Goodwill bazaar: NGO competition and giving to development

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Abstract

This paper builds a model of competition through fundraising between horizontally differentiated NGOs. NGOs allocate their time resource between working on the project and fundraising, which attracts private donations. If the market size is fixed, the fundraising levels increase with the number of NGOs and the free-entry equilibrium number of NGOs can be larger or smaller than the socially optimal number, depending on the efficiency of the fundraising technology. If the market size is endogenous and NGOs cooperate in attracting new donors, fundraising levels decrease with the number of NGOs and the free-entry equilibrium number of NGOs is smaller than the one that maximizes the welfare of donors and beneficiaries. If NGOs can divert funds for private use, multiple equilibria (with high diversion and no diversion of funds) appear.

1. Introduction

The share of giving to development causes through non-government organizations (NGOs) in total private giving in OECD countries is substantial. It is about 72% in Germany, 23% in the U.K., and 15% in the Netherlands (Micklewright and Wright, 2003). NGOs command an important role in development aid in the U.S. as well: more than 40% of U.S. overseas development funds are channeled through NGOs (Barro and McCleary, 2006). Increasingly, international aid agencies also have been considering NGOs a superior alternative to public channels. For instance, between 1973 and 1988 a mere 6% of World Bank projects went through NGOs, while in 1994 this number reached 50% (Hudock, 1999). More generally, the rise of NGOs during the 1980s has marked a key change in the foreign aid paradigm (Kanbur, 2006).

These changes raise important development policy questions about the optimal regulation of the NGO sector. One issue which has been studied, for instance, by Besley and Ghatak (2001) is the optimal contracting structure to be implemented between a government and an NGO to carry out a particular development project. One crucial feature, however, that distinguishes aid NGOs from the public sector organizations is that in order to raise funds that they afterwards use for their projects, NGOs have to compete between each other for donations. As the opening quote suggests, such competition, mainly done through fundraising activities (direct mailing, door-to-door campaigns, advertising in the media, organizing dinners, etc.), represents a potential source of inefficiency, i.e. excessive fundraising can occur as the competition between NGOs becomes more intense. In this paper, we take an industrial organization perspective and analyze the effects of competition between NGOs. More specifically, we address the following questions: If NGOs have to raise funds through fundraising activities and their resources are fungible between fundraising and working on their projects, how does a more intense competition affect the behavior of NGOs? Given free entry, how many NGOs would we observe in equilibrium? Does more intense competition between NGOs on the donation market increase social welfare (and, in particular, the welfare of beneficiaries)? How do the answers to these questions change when NGOs can divert part of the donations?
for private use? Do the answers change if NGOs also cooperate in attracting new donors?

To study these questions, we build a simple model of competition among non-profit, horizontally differentiated NGOs. Each NGO has a single project distinct from all other NGOs and a time resource that can be divided between working on the project and conducting fundraising activities. These activities serve to attract the donations from the donors that are located on a Salop circle (of fixed size). The output of the NGO project is produced using a Cobb–Douglas technology with time and collected funds as inputs. The number of NGOs on the market is tied down by a free-entry condition for NGO entrepreneurs that compare the altruistic returns – “making a difference” – in the NGO sector (that depend on the expected output of an NGO project) to the outside fixed wage.

One extension of the basic model analyzes the interplay between competition and cooperation among NGOs. In this extension, the size of the circle is endogenous and increases with total fundraising level. Another extension allows us to study an NGO’s joint decision to engage in fundraising and to divert a part of the raised funds. Here, an NGO entrepreneur maximizes the weighted sum of the project output and diverted funds.

Our main results are as follows. When the size of the “giving” market – i.e. the number of private donors – is fixed, a more intense competition for donations leads to higher fundraising levels. This happens for the following reason. Fundraising serves to “convince” donors that the NGO’s project is located “closer” to their ideal “points.” An NGO’s time is fungible between fundraising and working on the project. Time and collected funds are complementary in the NGO’s production function. The entry of an additional NGO in the market reduces both the marginal benefit (as there are more NGOs fishing in a common donor pool) and the marginal cost of fundraising (as this cost consists of the opportunity cost of time spent raising funds instead of working on the project, and the additional entrant reduces the scale of the project). Given the fixed costs that have to be covered using a part of the funds collected, the effect on the marginal cost is stronger than on the marginal benefit, in proportional terms. Therefore, the NGO chooses to increase its fundraising.

From the normative point of view, the unregulated competition generates the outcome with a number of NGOs above or below the optimal number (from the society’s or the beneficiaries’ point of view), depending on the opportunity cost of fundraising time (or, equivalently, the efficiency of the fundraising technology), and the elasticity of substitution between NGO projects in the beneficiaries’ welfare function. A higher opportunity cost of fundraising time implies that NGOs put lower fundraising effort, which reduces the welfare of donors. For a sufficiently high level of the opportunity cost of fundraising time, this negative effect on the welfare of donors outweighs all the other effects, which means that the equilibrium number of NGOs is below the social optimum.

From the beneficiaries point of view, given that NGOs’ development projects are likely to affect their well-being in a complementary way, an increase in the number of NGOs has two effects on their welfare. On the one hand, along the extensive margin, there are more varieties of development projects. On the other hand, along the intensive margin, an additional NGO imposes a negative externality on the impact of all the existing NGOs, and therefore leads to a welfare decrease. For a sufficiently low elasticity of substitution between projects, the variety effect dominates the negative externality effect and the free-entry number of NGOs is too low from the beneficiaries’ point of view.

This result for the welfare of beneficiaries changes when the size of the donations market is endogenous and fundraising increases the size of the market. In this case, a more intense competition for donations leads to lower fundraising. This occurs because NGOs now both compete and cooperate in increasing the size of the market, and the cooperation (positive externality) effect dominates the competition effect. Thus, the increase in the market size caused by the entry of one additional NGO relaxes the competition. Given that in this case an additional NGO imposes a positive externality on the impact of all the existing NGOs, the free-entry number of NGOs is lower than the number preferred by the beneficiaries.

Finally, if NGOs can divert part of their funds and the NGO entrepreneur maximizes a weighted sum of project output and funds diverted, the ease of entry determines the level of diversion, and multiple equilibria (with high and low diversion of funds) can occur. This happens because for an NGO entrepreneur, fundraising and diversion are complements. The opportunity cost of diverting funds depends on how productive one unit of funds is in the project output. More fundraising means less time devoted to the project and lower productivity of funds in the project output. This reduces the opportunity cost of diverting funds and increases the incentives to divert. When there is a sufficiently high number of NGOs on the market, fundraising competition becomes very intense and NGOs devote very little amount of time to their projects. This induces a (unique) equilibrium with the maximum level of diversion. On the contrary, for a sufficiently low number of NGOs, fundraising competition is very weak, NGOs devote most of their time to projects, and the opportunity cost of diverting funds is very high. Consequently, this induces a (unique) equilibrium with no diversion. Finally for an intermediate number of NGOs on the market, both equilibria exist (one with no diversion and the other with maximum diversion of funds).

Despite the maturity of the nonprofit literature, Bilodeau and Steinberg (2006) point out that the papers that study the long-run equilibrium of the non-profit sector are very few. The most well-known paper is by Rose-Ackerman (1982). She presents a model in which charities are differentiated along one dimension, “ideology” (just like in our model) and donors are initially uninformed of charities. Charities thus inform the donors through fundraising and donors give to charities which are closest to their preferred point along the “ideology”. Moreover, the managers of charities maximize revenue from fundraising and there is free entry. Rose-Ackerman finds that competition for donations leads non-profits to engage in excessive fundraising, i.e. to spend very high proportion of their budgets for fundraising. This suggests a rationale for competition-reducing umbrella organizations such as United Way. That paper, however, has two limitations. First, the charities are assumed to maximize revenue. This, together with free entry, implies that as far as the net returns on fundraising are positive, fundraising will increase and the new charities will be formed, which drives the main conclusion about excessive fundraising. This assumes a view of charity entrepreneurs as pure budget maximizers. However, in an important empirical contribution, Okten and Weisbrod (2000) show that charities do not behave as budget maximizers: the marginal return to fundraising far exceeds its cost. In this paper, we thus assume a more realistic view of NGOs by assuming that they have a development mission, and that they maximize the impact of this mission and choose their fundraising efforts accordingly. This is the first reason why we get a result different from that of Rose-Ackerman.

Second, in Rose-Ackerman’s paper no value is given to the fact that higher entry of non-profit firms increases the welfare of donors by reducing the average distance between the closest non-profit and donors’ preferred points. This is the second reason why our results differ from those of her paper. More generally, the welfare analysis in that paper is done only implicitly, without specifying a social welfare function (notably, in the conclusion of the paper, Rose-Ackerman suggests that exploring the tradeoff between variety and non-profits’ output is an important extension to consider). In this paper, we close
this gap by giving explicit weight to this ‘transport-cost’ reducing effect of entry and conducting a full-fledged welfare analysis.

Several other papers consider the related questions but look only at some aspects of the problem. In the paper by Bilodeau and Slivinski (1997), charities can produce bundles of public goods. They show that competition between charities leads to specialization in production and that the equilibrium provision of public goods through competing charities is higher than the one through a monopopy charity. The authors, however, do not perform a welfare analysis by looking at the overall effect of higher competition between charities.

Two papers (Economides and Rose-Ackerman, 1993; Pestieau and Sato, 2006) employ the monopolistic-competition approach to the donations market and the question of the optimal number of charities. They derive the optimal number of charities as a function of set-up costs and of donor attachment, in a setup similar to ours. However, it differs from ours in that fundraising is not present in their model, while in our paper it is a fundamental decision variable (see Section 2.1 concerning the importance of strategic fundraising activities by NGOs).

Chau and Huysentruyt (2006) study non-profit competition from the contracting point of view. They design a model where the government contracts with competing non-profits to provide a public good. They show that such competitive contracting procedure for the formation of public-private partnerships leads to a compromise between the preferred points of the public and the contracted nonprofit. In their paper, however, fundraising is absent and there is no free entry (the number of nonprofits is restricted to two).

There is a small emerging literature that studies the diversion of funds by NGOs. Castaneda et al. (2008) present a model in which non-profits can divert a part of donations for perquisite consumption. They analyze the effect of an (exogenous) increase in the number of competing non-profits on the amount of diverted funds and on fundraising expenses. They show that increased competition reduces diversion and increases fundraising. The increase in the number of non-profits is, however, exogenous, and thus one finds it difficult to interpret their results in a world where not-for-profit entrepreneurs can freely enter the donations market. Compared to this, we allow for endogenous entry of NGOs and characterize the conditions that lead to high diversion of funds.

Rowat and Seabright (2006) construct a principal-agent model where donors act as principals and aid agencies as agents. The aid agency serves as a platform on a two-sided market, with altruistic donors on one end and aid recipients on the other. They show that in a setting with both moral hazard and adverse selection, the declaration of a non-profit status serves as a costly commitment mechanism to curb diversion of funds by aid agencies. Since our main interest regards the entry of NGOs on the donations market, we abstract from such informational asymmetries. In our model the diversion of funds in equilibrium arises not because of asymmetric information, but because of excessive competition between NGOs.

2. Basic model

There is little formal empirical work studying NGOs competition in the market for private giving to development (Micklewright and Wright, 2003). Still, from the descriptive and case studies literature, we extract a few stylized facts that help us to formulate the basic modelling assumptions about the functioning of the NGOs sector.

2.1. Stylized facts about the functioning of the NGO sector

Five basic facts seem particularly important for the pattern of competition between NGOs in the private donations market.

