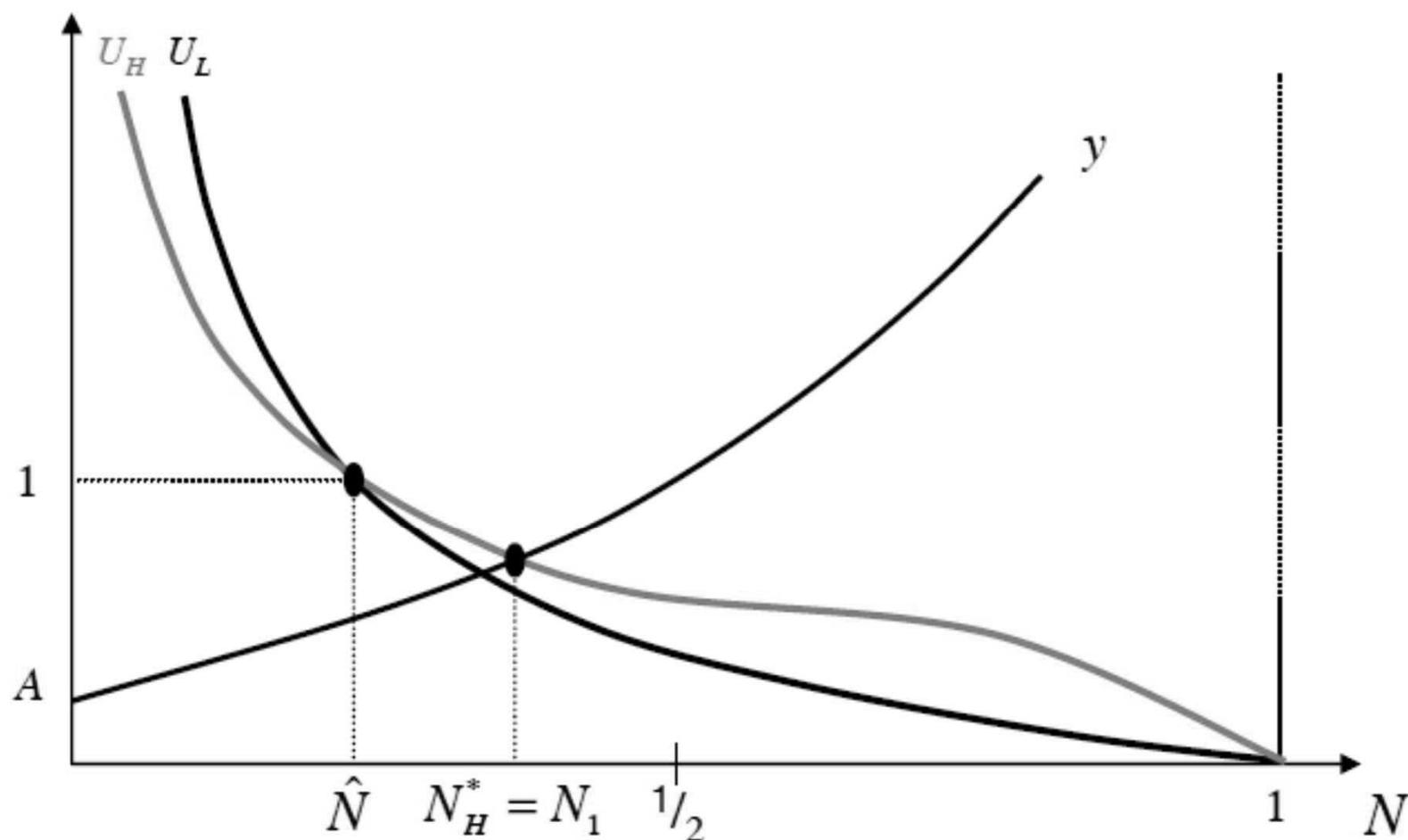


Figure 1C. High-effectiveness equilibrium with full sorting