2.1.1. NGO projects are horizontally differentiated

Several observers point out that NGOs (and, more generally, non-profit firms) try to differentiate the services and activities they offer from those of other NGOs. Pepall et al. (2006) study the role of competitive forces in the provision of social services among U.S. religious denominations. They find that churches try to differentiate themselves from other churches by offering different sets of visible social services, such as organizing soup kitchens, arranging hospital visits, etc. The authors say, “a church or temple may well be unwilling, or unable to alter its basic spiritual message. Yet it can nevertheless attract individuals or households by instead offering new and different ways to deepen and enrich their spiritual experience through the participation in the community.”

Bilodeau and Slivinski (1997) note that “[non-profit] firms can attempt to differentiate themselves by offering public goods that have particular characteristics. For example, communities often include several nonprofit organizations that provide a variety of in-kind assistance to the indigent, shelters for battered spouses or runaway teenagers, or support alternative kinds of medical research. Private post-secondary educational institutions in the U.S. differ considerably in the nature of the education they provide, and are partly funded through private contributions. The towns of London, Ontario and Sherbrooke, Quebec are each home to a number of youth hockey leagues, each of them offering different programs and each soliciting private contributions to aid their operations.”

Hakkarainen et al. (2002) note that the similar reasoning applies also to NGOs in the developing world. The authors write, “In order to survive, a civil society organization has to cut a niche for itself.” Also, many advisers on NGO management underline the importance of differentiation. For instance, Srinivas (2006) notes that “... the reality is such that NGOs, in many cases, are in competition with each other to seek and find funds. [The strategy is] to find the differences and uniqueness of your own programme or project. What new approaches have you used? Usually, each NGO services a different aspect or a different community — with rare overlap.”

2.1.2. NGOs compete for private donations through fundraising

Smillie (1995) in his study of the non-profit sector in international development recognizes that fundraising is an essential component of NGOs activities. In his analysis of the disaster relief NGOs, De Waal (1997) also emphasizes the (sometimes ruthless) efforts of NGOs to attract private donations through fundraising advertising. In particular, he describes the Gresham’s Law as applied to the NGO sector: “[An organization that is] most determined to get the highest media profile obtains the most funds ... In doing so it prioritizes the requirements of fundraising: it follows the TV cameras, ... engages in picturesque and emotive programmes (food and medicine, best of all for children), it abandons scruples about when to give in and when to leave, and it forsakes cooperation with its peers for advertising its brand name.”

In his poignant account of the development aid industry, Hancock (1989) describes the example of an American NGO, World Vision, aggressively competing for donors in the Australian market with local religious organizations: “On 21 December 1984, unable to resist the allure of Ethiopian famine pictures, World Vision ran an Australia-wide Christmas Special television show calling on the public in that country to give it funds. In so doing it broke an explicit understanding with the Australian Council of Churches that it would not run such television spectacles in competition with the ACC’s traditional Christmas Bowl appeal. Such ruthless treatment of ‘rivals’ pays, however: the American charity is, today, the largest voluntary agency in Australia.”

Kouchner (1991) describes the “Law of the Hype” of the development aid industry (La loi du tapage). It essentially means that the more an NGO talks about a certain emergency, the more individual donors are likely to give to this cause: “an un-televised misery is an unknown misery.”

2.1.3. Private donors have “spatial” preferences about NGOs and are sensitive to fundraising

According to Andreoni and Payne (2003), it is plausible to consider the following decision pattern for donors: “[Donors] seem to have
latent demands to donate. Until they are asked, this demand goes unexpressed... Individuals who may have ‘always wanted to donate’ but ‘didn’t know the address’ will be able to donate when solicited by the charity.” This is closely related to the above point about the differentiation of NGOs.

Thornton (2006) also states that “product differentiation in the nonprofit context can be driven by several factors. Ideology, methodology, or targeted beneficiaries can differentiate an organization’s product or service. In practical terms, this implies that a donor may prefer Baptist churches to Pentecostal, or domestic antipoverty initiatives to foreign. Donors will choose the nonprofit that most closely matches their own preferences.”

2.1.4. NGOs’ resources are fungible between fundraising and working on the project

Fungibility of resources is a classical issue in the literature on nonprofit firms. Okten and Weisbrod (2000) show in their study of the U.S. nonprofit sector that non-profits face a trade-off: on one hand, increasing fundraising increases donations through advertising and informing donors (the direct or “advertising” effect), but on the other hand, it implies devoting a lower fraction of total revenue to output of the firm (the indirect or “price” effect).

2.1.5. The entry decision of NGO entrepreneurs is affected by relative returns in the for-profit and non-profit sectors

Based on the findings of the Brookings Institution survey of 1200 non-profit members, Light (2003) shows that 97% of them feel that they accomplish something worthwhile with their job and are happy to take the lower pay to have a chance to “make a difference.”

Even in for-profit firms, entrepreneurship does not pay, on average, in monetary terms. Hamilton (2000) finds that the largest part of entrepreneurs get less out of their businesses than what they could earn as employees. Based on this and similar evidence, Benz (forthcoming) makes the argument that all kinds of entrepreneurship is better described as a non-profit activity, driven by psychological payoffs that are heavy enough to outweigh the monetary benefits of the wage of an employee.

The Economist (2006) dedicates an entire survey to modern philanthropy and discusses the motivations of the founders of charitable organizations. It finds that the founders are “actively involved in their foundations, which for many have become a second career.” Typically these are entrepreneurs coming from the private sector. Prominent examples include Bill Gates, George Soros, and Pierre Omidyar (the founder of eBay). This survey also shows that an important motivation to start foundations, which for many have become a second career.

The objective of an NGO is to maximize the impact of its project (3) subject to the non-distribution constraint (1). In this model crucially differs from the principal studies of nonprofits (Rose-Ackerman, 1982; Andreoni and Payne, 2003) which instead assume that nonprofits act as revenue maximizers. We will see below that relaxing this assumption considerably alters the results concerning welfare.

Donors are located on the circle and decide between giving to one of the ‘nearest’ NGOs. This distance is defined in the following sense: each donor has her perception of which dimension of development is the most urgent one (e.g., promoting women’s rights, banning child labor, providing education, fighting diseases, etc.), and the less the projects of NGOs correspond to this dimension, the further the NGOs are located on the circle. Thus donors, in choosing an NGO, act as if they care not simply about the outcome (increasing the overall well-being of beneficiaries), but also about the way such increase is implemented. In other words, they have a “procedural utility” component (Frey et al., 2004). A donor also enjoys a positive constant utility from giving and a variable expected utility from “participation” in development. This latter part depends on the expected total impact of the projects. The higher is the expected overall impact of development NGOs, the more the donor enjoys giving for development. Thus, summarizing, the

An NGO i faces the non-distribution constraint — in that it cannot retain donations it receives:

$$D_i(y_i) = cD_i(y_i) + f + F_i,$$  
(1)

where $$y_i$$ is time spent in fundraising activities, $$D_i$$ is the amount of donations $$i$$ collects, $$f$$ is the fixed cost of entry, $$c$$ is the cost of administering a unit of donations, and $$F_i$$ is the amount of resources the NGO invests in the development project (both $$f$$ and $$c$$ are strictly lower than 1). Thus, the amount of funds devoted to the project is

$$F_i(y_i) = D_i(y_i)(1 - c) - f.$$  
(2)

The impact of the project is produced using a technology described by the following production function, with time and money as inputs:

$$Q_i = F_i(y_i)\tau_i,$$  
(3)

where

$$\tau_i = 1 - v y_i$$

is the effective time spent implementing the project. $$v$$ measures the opportunity cost of fundraising time, in terms of effective time devoted to the project: one minute more for fundraising means $$v$$ effective minutes less for the project. Alternatively $$1/v$$ can be also interpreted as a measure of efficiency of the technology of fundraising.

Time and money enter into the production function multiplicatively. Clearly, given the Cobb–Douglas production function, it is never optimal for the NGO to choose the level of fundraising equal to (or higher than) $$1/v$$.

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1 In other words, we normalize the fixed size of the donation market to 1.

2 More general functional forms can be adopted, at the cost of increased mathematical complexity. As far as the elasticity of substitution between time and money is not too high, the qualitative results of the model do not change. Moreover, in this case, the returns to scale also do not affect the equilibrium.

3 Chau and Huysentruyt (2006) and Pestieau and Sato (2006) also consider similar setups of location on the preference circle/line. In those papers, however, the strategic variable is location/platform of the nonprofit and not fundraising expenditures, as in our case.

4 Note, however, that our utility formulation is different from the “warm-glow” utility introduced by Andreoni (1989): the utility of the donor does not depend on the amount she gives (which is the crucial element of the “warm-glow” utility model).
expected utility of the donor located at distance $x$ from the closest NGO $i$ is

$$EU(x) = u + \text{Eu} \left( \sum_{j=1}^{n} Q_j \right) - \frac{r}{y_i} x,$$  \hspace{1cm} (4)

where $u_i$ is the constant part of the utility from giving, $\text{Eu} \left( \sum_{j=1}^{n} Q_j \right)$ is the expected participatory utility of giving, $yi$ is the fundraising effort by NGO $i$, and $\text{Eu}(\cdot)$ is an increasing function. The fundraising effort of an NGO serves to persuade donors that the NGO’s project is ‘closer’ to their preferred dimension of development. Note that $r$ is the parameter which measures the weight that the donor gives to project congruence (with respect to the other components of her utility): the higher is $r$, the higher is the importance of congruence between the preferred dimension of development of the donor and the NGO mission.

This is the second modelling difference with respect to the constant part of the utility, $u_i$, is high enough, so that all donors always prefer to give to some NGO. This assumption corresponds to ruling out the “monopoly” region of consumer demand curve in the Salop (1979) model. In other words, we assume that the donations market is fully “covered” by NGOs.

We also assume that donors have rational expectations, so that even if at the moment of donation the project impacts are not yet realized, upon their realization the expectations of donors are confirmed.

Let all NGOs (except $i$) choose fundraising effort $y$, and the NGO $i$ choose effort $yi$. The donor located at distance $x$ from $i$ is indifferent between giving to $i$ and giving to the other nearest NGO if

$$u + \text{Eu} \left( \sum_{j=1, j \neq i}^{n} Q_j \right) - \frac{r}{y_i} x = u + \text{Eu} \left( \sum_{j=1}^{n} Q_j \right) - \frac{r}{y} \left( \frac{1}{n} - x \right),$$  \hspace{1cm} (5)

where $n$ is the total number of NGOs in the donations market.

2.3. Equilibrium

From Eq. (5), total donations that NGO $i$ collects are

$$D_i(y_i, y) = 2x = \frac{2}{n} y_i - y_i.$$  \hspace{1cm} (6)

Total donations $D_i(y_i, y)$ to NGO $i$ depends positively on its fundraising effort $yi$ and negatively on the fundraising effort $y$ of the other nearest competing NGOs. In other words, by increasing its fundraising level, an NGO imposes a negative externality on the neighboring NGOs.

This donation function looks similar to a contest success function extensively discussed in the public-choice literature (Tullock, 1980). Note also that it is increasing at a decreasing rate, i.e. the marginal donation returns to fundraising are decreasing.

NGO $i$’s problem is to maximize the impact of its project by choosing its fundraising effort $yi$, given the fundraising efforts of other NGOs, $y$:

$$\text{max } Q_i(y_i, y).$$  \hspace{1cm} (7)

Given Eq. (3), the first-order condition of this problem is:

$$\frac{\partial F_i}{\partial y_i} (1 - vy_i) = vF_i(y_i).$$  \hspace{1cm} (8)

The left-hand side is the marginal benefit of higher fundraising effort, in terms of the impact of the project. For each unit of time spent in the development project, higher effort increases the donations that the NGO can invest into its project by $\frac{\partial F_i}{\partial y_i}$. The right-hand side is the marginal cost: one extra unit of time spent for fundraising reduces time spent implementing the project by $v$, and each unit of this reduction implies a fall in project impact equal to $F_i$.

Using the functional forms imposed, the first-order condition (8) becomes

$$\frac{\partial Q_i}{\partial y_i} (1 - c) \frac{2}{n} y (1 - vy_i) - \left( 1 - c \right) \frac{2}{n} y_i - f = 0.$$  \hspace{1cm} (9)

Note that the second-order condition,

$$\frac{\partial^2 Q_i}{\partial y_i^2} = -4v(1 - c)(1 + vy_i) < 0,$$  \hspace{1cm} (10)

is always satisfied.

2.3.1. Equilibrium fundraising effort and project impact

We analyze symmetric Nash equilibria, $yi = y$. Then,

$$\frac{\partial F_i}{\partial y_i} |_{y_i = y} = \frac{1 - c}{2ny} - f,$$  \hspace{1cm} (11)

Note that the funds devoted to the project, $F_i$, cannot be negative. Thus, we need that the donations collected in the symmetric equilibrium, net of administrative costs, $\frac{1}{n} - \frac{c}{n}$, are sufficiently high to cover the fixed cost of the project, $f$. In other words, $\frac{1}{n} - \frac{c}{n} - f$ is always positive.\(^5\)

The first-order condition (8) thus becomes

$$\frac{1 - c}{n} - f = v \left( \frac{1 - c}{n} - f \right).$$  \hspace{1cm} (12)

Solving Eq. (12) for $y$, we find the equilibrium fundraising effort, given the number of NGOs on the market, $n$:

$$y^* = \frac{1}{2} \frac{1 - c}{3(1 - c) - 2fn}.$$  \hspace{1cm} (13)

It is useful to define the following value:

$$\hat{y} = y^* |_{c=1} = \frac{1 - c}{3(1 - c) - 2fn}.$$  \hspace{1cm} (14)

The equilibrium project impact, given $n$, is

$$Q^*(n) = \left( \frac{1 - c}{n} - f \right) \left( 1 - vy^*(n) \right) = \left( \frac{1 - c}{n} - f \right) (1 - \hat{y}(n)).$$  \hspace{1cm} (15)

Note that the equilibrium project impact, $Q^*(n)$, is independent\(^7\) of $v$. A simple differentiation of expressions (13) and (15) gives then the following comparative statics results.

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\(^5\) A more realistic (but less tractable) model would assume that NGOs compete not only by exerting fundraising effort, but also by reducing administrative expenses. This way, an increased competition between NGOs would have an additional positive effect through reducing such expenses. In this paper, we abstract from this possibility and leave it for future work.

\(^6\) For a given number $n$ of NGOs, we consider situations such that competition is not too strong (i.e. such that $\frac{1}{n} - \frac{c}{n} - f > 0$) so that each NGO in the market has a positive project output $Q^*(n)$. In the free entry equilibrium, this will always be the case, as will be seen later on. Also, keep in mind that the mass of donors at each point of the circle is normalized to 1. If we allow for a mass $L$ of donors at any point on the circle, this condition becomes $L(1 - c) > fn$, which implies that the number of NGOs has to satisfy $n < \frac{L}{(1 - c)}$.

\(^7\) Indeed, given our linear formulation $C(v) = vy(y)$ of the time cost of fundraising, any change in $v$ is matched one for one by a change in the equilibrium fundraising effort $y^*(n)$ and $vy^*(n)$ remains independent of $v$. It is easy to see that this property would also hold for any convex cost function of fundraising of the form $C(v) = vy^2$ with $y \geq 1$. 
Proposition 1. The symmetric Nash equilibrium fundraising effort, $y^*$, increases with the number of NGOs on the market, with the fixed cost of the project, with the unit cost of administering donations, and decreases with the opportunity cost of fundraising time:

$$\frac{\partial y^*}{\partial n}, \frac{\partial y^*}{\partial f}, \frac{\partial y^*}{\partial c}, \frac{\partial y^*}{\partial v} < 0.$$

The equilibrium project impact, $Q^*$, decreases with the number of NGOs on the market, with the fixed cost of the project, and with the unit cost of administering donations:

$$\frac{dQ^*}{dn} < 0, \frac{dQ^*}{df} < 0, \frac{dQ^*}{dc} < 0.$$

Intuitively, an increase in the number of NGOs on the market reduces less the marginal benefit of fundraising, $\frac{d}{dy} (1 - vy)$, than it reduces the marginal cost of fundraising, $vf(y)$. Hence, for each NGO, the incentive to engage in fundraising is higher, and this, in equilibrium, induces a higher value of $y^*$. Similarly, both a higher fixed cost, $f$, and a higher administrative cost, $c$, decrease the marginal profitability of time devoted to the project; i.e. they decrease the marginal cost of fundraising. The resulting outcome is again a higher equilibrium value of $y^*$. Finally, an increase in the opportunity cost of fundraising time, $v$, both increases the marginal cost of fundraising and reduces its marginal benefit (by reducing the amount of the time input in the production function). These changes, put together, decrease the incentives to do fundraising.

The comparative statics on $Q$ are also straightforward. A larger number of NGOs tends to reduce the equilibrium project impact through two channels. First, there is the usual “business stealing” effect of increased competition. An additional NGO on the donations market reduces the market share of each existing NGO. Second, as we have shown above, a higher $n$ triggers tougher competition for funds and thus NGOs shift more of their time from the implementation of development projects towards fundraising. Through both channels, an increase in $n$ leads to a reduction of project impact for each NGO. Thus, NGOs impose a negative externality on the impact of each other’s project. The intuition for the comparative statics on fixed and administration costs, $f$ and $c$, is similar.

Our finding that the equilibrium fundraising effort increases with the number of NGOs on the market is in line with the empirical evidence on non-profits provided by Feigenbaum (1987). She finds, using the data from the U.S. medical charities, that fundraising expenditures increase when the market becomes less concentrated, i.e. when the number of charities on the market increases.

2.3.2. Free entry

We assume that NGOs are founded by ‘NGO entrepreneurs’, who are altruistically concerned with some development goal, but also can engage in other activities (such as working in the for-profit sector). The free-entry condition requires that the equilibrium payoff to an NGO entrepreneur equals her outside option that she can get in the for-profit sector. Let this outside option be exogenous and equal to $w$, and let her get the payoff $\partial Q^*(n)$ from the impact of the project where $\delta$ measures the degree of altruism of NGO entrepreneurs.

Under the free-entry condition, the equilibrium number of NGOs, $n^*$, satisfies

$$\partial Q^*(n) = w.$$  \hspace{1cm} (18)

Fig. 1 represents the free-entry equilibrium in this benchmark model. Given that the equilibrium project impact monotonically decreases with the number of NGOs on the market, the free-entry equilibrium is unique and stable. We thus immediately get the following comparative statics results.

$$\frac{dn^*}{dn} > 0, \frac{dn^*}{dw} < 0, \frac{dn^*}{df} < 0, \frac{dn^*}{dc} < 0.$$  \hspace{1cm} (19)

The first two comparative statics results come from Eq. (18). The last two results come directly from the comparative statics on $Q^*(n)$, described by Eq. (17).

Intuitively, an increase in NGO entrepreneurs’ outside option, $w$, temporarily sets the payoff to NGO entrepreneurs present on the donations market below their outside option. This induces some entrepreneurs to close their NGOs and quit the market, which reduces the number of NGOs, relaxes the competition for funds, and, therefore, increases the project impact for all remaining NGOs. This process continues until the free-entry condition (18) is again satisfied. The intuition for the remaining three comparative statics results is similar.

2.4. Welfare

In this sub-section we analyze the welfare properties of the free-entry equilibrium.

We assume that beneficiaries of NGO projects (as a group whose size is normalized to 1) care about the impact of the projects. Their welfare can be represented by a Dixit–Stiglitz function

$$W^B = \left( \sum_{j=1}^{n} Q_j(n)^{\rho} \right)^{\frac{1}{\rho}},$$

where $\rho$ is the substitution parameter lying between 0 and 1. Through this parameter $\rho$, this specification allows a convenient parameterization of the degree of complementarity of development projects in the welfare of recipients.

The social welfare is the sum of the welfare of donors, that of beneficiaries, and that of NGO entrepreneurs:

$$W = W^D + W^B + W^N.$$  \hspace{1cm} (21)

1. The welfare of donors,

$$W^D(n) = 2n \int_0^1 \left[ u + Eu \left( \sum_{j=1}^{n} Q_j \right) - \frac{T(n)}{4n} \frac{y_i}{y_i} \right] dx = u + Eu\left( nQ^*(n) \right) - \frac{T(n)}{4n} \frac{y_i}{y_i}.$$  \hspace{1cm} (22)
is made of three parts: the total constant utility \( u \) from giving, the total participatory utility \( Eu(nQ^*(n)) \) (increasing in projects’ total impact) and the total disutility arising from incongruence \( T(n) \) (which decreases in total fundraising effort).

2. The welfare of beneficiaries, \( W^B(n) = n^{1/2}Q^*(n) \). (23)

3. The welfare of NGO entrepreneurs, \( W^N(n) = n(\alpha Q^* - w) = n\alpha Q^* - wn \). (24)

equals the total payoff to the entrepreneurs less their total opportunity cost.

This configuration thus underlines the discrepancy of preferences concerning the way aid money should be channeled to projects done by NGOs in developing countries. Donors have precise priorities concerning their dimensions of development and are somewhat conservative concerning them. So are NGO entrepreneurs (they have their missions) and have a “warm-glow” view concerning those dimensions: not only they prefer one dimension over all others, but they also prefer to actively work in that dimension themselves. In turn, beneficiaries do not have a preferred dimension but enjoy the output of the different NGOs’ projects and consider those projects as complementary (at least, to some degree).

Maximizing \( W \) with respect to \( n \), we find the socially optimal number of NGOs:

\[
\frac{dW}{dn} = \frac{dW^B}{dn} + \frac{dW^N}{dn} + \frac{dW^F}{dn} = 0. 
\] (25)

It is useful to define the elasticity of equilibrium project impact with respect to the number of NGOs:

\[
\varepsilon = \frac{n}{Q^*(n)} \frac{dQ^*(n)}{dn}. 
\] (26)

The following Lemma holds.

**Lemma 3.** The elasticity of equilibrium project impact with respect to the number of NGOs in the market is negative and larger than 1 in absolute value. Equivalently, total project impact decreases with the number of NGOs in the market:

\[
\frac{d(nQ^*(n))}{dn} < 0. 
\] (27)

**Proof.** See Appendix A. □

Lemma 3 states that the positive effect on total project impact from the entry of one additional NGO on the donations market is smaller than the negative externality that this entrant imposes on the impact of all the existing NGOs’ projects.

Now we can analyze the effect of a higher number of NGOs on total welfare.

1. The effect of a higher number of NGOs on donors’ utility is:

\[
\frac{dW^D(n)}{dn} = u'\left(\frac{1}{\rho}Q^* + n\frac{dQ^*}{dn}\right) - dT(n) \frac{dn}{dn}. 
\] (28)

The first term is the effect on the participatory utility from giving. It is negative, by Lemma 3. The second term decreases with \( n \). This is because the entry of one additional NGO increases fundraising effort of all existing NGOs (by Proposition 1), and thus \( a \) decreases the total incongruence disutility for donors. The overall effect on the welfare of donors is ambiguous. On the one hand, one additional NGO on the market reduces the total project impact and the participatory utility from giving. On the other hand, it makes the average distance to the “nearest” NGO closer for each donor.