$$A(1+\delta)^{1-\alpha} < 1 \text{ and } N_1 > 0.5$$

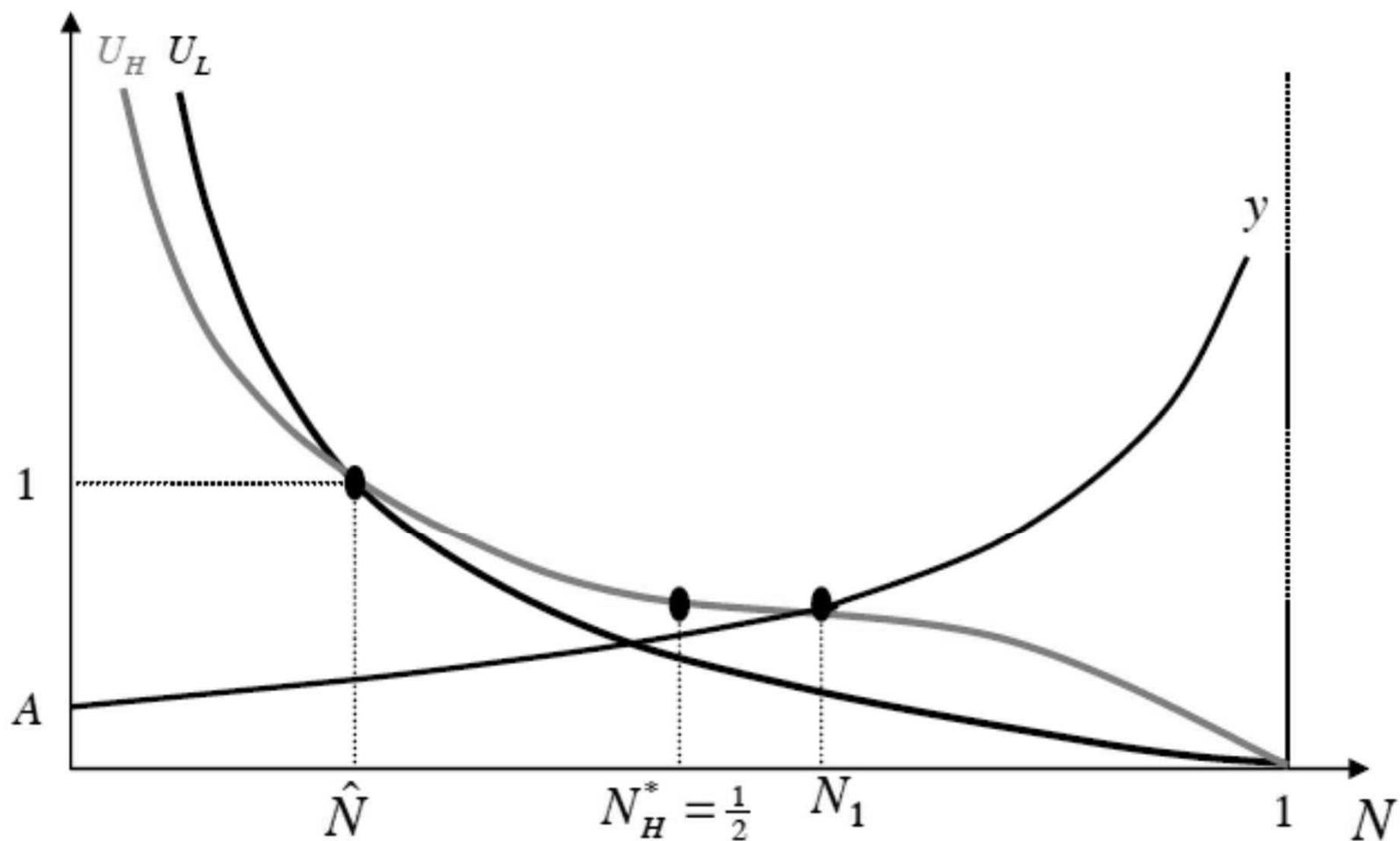


Figure 2. Effect of foreign aid injection

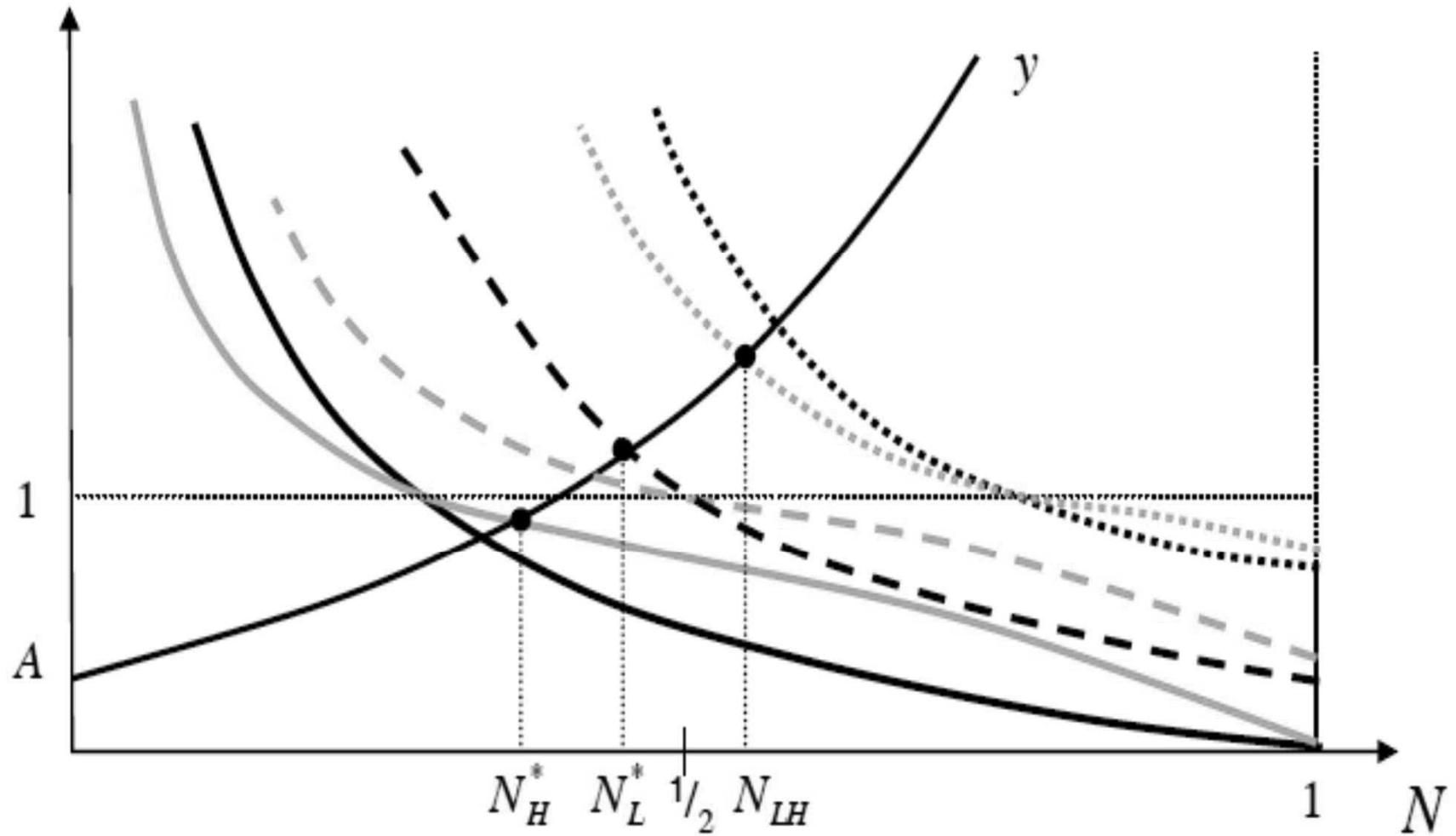


Figure 3. Foreign aid and non-profit sector output