2. The effect on the welfare of beneficiaries is given by:

\[
\frac{dW^B(n)}{dn} = n^{1/2} \left[ \frac{1}{\rho}Q^* + n\frac{dQ^*}{dn} \right] 
\]

or, after regrouping terms,

\[
\frac{dW^B(n)}{dn} = n^{1/2} \left[ \left( \frac{1}{\rho} - 1 \right)Q^* + \frac{d(nQ^*(n))}{dn} \right]. 
\] (30)

By Lemma 3, the second term in the square brackets is negative (and is independent of \( \rho \)). The first term in the square brackets takes value zero for \( \rho = 1 \) (thus \( \frac{d\omega^B}{dn} \) is negative at \( \rho = 1 \)) and goes to infinity as \( \rho \) tends to 0. Therefore, for \( \rho \) below some value \( \bar{\rho} \), \( \frac{d\omega^B}{dn} \) turns positive. An increase in the number of NGOs has two effects on the welfare of beneficiaries. On one hand, an additional NGO means more of a variety and thus, given that \( \rho = [0, 1] \), this implies an increase in the beneficiaries’ welfare. On the other hand, each additional NGO imposes a negative externality on the impact of all projects’ output, and therefore leads to a welfare decrease. The size of the first effect depends on the substitution coefficient \( \rho \). If different projects are close substitutes for beneficiaries (i.e., \( \rho \) is close to 1), the first effect is relatively small and thus the negative effect dominates. Contrarily, if the projects are strongly complementary from the beneficiaries’ point of view (i.e., \( \rho \) is small enough), the positive variety effect dominates the negative externality effect.

3. The effect on the welfare of NGO entrepreneurs is:

\[
\frac{dW^N(n)}{dn} = n\alpha \frac{dQ^*(n)}{dn} + [\alpha Q^*(n) - w]. 
\] (31)

The term in square brackets constitutes the net benefit from an additional NGO on the market (it equals zero in the free-entry equilibrium). The first term is the negative externality that each NGO imposes on the welfare of other NGO’s (by reducing their projects’ impact). Thus, in the free-entry equilibrium, the effect on the welfare of NGO entrepreneurs is unambiguously negative.

Overall, the condition for the socially optimal number of NGOs writes as:

\[
\frac{dW(n)}{dn} = u'\left(\frac{1}{\rho}Q^* + n\frac{dQ^*}{dn}\right) + n\alpha \frac{dQ^*(n)}{dn} + n^{1/2} \left[ \left( \frac{1}{\rho} - 1 \right)Q^* + \frac{d(nQ^*(n))}{dn} \right] + \left( \frac{d(\omega^B)}{dn} \right) + [\alpha Q^*(n) - w] = 0 
\]

The first and the second terms are negative. The third term is negative or positive depending on the value of \( \rho \). The fourth term is the derivative \( \frac{d\omega^B}{dn} \) of the donors’ average disutility arising from incongruence. This term is positive (it enters with the minus sign). The last term reflects the utility gain of an additional NGO entrepreneur. It can be positive or negative depending on whether \( n \) is smaller or larger than the free entry level \( n^* \).
Assuming that $W(n)$ admits a well-defined interior optimum $n_*$, we can then compare the free-entry equilibrium with the optimal number of NGOs. Recall first that $Q^*$ does not depend on $v$, and therefore that all terms but the fourth one are independent from $v$. Then, as

$$
\frac{d^2W}{dv} = - \frac{d^2}{dv} \left( \frac{t \hat{y}(n) + n \hat{y}_n}{4n \hat{y}(n)} \right) = \frac{t \hat{y}(n) + n \hat{y}_n}{4n \hat{y}(n)^2} > 0,
$$

and $W_m = 0$ at $n_*$, making use of the implicit function theorem we immediately get:

$$
\frac{dn_*}{dv} = - \frac{W_m}{W_m} > 0.
$$

**Lemma 4.** Assume that $W(n)$ admits a well-defined interior optimum $n_*$ ($v$). Then this social optimum $n_*(v)$ depends positively on the opportunity cost of fundraising time $v$.

Intuitively, as $v$ goes up, there is less fundraising effort by NGOs. Therefore development projects are perceived as less substitutable by donors and the social value of an additional entrant NGO increases from the donors’ (and social) welfare point of view, as it reduces the donors’ average disutility from incongruence.

Under free entry, $[Q^* - w]$ is zero and the free entry equilibrium number of NGOs $n^*$ is also independent from $v$. Then we get

$$
\frac{dW(n)}{dn} \bigg|_{n=n^*} = u'(v) \left( \frac{d(nQ^*(n))}{dn} \right) + \frac{\rho n}{\hat{y}(n)} \frac{dQ^*}{dn} + n + v \frac{d}{dn} \left( \frac{-t}{4n \hat{y}(n)} \right).
$$

For a large enough value of $v$, $\frac{dW(n)}{dn} \bigg|_{n=n^*} > 0$ and the value of $n_*(v)$ becomes larger than the free-entry equilibrium number of NGOs. A simple inspection of Eq. (34) reveals that $\frac{dW(n)}{dn} \bigg|_{n=n^*} < 0$ when $\rho$ is close to 1 and $v$ close to 0, implying therefore that $n_*(0) - n^*$ is close to 1. These observations lead to the following proposition:

**Proposition 5.** There exists a value $\bar{v}$ such that: i) for $v > \bar{v}$, the free-entry equilibrium number of NGOs, $n^*$, is below the socially optimal number $n_*(v)$, ii) if $n_*(0) < n^*$ (which is the case when development projects are substitutable enough), then for $v < \bar{v}$, there is excess entry of NGOs and $n^*$ is above $n_*(v)$.

When the productivity of time (in terms of project output) is sufficiently high (i.e. $v = \bar{v}$), unregulated entry in the donations market delivers a number of NGOs below the socially optimal number. Intuitively, NGOs in such case provide low fundraising effort. Therefore donors suffer a large utility loss from donating to projects that do not match their ideal view. NGOs in the free entry equilibrium do not internalize this cost to donors, and consequently there is not enough entry compared to the social optimum. Similarly, when the opportunity cost of fundraising time is sufficiently low (i.e. $v < \bar{v}$), unregulated entry delivers a number of NGOs above the socially optimal number. Here, on the opposite, NGOs undertake high fundraising efforts and consequently the donors’ utility loss due to preference incongruence is small. At the same time, however, the crowding out effect of NGO entry on total project impact $nQ^*(n)$ affects social welfare negatively, especially so when projects are highly substitutable for recipients. In that case, the free entry equilibrium clearly generates an excessive number of development projects.

The proposition above and the preceding discussion provide conditions for regulatory action regarding entry of NGOs in the donations market. The correct policy (restricting or subsidizing entry) depends crucially on how intensive the technology of NGOs is in time input. In particular, our results suggest that if the NGO technology is very intensive in funds (i.e., the opportunity cost of fundraising time is low), public intervention restricting entry of NGOs in the donations market is desirable.

If $1/v$ is interpreted as a measure of efficiency of the technology of fundraising, the previous discussion suggests that innovations in the technology of fundraising can generate excess entry of NGOs. A change in information technologies that makes it easier for NGOs to supply information and reach private donors may induce too much entry of NGOs in the sector and may call therefore for regulatory measures that restrict entry. Note also that, crucially for policy purposes, the parameter $v$ (or $1/v$) is potentially observable.

We conduct our normative analysis on the basis of a social welfare function aggregating the welfare of donors, beneficiaries, and NGO entrepreneurs with equal weights. However, one can adopt a different criterion to evaluate equilibrium outcomes. For instance, one can mainly be concerned with the welfare of beneficiaries (which is typically the case in a development policy context). In that case, the discussion presented above shows that the correct regulatory action depends on the substitution coefficient $\rho$. If different projects are close substitutes for beneficiaries, the free-entry number of NGOs is too high from the beneficiaries point of view; thus, public intervention restricting entry of NGOs is desirable. Contrarily, if the projects are strongly complementary from the beneficiaries’ point of view, encouraging entry of NGOs is desirable.

Note that these findings are quite different from those from the earlier literature on nonprofits (Rose-Ackerman, 1982). In that analysis, no weight is given to the ‘variety’ effect, i.e. that the welfare of donors and/or beneficiaries might increase with the number of nonprofits on the market, through reducing the ‘transport’ cost for the donors and increasing the complementary project dimensions for beneficiaries. Once these effects are added into the welfare analysis, the result concerning the excessive entry of nonprofits does not hold anymore: if these effects are sufficiently strong, the result is actually reversed: there are too few nonprofits in the free-entry equilibrium.

Moreover, the earlier papers assume that nonprofits act as revenue maximizers. Rose-Ackerman (1982) shows that in that case, in equilibrium, a very big fraction of the nonprofit budget is devoted to fundraising. In our framework, this would imply that the fundraising competition between the NGOs is extremely aggressive and therefore, the negative externality that an additional NGO imposes on other NGOs is very big (the absolute value of the second negative term in Eq. (34)). It is not surprising, then, why such an assumption on the behavior of nonprofits leads to the conclusion that there is excess entry in the market. In our case, instead, given that we allow for a more realistic assumption concerning the behavior of NGOs, the fundraising competition is weaker than in the model of Rose-Ackerman — thus, we are less categorical concerning excess entry.

3. Endogenous market size

3.1. Setup

In the model of the previous section, the size of the donations market was fixed. Hence, the only effect that one NGO’s fundraising has on other NGOs is to reduce their market share. How are the

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9 Obviously if $n_*(0) \geq n^*$, then $\bar{v} = 0$ and the free-entry equilibrium number of NGOs, $n^*$, is always below the socially optimal number $n_*(v)$.

10 This could be justified if beneficiaries are much poorer than donors and one puts more weight on beneficiaries’ welfare for ethical reasons.
previous conclusions affected when the donation market size is variable? In this section, we consider this issue, extending the basic framework to the setup where the market size is endogenous and depends positively on the total fundraising effort by NGOs.\footnote{For simplicity, in this and the next sections we normalize the fundraising technology by assuming $v = 1$.}

We assume that potential donors are unaware (or not informed) of the importance of development problems and have to be "awakened" or "activated" by NGOs. Fundraising has a double function. On the one hand, it awakens donors to giving. On the other hand, it in

We assume that even before being awakened, donors know their ideal positions. The rationale behind this assumption is as follows. Donors may be well aware of what particular problem (or a set of problems) of developing countries they feel to be the most important ones. However, they may not want to give donations (remain "asleep") until they are aware of a solution that they find satisfactory. Thus, in the context of our model, the projects of different NGOs correspond to different solutions.

The potential donors observe the total fundraising effort (total "voice") of the NGOs sector, $\sum_{i=1}^{n} y_i$. The degree of "deafness" of a potential donor is a random variable, uniformly distributed on the interval $[0, \theta]$:\footnote{The uniform distribution is chosen for analytical tractability. The results are not qualitatively affected with more general distribution functions.}

$$\theta - U[\theta, \theta].$$

(35)

The potential donor decides to give if the total "voice" of NGOs is "loud" enough. In other words, she gives if

$$\theta < \sum_{i=1}^{n} y_i.$$  

(36)

Thus shifts in the distribution parameter, $\theta$, capture the exogenous changes in the willingness to give of the potential donor community. For instance, during humanitarian crises it becomes much easier for NGOs to awaken the donor community (see Smillie, 1995, Chapter 6, for a detailed account of giving to NGOs after natural disasters), which in this model corresponds to a fall in $\theta$. Hence $1/\theta$ reflects the overall readiness of donors to give to development causes.

Formally, all potential donors are uniformly distributed on the circle of unit size. The preferences of a typical donor located at point $x$ on the circle can be written as:

$$u_\theta(x) = \left\{ \begin{array}{ll} \frac{1}{n} \sum_{i=1}^{n} y_i - \theta & \text{if } x < \theta \\ 1 - \frac{1}{n} \sum_{i=1}^{n} y_i + \theta & \text{if } x \geq \theta \end{array} \right\}.$$  

When the total voice of NGOs, $\sum_{i=1}^{n} y_i$, is below the individual parameter $\theta$, the donor remains inactive and enjoys the consumption of the unit of endowment. When, instead, the total voice is above the threshold $\theta$, the donor enjoys a different preference structure: the one in which she is altruistic towards beneficiaries and receives the utility

$$\max \left\{ u\left( \sum_{i=1}^{n} Q_i - \frac{1}{n} |x - x_i| \right) \right\}. $$

This term represents the maximum utility she can get by giving her endowment to the NGO "perceived" as being closest to her ideal point $x$ on the circle.\footnote{We assume that, analogously to the basic model, the lower bound of this value is strictly larger than 1. This guarantees that the market is covered.}

The timing of the game is as follows. (1) NGO entrepreneurs decide on their preferred NGO and the resulting donations determine the impact of each NGO. (2) Effective donors decide on their preferred NGO and the fundraising expenditures; this determines the pool of effective donors. (3) Effective donors decide on their preferred NGO and the resulting donations determine the impact of each NGO.

3.2. Equilibrium

Given our assumptions about the "awakening" process, the effective pool of donors (denoted by $S$) is:

$$S\left( \sum_{i=1}^{n} y_i \right) = \frac{1}{\theta} \left( \sum_{i=1}^{n} y_i \right).$$

(37)

The effective pool of donors depends positively on total fundraising effort of the NGOs.

NGOs find themselves in both competition and cooperation. On one hand, they compete for neighboring donors, given the size of the donations market. On the other hand, they cooperate in awakening the "sleeping" donors and in increasing the size of the donations market.

By the same token as in the basic model, an NGO spending fundraising effort $y_i$ will get (given that all other NGOs spend effort $y$):

$$D_i(y_i, y) = \frac{2}{n} \frac{y_i}{y + y_i} S(y_i + (n - 1)y),$$

(38)

where $S(.)$ is the effective pool of donors determined by Eq. (37).

The NGO’s funds devoted to the project are:

$$F_i(y_i) = (1 - c) \frac{2}{n} \frac{y_i}{y + y_i} S(y_i + (n - 1)y) - f.$$  

(39)

3.2.1. Equilibrium fundraising effort and project impact

The first-order condition of the NGO now changes to:\footnote{The second-order condition of the optimization problem writes as:

$$\left[ - \frac{4y}{(y + y_i)^2} S + \frac{4y}{(y + y_i)^2} \frac{\partial S}{\partial y_i} + \frac{2y_i}{y + y_i} \frac{\partial^2 S}{\partial y_i^2} \right] (1 - y_i) - \left[ - \frac{2y_i}{(y + y_i)^2} S + \frac{2y_i}{y + y_i} \frac{\partial S}{\partial y_i} \right] \left( 1 - \frac{1 - c}{n} S(ny) - f \right).$$}

$$\left[ \frac{1}{n} \frac{2y}{(y + y_i)^2} S(y_i + (n - 1)y) + \frac{2y_i}{y + y_i} \frac{\partial S}{\partial y_i} (1 - y_i) \right] - \left[ \frac{1 - c}{n} \frac{2y_i}{y + y_i} S(y_i + (n - 1)y) - f \right] = 0.$$  

(40)

At the symmetric Nash equilibrium, $y_i = y$, using Eq. (37), the first-order condition (40) reduces to:

$$\left[ \frac{1 - c}{n} S(ny) \frac{\partial S}{\partial y} (1 - y) - \left[ \frac{1 - c}{n} S(ny) - f \right] \right] = 0.$$  

(41)

Note that under the fixed market size (i.e., $S = 1$ and $\frac{\partial S}{\partial y} = 0$) with $v = 1$, this expression collapses to Eq. (12). Substituting the form (37) into (41), we find that the equilibrium fundraising effort, $y^*(n, f, c, \Theta)$, is given by:

$$y^*(n, f, c, \Theta) = \frac{n + 2}{2n + 2} + \frac{2n f \Theta}{2n + 2(1 - c)}.$$  

(42)

Using Eq. (42), we can find the effective pool of donors in equilibrium, $S^*(n, f, c, \Theta)$:

$$S^*(n, f, c, \Theta) = \frac{1 - c}{\Theta} y^*(n) - f \left[ 1 - y^*(n) \right] = \frac{2n(n + 2)}{(3n + 2)^2} \left[ \frac{1 - c}{\Theta} f \right]^2 \left[ 1 - \frac{1}{1 - c} \right]$$  

(43)

and the equilibrium project impact, $Q^*(n, f, c, \Theta)$:

$$Q^*(n, f, c, \Theta) = \left[ \frac{1 - c}{\Theta} y^*(n) - f \right] \left[ 1 - y^*(n) \right] = \frac{2n(n + 2)}{(3n + 2)^2} \left[ \frac{1 - c}{\Theta} f \right]^2 \left[ 1 - \frac{1}{1 - c} \right]$$  

(44)

The following proposition summarizes the main comparative statics results.
Proposition 6. The equilibrium fundraising effort decreases with the number of NGOs on the market and with the willingness to give 1/θ of the potential donors. The equilibrium effective pool of donors increases with the number of NGOs on the market and with the willingness to give 1/θ of the potential donors. The equilibrium impact of an NGO project decreases with the number of NGOs if n ≥ 2 and increases with the willingness to give 1/θ of the potential donors.

Proof. See the Appendix A.

For equilibrium fundraising effort \( y^* \), the result differs from the basic model. An increase in the number of NGOs increases the total fundraising effort \( ny^* \) and therefore the size of the donations market. Everything else equal, this effect, in turn, increases the profitability of individual projects and the opportunity cost of undertaking fundraising for an individual NGO. In equilibrium, for the particular specification of the model, this effect overcomes the strategic substitutability effect shown in the benchmark model.

Consider next the comparative statics on θ. As discussed above, a fall in θ means that the distribution of the “dearness” parameter θ becomes narrower — i.e., ceteris paribus, potential donors are now easier to awaken. The donors are, therefore, more sensitive to total fundraising efforts by the NGO sector. As NGOs find it easier to get access to (endogenous) donations, competition in fundraising becomes more relaxed.

An increase in \( n \) affects positively the equilibrium number of effective donors \( S^* \). As discussed above, the equilibrium fundraising effort \( y^* \) decreases with \( n \), but this reduction is over-compensated by a higher number of NGOs. Hence, total fundraising effort \( ny^* \) increases and the number of effective donors is consequently enhanced. The impact of an increase in \( n \) on the donations market size \( S^* \) is, however, negative. Though a less “sensitive” donations market triggers a higher fundraising effort by each individual NGO, this increase is not strong enough to overcome the fact that donors are more difficult to “awaken.”

An increase in \( n \) affects negatively \( Q^*(n, f, c, θ) \) when \( n > 2 \). This is the result of different effects combining cooperation and competition between NGOs. First, more NGOs on the market for donations imply, everything else being constant, a higher total fundraising. This, in turn, stimulates a higher volume of donations. Second, a larger number of NGOs induces a smaller equilibrium fundraising effort \( y^* \). Hence, more time is allocated to projects. This, in turn, increases the value of project impact. Finally, there is also the usual negative “business stealing” effect of an additional NGO on the existing ones. This tends to reduce the profitability of individual projects and therefore the opportunity cost of spending time for fundraising rather than for the project. For our parameterization, the latter effect dominates the other two effects and an increase in \( n \) leads to a reduction of an individual project impact.

Finally, a fall in \( θ \) leads to an increase in equilibrium project impact \( Q^*(n, f, c, θ) \). On the one hand, less time is spent for fundraising (thus more time is left for the project). On the other hand, the donations to an NGO – and thus the available funds for the project – decrease with \( θ \). The donations to an NGO are \( y^*/θ \). The denominator falls faster than the numerator, which has a slope in \( θ \) less than one. In other words, as the distribution of donors “dearness” becomes more narrow, the increase in the size of the market is bigger than the decrease in fundraising effort.

3.2.2. Free entry

Since the schedule \( Q^*(n, f, c, θ) \) is downward sloping, there exists a unique value of \( n \) that satisfies the usual free-entry condition, \( δQ^*(n, f, c, θ) = 0 \). Moreover (and as in the basic model), this equilibrium is stable. It is characterized by an equilibrium \( n^* \) such that:

\[
\frac{2n^*(n^* + 2)}{(3n^* + 2)^2} \left[ \frac{1 - c}{θ} - f \right]^2 = w.
\]

(45)

What does this imply for the total impact of NGO projects? One can easily show that

\[
\frac{dn^*}{dn} > 0,
\]

(46)

i.e., the total impact is now increasing in the number of NGOs. In other words, the equilibrium impact elasticity with respect to the number of NGOs is less than one in absolute value, \(|ε| < 1\).

Finally, we can perform comparative statics on the free-entry equilibrium number of NGOs. The novel one is with respect to \( θ \).

Proposition 7. The free-entry equilibrium number of NGOs decreases with \( θ \) for \( n > 2 \):

\[
\frac{dn^*}{dθ} < 0 \quad \text{for } n > 2.
\]

(47)

Proof. See the Appendix A.

Consider the case of a humanitarian crisis. As the donors become easier to awaken (i.e. \( 1/θ \) increases), more NGOs enter the market. Intuitively, when donors are less reluctant to donate, the competition for funds becomes more relaxed and the impact of each project is larger. This induces more NGO entrepreneurs to enter the donations market. This mechanism explains, for instance, a large increase in the number of NGOs after the 2004 tsunami in Southern Asia, as well as why, after humanitarian crises, many non-relief NGOs enter the market for charitable giving (Smillie, 1995: 117).

3.2.3. Welfare

Note that now the total impact of NGOs increases with \( n \):

\[
\frac{dn^*}{dn} = Q^* + \frac{dQ^*}{dn} > 0.
\]

(48)

Then, following the welfare analysis in the basic model, it is clear that an increase in the number of NGOs unambiguously increases beneficiaries’ welfare. This occurs because both effects (the variety effect and the externality effect) are positive:

\[
\frac{dW^B(n)}{dn} = n^{θ-1} \left[ \left( \frac{1}{θ} - 1 \right) Q^*(n, f, c, θ) + \frac{dQ^*(n, f, c, θ)}{dn} \right] > 0.
\]

Then, we can state the following

Proposition 8. If the size of the donations market is endogenous and fundraising activates new donors, the free-entry equilibrium number of NGOs is always below the number preferred by the beneficiaries.

From the policy point of view, this implies that if fundraising awakens new donors to giving, a policy that encourages entry of NGOs into the donations market always increases the welfare of beneficiaries.

4. Soft non-distribution constraint

4.1. Setup

In the previous sections, NGOs had to satisfy the non-distribution constraint and could not divert received donations for private uses. However, this assumption is too restrictive in some settings. A recent quote from The Economist reads:

“Competition for funds and publicity among the larger NGOs results in a divided movement that is not making the best use of its assets. It also results in the diversion of funds ... to institutional
survival, self-interest and a lack of transparency.” ("Who guards the guardians?" The Economist, Sep. 18th, 2003).