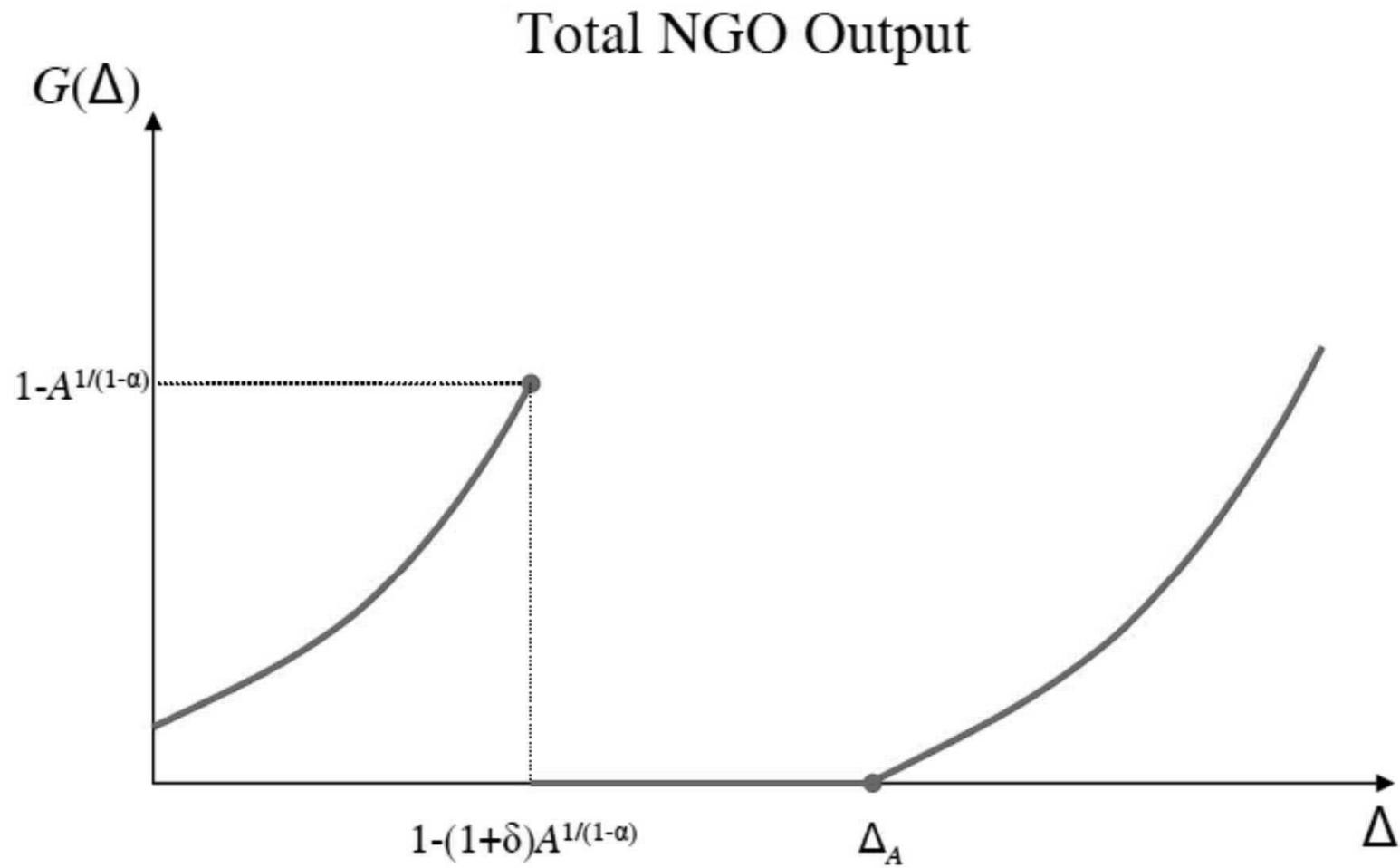


Figure 4. Public financing of non-profit sector