This quote suggests that competition for funds between NGOs may lead to diversion of funds for uses other than development projects. Thus, in the context of our model, the following questions arise: How are the results of the benchmark model affected when we allow for a soft non-distribution constraint? Does increased competition between NGOs lead to an increased diversion of funds?

To investigate these questions, we consider the following simple extension of the basic model. Each NGO collected donations, private use (prestige, non-pecuniary advantage, etc.) and gain additional payoff \(\eta_i\) from this activity. Thus, \(\eta\) measures the weight an NGO entrepreneur gives to her payoff from diverted funds with respect to her payoff from the impact of the project she implements.

The non-distribution constraint of NGO \(i\) becomes:

\[
D_i(y_i) = cD_i(y_i) + f + F_i + G_i. \tag{49}
\]

We assume that there is an upper limit \(C = \frac{1}{\eta} - f\) to the amount of funds that an NGO can divert from its budget. This limit can be imposed because of a stringent regulation or some control mechanism. For instance, if an NGO entrepreneur diverts funds beyond this limit, this can be immediately observed and can lead to the loss of reputation or can be legally punished. The key point of this assumption is to ensure, in a simple way, that the cost of diversion becomes very steep after a certain level.

Moreover, the level of \(C\) allows an easy parameterization of the degree of softness of the non-distribution constraint. Hence, the lower is \(C\), the better is the governance structure of the NGO industry and the “harder” the non-distribution constraint.

The problem of NGO \(i\) is to maximize the weighted sum of payoffs from the project impact and diverted funds:

\[
\omega_i = Q_i + \eta_i G_i, \tag{50}
\]

subject to soft non-distribution constraint (49) and the cap on the funds diverted, \(G_i \leq C\). As before, \(Q_i = F_i(1 - y_i)\) denotes the impact of the NGO’s project.

This problem reduces to:

\[
\max_{G_i \in \mathcal{U}} (1 - c)D_i(y_i) - f - G_i(1 - y_i) + \eta_i G_i. \tag{51}
\]

4.2. Equilibrium

Consider first the maximization with respect to \(G_i\). The first-order condition with respect to \(G_i\) implies:

\[
G_i = 0 \quad \text{for} \quad y_i \leq 1 - \eta \quad \text{and} \quad G_i = C \quad \text{for} \quad y_i > 1 - \eta. \tag{52}
\]

Given that the diverted donations enter the objective function of the NGO linearly, for any effort level \(y_i \leq 1 - \eta\), the marginal benefit of diversion (private use) is everywhere lower than its marginal cost (a reduction in the project impact). Intuitively, when the fundraising effort is low, the NGO devotes a lot of time for the project implementation. Since time and donations are complementary in the project production function, the opportunity cost of donations – in terms of project impact – is high. The intuition is reversed when fundraising effort is sufficiently high: \(y_i > 1 - \eta\). Thus, for an NGO, its fundraising effort and the diversion of funds are complements.

Let all NGOs (except \(i\)) choose fundraising effort \(y\). Denote NGO \(i\)’s payoff function as

\[
\pi(n, y_i, y, G_i) = [(1 - c)D_i(y_i) - f - G_i(1 - y_i)] + \eta_i G_i \tag{53}
\]

\[
\pi(n, y_i, y, G_i) = \left[ (1 - c) \frac{2}{n y + y_i} - f - G_i \right] (1 - y_i) + \eta_i G_i.
\]

and denote its payoff function when it optimally chooses its diversion of donations as

\[
\Omega(n, y_i, y, C) = \left\{ \begin{array}{ll}
\pi(n, y_i, y, 0) & \text{for} \quad y_i \leq 1 - \eta \\
\pi(n, y_i, y, C) & \text{for} \quad y_i > 1 - \eta.
\end{array} \right.
\]

Then, the problem of NGO \(i\) becomes:

\[
\max_{y_i} \Omega(n, y_i, y, C). \tag{55}
\]

In other words, NGO \(i\) chooses its fundraising effort \(y_i\) to maximize its payoff, given that it chooses the level of diversion optimally.

For a given value of \(G_i \in [0, C]\), the first-order condition of problem (55) for \(y_i\) in each of the two regimes \((G_i = 0 \text{ and } G_i = C)\) is:

\[
\frac{\partial \pi(n, y_i, y, G_i)}{\partial y_i} = (1 - c) \frac{2}{n(y + y_i)} - (1 - c) \frac{2}{ny + y_i} + f + G_i = 0. \tag{56}
\]

which implicitly describes NGO \(i\)’s reaction curve \(y_i(n, y, G_i)\). For convenience, we denote with

\[
V(n, y, G_i) = \pi(n, y_i, n, y, G_i) + \eta_i G_i \tag{57}
\]

the maximum payoff of NGO \(i\) in a regime with \(G_i \in [0, C]\). The following lemma holds:

Lemma 9. NGO’s fundraising efforts are strategic complements. The equilibrium fundraising effort of NGO \(i\) increases with the number of NGOs on the market and with the amount of funds \(G_i\) it diverts. Finally, \(y_i(n, 0, G_i) = 0\) and \(y_i(n, 1, G_i) < 1\).

Proof. See the Appendix A. □

The intuition behind the strategic complementarity is as follows. An increase in the rival’s effort reduces both the marginal benefit and the marginal cost of fundraising effort of NGO \(i\). However, the reduction in the marginal cost is larger than the reduction in the marginal benefit. Therefore, the payoff-maximizing fundraising effort \(y_i\) increases with the fundraising effort of the rival, \(y\).

We show in the Appendix A that, for values of \(\eta\) large enough (i.e., larger than some threshold \(\eta_0\)), there exists also a threshold value of fundraising of a rival NGO \(y < \tilde{y}(n, G_i)\) such that for \(y < \tilde{y}(n, G_i)\), the NGO chooses the regime with no diversion of funds (i.e. \(G_i = 0\) and \(y_i = \bar{y}(n, 0, 0)\)). While for \(y > \tilde{y}(n, G_i)\), it chooses the regime with maximum diversion (i.e. \(G_i = C\) and \(y_i = \bar{y}(n, y, G_i)\)). Finally, at the limit case \(y = \tilde{y}(n, G_i)\), the NGO is indifferent between the two regimes. Fig. 2 depicts the reaction curve \(y_i\) of an NGO \(i\) as a function of the fundraising effort of the rival, \(y\).

4.2.1. Equilibrium fundraising effort

The nature of symmetric Nash equilibria in fundraising effort can now be easily characterized. The strategic complementarity between NGOs’ fundraising efforts suggests naturally the possibility of multiple equilibria in fundraising and fund diversion on the donation market.

The following proposition confirms this intuition when NGO entrepreneurs...
Proposition 10. Assume that NGO entrepreneurs care moderately about fund diversion (i.e. \( \eta \) takes intermediate values in a certain interval \([\eta_0, \eta_c]\) with \(\eta_c \leq 1^{17}\)^18. Then: i) for a sufficiently low number of NGOs on the market, there exists a unique symmetric Nash equilibrium, such that no NGO diverts funds. ii) For a sufficiently high number of NGOs on the market, there exists a unique symmetric Nash equilibrium, such that all NGOs divert maximum funds. iii) For an intermediate number of NGOs on the market, there exist two stable symmetric Nash equilibria: one with no diversion and the other one with full diversion.

Proof. See the Appendix A.

Fig. 3 depicts this proposition. It represents the three possibilities in panels A, B, and C. In the first case (Fig. 3a), the 45° line crosses only the reaction curve \( y_1 = \bar{y}(n, y, 0) \) at the point \( y_0 \) and thus the only possible regime is the one with no diversion. In the second case (Fig. 3b), the 45° line crosses both reaction curves, \( y_1 = \bar{y}(n, y, 0) \) and \( y_1 = \bar{y}(n, y, G) \), respectively at points \( y_0 \) and \( y_c \), and we have two symmetric pure-strategy Nash equilibria. Clearly, in the full-diversion regime, the equilibrium fundraising, \( y^*_G \), is larger than the fundraising in the no-diversion regime, \( y^*_0 \). The diversion of funds reduces an NGO’s opportunity cost of time allocated to fundraising activities. This leads to more fundraising in equilibrium. There is also the reverse channel. A higher fundraising effort reduces the benefit of investing funds in the development project and therefore increases an NGO’s incentives to divert donations for private use. This generates a complementarity between diversion and fundraising. Because of this complementarity, we get multiple equilibria for a certain range of \( n \).

Finally, Fig. 3c depicts the third possibility. Here, the 45° line crosses only the reaction curve \( y_1 = \bar{y}(n, y, G) \) at point \( y_c \), with a unique equilibrium with full diversion. Note that this equilibrium exists only when NGOs’ valuation of diversion is sufficiently high (i.e., \( \eta \) is larger than the threshold \( \eta^* \)). Otherwise, the only possible equilibrium is the one with no diversion.

The intuition for this result is as follows. When the number of NGOs is relatively small (i.e., \( n < n_0 \), competition for funds between NGOs is not too intense and the return on investing resources into development projects is high. In this situation, a dominant strategy for each NGO is to invest all available funds into development projects rather than to divert them for private use. Hence, the (unique) equilibrium is the one with no diversion.

Contrarily, when the number of NGOs is large (i.e., \( n > n_1 \), competition for funds between NGOs is intense and, consequently, the return on investing resources into development projects is low compared to the marginal gain of diverting the funds for private use. Therefore, a dominant strategy for each NGO is to divert maximum resources. Consequently, the (unique) equilibrium is the one with full diversion.

Finally, when the number of NGOs is in the intermediate range (\( n_0 < n < n_1 \), the optimal strategy for an NGO – in terms of diverting funds – depends on the actions of other NGOs. If other NGOs divert funds, little money is invested into projects and the opportunity cost of fundraising is low. Therefore, the competition for funds is relatively intense. As fundraising efforts are strategic substitutes, the individual NGO increases its fundraising effort. This, in turn, reduces the individual return on investing funds into projects and increases the incentives to divert resources. Hence, when all other NGOs divert resources, it is optimal for an individual NGO to do the same.

By the same token, when all other NGOs do not divert resources, the optimal strategy of a given NGO is to put all collected funds – net of

---

¹⁷ In the Appendix A, we show that such threshold value \( \eta_c \) exists.

¹⁸ When \( \eta \) is small enough, only equilibria with no diversion exist, as NGOs value little the diversion of funds. On the contrary, when \( \eta \) is sufficiently close to 1, only equilibria with full diversion exist, as the valuation of diverted funds is sufficiently high to rule out the no-diversion regime for an individual NGO.
costs – into its development project. Hence, two equilibria are possible. The first equilibrium is with full diversion, high competition in fundraising, and little money invested into development projects. The second equilibrium is with no diversion, less intense competition in fundraising, and maximum funds invested into the projects.

4.2.2. Free entry

As in the basic model, we next analyze the free-entry equilibria. We consider again the configuration of parameters such that \( \eta \in [\eta_b, \eta_c] \).

The free-entry equilibrium number of NGOs, \( n^* \), is determined by the following condition:

\[
V(n, y^*, G^*) = w,
\]

where \( V(n, y^*, G^*) = \pi(n, y^*, G^*) \) is the payoff from entering the donations market at the Nash equilibrium values \( y^* \) and \( G^* \), and \( w \) is the (exogenous) outside option of an NGO entrepreneur.

The equilibrium number of NGOs depends on the equilibrium regime (no diversion, \( G^* = 0 \), or full diversion, \( G^* = \tilde{G} \)). The properties of the no-diversion equilibrium have been analyzed in Section 2. Here we concentrate on the full-diversion equilibrium.

The following lemma holds.

**Lemma 11.** The payoff from entering the donations market at the Nash equilibrium values \( y^* \) and \( G^* \) decreases with the number of NGOs on the market and with the amount of funds diverted:

\[
\frac{dV(n, y^*, G^*)}{dn} < 0, \quad \frac{dV(n, y^*, G^*)}{dG} < 0.
\]

**Proof.** See the Appendix A.

Clearly, the equilibrium payoff \( V(n, y^*, G^*) \) depends on the equilibrium diversion regime. Hence, the equilibrium payoff function has the following shape:

\[
V(n, y^*, G^*) = \begin{cases} 
V(n, y^*_G, \tilde{G}) & \text{for } n < n_0 \text{(unique no-diversion equilibrium)} \\
V(n, y^*_G, 0) & \text{for } n > n_1 \text{(unique full-diversion equilibrium)} \\
V(n, y^*_G, 0) & \text{for } n_0 \leq n \leq n_1 \text{(multiple equilibria)},
\end{cases}
\]

where \( y^*_G \) and \( y^*_G \) are the Nash equilibrium values of fundraising \( y^* \) respectively under no-diversion and under full diversion. This is described in Fig. 4. Simple inspection of this figure reveals the structure of free-entry equilibria, as a function of the opportunity cost of entering the market, \( w \).

**Proposition 12.** Under free entry, for a sufficiently low outside option of NGO entrepreneurs, there exists a unique symmetric Nash equilibrium, such that no NGO diverts funds and equilibrium entry is given by \( n^*(0, w) \).

For a sufficiently high outside option of NGO entrepreneurs, there exists a unique symmetric Nash equilibrium, such that all NGOs divert maximum funds and equilibrium entry is given by \( n^*(\tilde{G}, w) \). Finally, for intermediate values of the outside option of NGO entrepreneurs, there exist two stable symmetric Nash equilibria: one with no diversion and the other one with full diversion.

The intuition for this result is essentially the same as for Proposition 10. When the opportunity cost of establishing an NGO is low (i.e., \( w < w_0 \)), the equilibrium number of NGOs is large. This, in turn, induces the full-diversion equilibrium with intense fundraising competition. Contrarily, when the opportunity cost is high (i.e., \( w > w_1 \)), few NGO entrepreneurs enter the donations market and the resulting outcome is the no-diversion equilibrium with a smaller fundraising effort. Finally, the intermediate range of outside option, \( w_0 \leq w < w_1 \), induces multiple equilibria, either with full diversion or with no diversion.

Furthermore, note that the free entry equilibrium number of NGOs \( n^*(\tilde{G}, w) \) decreases with \( G \) and \( w \). Therefore,

\[
n^*(\tilde{G}, w) < n^*(0, w).
\]

The intuition is as follows. Under the soft non-distribution constraint, NGOs have a higher incentive to undertake fundraising activities to attract donations. As the market size is fixed, each NGO creates a strong business-stealing effect on the donations to neighboring NGOs. This fierce competition for funds, in turn, reduces the impact of each individual project, which leads to a lower payoff from entering the market.

In terms of welfare analysis, the full-diversion equilibrium is Pareto-dominated by the no-diversion equilibrium. First, the free entry equilibrium project impact \( Q^*(\tilde{G}) \) under full diversion is less than the corresponding one \( Q^*(0) \) under no-diversion.\(^{19}\) Also, from Eq. (60), there are less NGOs entering under full diversion than under no diversion. Then the projects’ impact is smaller under full diversion than under no diversion. For both reasons (less entry and smaller equilibrium impact), both donors and recipients are worse off, while NGOs entrepreneurs are just indifferent (because of the free-entry condition). This suggests, therefore, an additional role for public policy in the NGO sector. In the range of parameters in which multiple equilibria are possible, some public coordination mechanism may be necessary to anchor NGO entrepreneurs’ expectations that a no-diversion equilibrium strategies are played.\(^{20}\)

5. Conclusion

This paper has built a model of the development donations market with horizontally differentiated NGOs. The model has two key assumptions. The first is the fungibility of effort of an NGO between fundraising and working on the project. This drives the result on the optimality of fundraising and the number of entrants (from the social and beneficiaries’ point of view) in the basic model. It also leads, in the extension with diversion of funds, to the complementarity between fundraising effort and diversion: increased fundraising effort means less time for the project and this reduces the opportunity cost of diversion.

The second key assumption is the positive relationship between total fundraising and the likelihood of giving of an individual donor in the model with endogenous market size. This assumption leads to the

\(^{19}\) From the free entry condition, we get \( V(n^*(\tilde{G}, w), y^*_G, \tilde{G}) = Q^*(\tilde{G}) + \eta \tilde{G} - w = V(n^*(0, w), y^*_G, 0) = Q^*(0) \), hence, \( Q^*(\tilde{G}) < Q^*(0) \).

\(^{20}\) Obviously, a better governance and more transparency on NGOs books (as captured by a reduction of \( \tilde{G} \) in the model) would help to mitigate the issue of the full-diversion equilibrium.
positive externality of one NGO's fundraising on the project impact of all other NGOs. This, in turn, implies the less-than-optimal number of NGOs in the free-entry equilibrium, from the beneficiaries' point of view.

Our results underline that the crucial question is how effective fundraising efforts are in attracting new donors. If fundraising is relatively ineffective, the basic model of Section 2 is a good description of reality. However, if fundraising is relatively effective in awakening potential donors, we are closer to the model with endogenous market size described in Section 3. Thus, which model applies best is an empirical issue. Van Diepen et al. (2006) find that charitable direct mailings in Netherlandes are short-run complements (i.e. the direct mailings done by one charity tend to increase the total pie that is divided among the charities). However, they are long-run substitutes: in the long run, donations induced by the fundraising of one charity tend to reduce donations received by others. This indicates that our basic model is a better description of the real workings of the donations market in the long run, while the extension with the endogenous market size applies better in the short run.

Finally, does a more intense competition lead to a higher diversion of funds? Our model in Section 4 suggests that it may. This depends on the level of the outside option of NGO entrepreneurs. If it is low enough, the competition between NGOs results in high diversion of funds. Crucially, this happens despite the fact that NGOs care about the impact of their projects. Our model, thus, shows the potential downside of increased competition between NGOs, in that it can lead to a higher diversion of the funds collected.

Our model assumes a lot of symmetry, for tractability purposes. Two extensions come naturally in mind: allowing for asymmetric donors (large and small) and for differences in the size of NGOs (given that currently the NGO industry exhibits a high degree of concentration). Both of these extensions would give a more realistic picture of the NGO world, and finding a simple way to integrate such asymmetries into the model would be very useful.

Also, it is clear that even keeping the market size fixed and allowing for some forms of positive externalities between NGO projects (for example, via higher productivity or allowing for NGO entrepreneurs to get some positive psychic benefits from the outputs of other colleagues that are relatively closely located on the circle) would give results similar to Proposition 8. We have opted for this formulation based on empirical evidence (Van Diepen et al., 2006); however, the alternative directions should be explored to see if the welfare conclusions differ from ours.

More generally, the activities that competing NGOs undertake in their work are various. Our paper presents an industrial-organization based on empirical evidence (Van Diepen et al., 2006); however, the model in this case could be further integrated into further studies of the aid sector and the implications for the allocation of resources within and/or between recipient and donor countries.

Appendix A

Proof of Lemma 3. The total project impact is \( nQ^*(n) = n(1 + \hat{\gamma}n) - f \)

\((1 - \hat{\gamma}n)(1 - c - fn)\). Differentiating with respect to \( n \), we get:

\[
\frac{d(nQ^*(n))}{dn} = (1 - \hat{\gamma} + (1 - c - fn)(\hat{\gamma} + fn)) - f(1 - \hat{\gamma})(1 - c - fn)(\frac{1}{n + fn} - \frac{1}{n + \hat{\gamma}}n) = -f(1 - \hat{\gamma} + \frac{(1 - \hat{\gamma})y}{\hat{\gamma} + fn} - \frac{1}{n + \hat{\gamma}}n) - f(1 - \hat{\gamma} + \frac{y}{\hat{\gamma} + fn} - \frac{1}{n + \hat{\gamma}}n).
\]

Thus, total project impact decreases with \( n^* \).

On the other hand, \( c + 1 = \frac{1}{\hat{\gamma}}(n\frac{\partial Q^*}{\partial n} + Q^*) = \frac{d(nQ^*(n))}{dn} < 0 \). Given that \( c < 0 \), this implies that the absolute value of the elasticity of project impact is larger than 1. □

Proof of Proposition 6. Differentiation of Eq. (42) gives: \( \frac{dQ^*}{dn} = \frac{4}{(3n + 2)^2}(\frac{1}{c - \hat{\gamma} - 1} - 1) < 0 \), since we assume that \( \frac{1}{c - \hat{\gamma}} > f \) (to be consistent with \( y^*(n, f, c) < 1 \)). Also, \( \frac{dQ^*}{\theta} = \frac{2n}{3n + 2}(3n + 2) \frac{f}{1 - c} > 0 \). For the effective pool of donors \( S^* \), we have:

\[
\frac{dS^*}{dn} = \frac{1}{\theta}[n\frac{\partial y^*}{\partial n} + y^*] = \frac{1}{\theta(3n + 2)^2}[n(6n + 8)\frac{f}{1 - c} + (3n^2 + 4n + 4)].
\]

while

\[
\frac{dS^*}{\theta} = \frac{n}{\theta} \frac{\partial (\nu^/(\theta))}{\partial \theta} = -n \frac{n + 2}{3n + 2} \frac{1 + c}{f}.< 0.
\]

Finally, from \( Q^* = \frac{2n(n + 2)}{(3n + 2)^2} \frac{1 - c}{\theta} - f \) we get:

\[
\frac{dQ^*}{dn} = -4(n - 2)\frac{\theta}{(3n + 2)^2} \frac{1 - c}{\theta} - f < 0 \text{ and}
\]

\[
\frac{dQ^*}{\theta} = -2(n + 2)\frac{(1 - c)}{(3n + 2)^2} - f \frac{1 + c}{\theta} < 0.
\]

Proof of Proposition 7. The free-entry condition

\[
Q^* - \frac{w}{\hat{\nu}} = \frac{2n(n + 2)}{(3n + 2)^2} \frac{1 - c}{\theta} - f = \frac{1 + c}{\theta} , \quad \frac{w}{\hat{\nu}} < 0.
\]

implicitly defines the equilibrium number of NGOs, \( n^* \). Using the implicit function theorem, we find \( \frac{dQ^*}{\theta} = -\frac{\frac{\partial Q^*}{\theta}}{\frac{\partial Q^*}{\theta}} \). The expression of \( \frac{\partial Q^*}{\theta} \) has been derived above. The denominator is \( \frac{\partial Q^*}{\theta} = -4n + 2\frac{\theta}{(3n + 2)^2} \frac{1 - c}{\theta} - f \), which is negative for \( n > 2 \).

\[
\frac{\partial Q^*}{\theta} = \frac{2n + 2}{(3n + 2)^2} \frac{1 - c}{\theta} - f > 0
\]

Proof of Lemma 9. Applying the implicit function theorem to the first-order condition (52) and given that the second-order condition holds for a maximum, we get

\[
\frac{\partial j}{\partial n} = \frac{\partial^2 n(n, y, G)}{\partial n^2} > 0
\]

given that \( \frac{\partial^2 n(n, y, G)}{\partial n^2} = -2(1 - c) \frac{y_1 - y_2}{(y + y_1 - y_2)} - \frac{y_1 - y_2}{(y + y_1 - y_2)} = \frac{1}{n}(f + G_i) > 0 \).

Similarly, as \( \frac{\partial^2 n(n, y, G)}{\partial n^2} = \frac{\partial^2 n(n, y, G)}{\partial g^2} > 0 \), we easily get

\[
\frac{\partial j}{\partial G_i} = \frac{\partial^2 n(n, y, G)}{\partial G_i^2} > 0
\]

Finally,

\[
\frac{\partial j}{\partial y} = \frac{\partial^2 n(n, y, G)}{\partial y^2} = \frac{\partial y_1 - y_2}{y_1 - y_2} > 0
\]

Substituting \( \frac{\partial j}{\partial y} < 0 \) in Eq. (56), we find the following expression:

\[
(1 - c) \frac{2y(1 - \frac{\partial j}{\partial y})}{y + \frac{\partial j}{\partial y}} - (1 - c) \frac{2}{ny + \frac{\partial j}{\partial y}} + f + G.
\]

The sign of this expression is the same as the sign of

\[
(1 - c) \frac{2y(1 - \frac{\partial j}{\partial y})}{y + \frac{\partial j}{\partial y}} + f + G \text{ or the sign of}
\]

\[
(1 - c) \frac{1}{ny + \frac{\partial j}{\partial y}} + f + G \text{ > 0.}
\]

Hence, given that the second-order condition holds for a maximum, this implies \( j_1(y_n, y, G) > \frac{\partial j}{\partial y} > 0 \) for all \( y \), and therefore \( \frac{\partial^2 n(n, y, G)}{\partial y^2} < 0 \), which implies \( \frac{\partial^2 n}{\partial y^2} > 0 \). Given that \( \frac{\partial^2 n}{\partial y^2} < 0 \), it is also clear that \( j_1(n, 0, G) = 0 \) and \( j_1(n, 1, G) \). □
A.2. Best response functions with diversion

We first show the preliminary result that for \( \eta \) large enough (i.e., larger than some threshold \( \eta_0 \)) there exists a unique \( \bar{y}^*(n, G_\eta, \eta) \) \( \in (0, 1) \) such that

\[
\bar{y}_1(n, y, G) \geq 1 - \eta \text{ if and only if } y \geq \bar{y}(n, G, \eta).
\]  

(61)

\( \bar{y}^*(n, G, \eta) \) is the value of \( y \) such that \( \bar{y}_1(n, y, G) = 1 - \eta \). From Lemma 9, \( \bar{y}^*_1(1, 1, G) < 1 \). Let \( \eta_0 \) be such that \( 1 - \eta_0 = \bar{y}_1(1, 1, G) \). Then, for all \( \eta > \eta_0 \) and \( \eta > 1 \), we get \( \bar{y}_1(n, 1, G) = \bar{y}_1(1, 1, G) = 1 - \eta_0 > 1 - \eta \). Hence, as \( \bar{y}_1(n, 0, G) = 0 \) and \( \bar{y}_1(n, 1, G) \) is increasing in \( y \), it follows that there exists, for all \( \eta > \eta_0 \) and \( n > 1 \), a unique value \( y = \bar{y}^*(n, G, \eta) \) \( \in (0, 1) \) such that \( \bar{y}_1(n, y, G) = 1 - \eta \). By simple differentiation, we find that \( \bar{y}_1(n, G, \eta) \) is decreasing in all three arguments.

Next we characterize the best response function of an NGO when there is the possibility of fund diversion.

\( \bullet \) Whenever \( \bar{y}^*(n, G, \eta) \) exists for \( G_\eta \in [0, G] \) there exists also a threshold value of fundraising of a rival NGO \( y = \bar{y}(n, G^*) \) such that for \( y = \bar{y}(n, G^*) \), the NGO chooses the optimal regime with no diversion of funds (i.e., \( G = 0 \) and \( y_1 = \bar{y}_1(n, y, 0) \)) while for \( y > \bar{y}(n, G^*) \), it chooses the optimal regime with maximum fund diversion (i.e., \( G = G^* \) and \( y_1 = \bar{y}_1(n, y, G^*) \)). Finally at the limit case \( y = \bar{y}(n, G^*) \), the NGO is indifferent between the two regimes. Also, the threshold \( \bar{y}(n, G) \) is decreasing in \( n \).

**Proof.** For simplicity, let us omit the dependence on \( \eta \) and denote \( \bar{y}^*(n, G, \eta) = \bar{y}^*(n, G) \). Differentiating \( V(n, y, G) = n(\bar{y}(n, y, G), y, G) \) and using the envelope theorem, we get

\[
\frac{\partial V}{\partial y} = \frac{\partial n(\bar{y}(n, y, G), y, G)}{\partial y} = -\left(1 - \frac{2}{n} \right) \frac{\bar{y}_1(n, y, G)}{(y + \bar{y})^2} (1 - y) < 0,
\]

and

\[
\frac{\partial V}{\partial G} = -\left(1 - \bar{y}_1(n, y, G)\right) + \eta > 0.
\]

\( \frac{\partial V}{\partial n} \) has the same sign as

\[
\frac{1}{\bar{y}_1} \frac{1}{1 - \bar{y}_1} + \frac{2}{y + \bar{y}_1} = \frac{2\bar{y} + \bar{y} + y - \bar{y}_1}{(1 - \bar{y}_1)(y + \bar{y})^2} = \frac{(y + \bar{y})}{(y + \bar{y})^2} = \frac{y + \bar{y}}{y + \bar{y}} = \frac{1}{y + \bar{y}} > 1/n.
\]

Thus, we get \( \frac{\partial V}{\partial n} > 0 \), and similarly, \( \frac{\partial V}{\partial G} > 0 \). Now we have also

\[
V(n, \bar{y}(n, G), G) = n(\bar{y}(n, y, G), y, G) = \left(1 - \frac{2}{n} \right) \frac{\bar{y}_1(n, y, G)}{(y + \bar{y})^2} (1 - y) < 0,
\]

\[
\frac{\partial V}{\partial n} = \frac{\partial n(\bar{y}(n, y, G), y, G)}{\partial n} = -\left(1 - \frac{2}{n} \right) \frac{\bar{y}_1(n, y, G)}{(y + \bar{y})^2} (1 - y) < 0.
\]

We show that there exists a unique value \( \eta_c \) determined by the condition \( \bar{y}^*(1, 1, G) = \bar{y}^*(1, G, \eta_c) \). Let us denote, for convenience, \( y_0^*(n, G) = \eta^*(n, G, \eta) \). The two functions are increasing in \( n \) for \( \eta > \eta_0 \), and

\[
\frac{\partial V}{\partial y} = \frac{\partial n(\bar{y}(n, y, G), y, G)}{\partial y} = -\left(1 - \frac{2}{n} \right) \frac{\bar{y}_1(n, y, G)}{(y + \bar{y})^2} (1 - y) < 0,
\]

\( \frac{\partial V}{\partial G} > 0 \),

\( \frac{\partial V}{\partial n} > 0 \).

\( \bar{y}^*(n, G, \eta) \) is decreasing in \( n \). Consider the function \( \Phi(\eta) = \bar{y}(1, G, \eta) \), which is decreasing in \( \eta \). Then, by definition of the threshold value \( \eta_c \), \( \Phi(\eta_c) = \bar{y}(1, G, \eta_c) \). From \( \bar{y}_1(1, 0, G) = 0 \) it follows that \( \Phi(1) = 1 \). Therefore, \( \bar{y}^*(1, G, \eta_c) \) exists if and only if \( \eta_c > \eta_0 \), and \( \eta_c > \eta_0 \). For \( \eta \in (\eta_0, \eta_c) \), we have \( \bar{y}^*(1, G, \eta) \in [y_c^*(1), 1] \).

**Proof of Proposition 10.** Note that \( \bar{y}(n, G, \eta) \) is decreasing in \( n \) and that \( y_0^*(n, G) \) and \( y_0^*(n) \) are increasing in \( n \) and take infinite value, respectively, at \( n = \frac{1}{2} \). Also, \( y_0^*(n) = \frac{1}{2} \). Given that \( \eta = \eta_0 \), \( \bar{y}(1, G) = \bar{y}^*(1, G, \eta_0) \). Thus, \( \eta \) follows that there exist \( \eta_0 \) and \( \eta_1 \) such that, respectively, \( \bar{y}(n_0, G) = y_0^*(n_0) \) and \( \bar{y}(n_1, G) = y_0^*(n_1) \). Also, given that \( y_0^*(n) = y_0^*(n) \) for \( n > 1 \), we have \( n_0 < n_1 \).

A pure-strategy symmetric Nash equilibrium with no diversion of funds, \( G^* = 0 \) and, respectively, with full diversion, \( G^* = G \), provides the fundraising equilibrium effort \( y_0^*(n) \) (respectively, \( y_0^*(n) \)) and exists if and only if \( y_0^*(n) < \bar{y}(n, G) \) (respectively, \( y_0^*(n) < \bar{y}(n, G) \)). For \( n < n_0 \), \( \bar{y}(n, G) > \bar{y}(n, G) \). Since \( y_0^*(n) = y_0^*(n) \), there is no no-diversion equilibrium case in such case. For \( n_0 < n < n_1 \), we have \( y_0^*(n) < \bar{y}(n, G) < y_0^*(n) \). Hence, only the no-diversion equilibrium case exists in such case. For \( n_1 \leq n = \infty \), we have \( y_0^*(n) > \bar{y}(n, G) \). And with full diversion, \( G^* = G \) exists. Finally, when \( n_1 \leq n \), \( y_0^*(n) < \bar{y}(n, G) \). Hence, in this case only the full-diversion equilibrium with \( G^* = G \) exists.
A.4. Free Entry Equilibria: Lemma 11 and Properties of Fig. 4

We find that

\[ dV(n, y^*, G) \]

\[ = \frac{\partial V(n, y^*, y^*, G)}{\partial n} + \frac{\partial V(n, y^*, y^*, G)}{\partial y^*} dy^* < 0, \]

as \( \frac{\partial V(n, y^*, G)}{\partial y^*} \) < 0 and \( dy^* > 0. \)

Also,

\[ dV(n, y^*, G) \]

\[ = \eta - 1 + y_t^* - 1 - c dy^* \frac{\partial y^*}{\partial G} < 0. \]

However, \( \frac{dy^*}{\partial G} = \frac{2n}{2n + \eta} \), and thus \( \frac{\partial V(n, y^*, G)}{\partial G} = \eta - 1 + y_t^* - \eta - 1 = 0. \)

The last thing to prove (in order to describe fully Fig. 4) is to show that \( V(n_0, y_t^* G_0, G) > V(n_t, y_t^* G_t, 0) \), namely, that point A is above point B. Note that \( n_t^* y_t^* = y_0(n_0, G) = y_t G_t, \) whereas \( y_t n_t^* = y_t y_t^* G_t, G_t = 1 - \eta. \) The first equality comes from the definition of \( n_0, \) the second from the definition of a symmetric Nash equilibrium, and the last from the definition of \( y_0(n_0, G). \) Similarly, \( y_t n_t^* = y_t(n_t, G_t) = y_t(n_t, y_t G_t, 0) > y_t(n_t, y_t G_t, 0) = 1 - \eta. \) Now

\[ V(n_0, y_t^* G_0, G) = V(n_0, y_t G_t, 0, G) = V(n_0, y_t G_t, 0) = V(n_0, y_t G_t, 0, 0). \]

\[ = V(n_t, y_t G_t, 0) = V(n_t, y_t^* G_t, 0). \]

\[ \square \]

References


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