

Brothers in Alms? Coordination between Nonprofits on Markets for Donations

Gani Aldashev, Marco Marini, Thierry Verdier

University of Namur, Sapienza Univ.of Rome, Paris School of Economics.

MDEF 2014

University of Urbino, September 18-20, 2014

- Private provision of public goods in modern economies is organized to a large extent by nonprofit organizations.
- Nonprofit sector employs, on average, 5.6 per cent, and in some countries - Netherlands, Belgium, Canada, U.K., Israel and Ireland - over 10 per cent of the economically active population (Salamon 2010).
- An important part of the revenues of nonprofits comes from charitable donations. Given that nonprofits have to compete for donations through fundraising activities, these organizations can be considered as rational players on the philanthropic 'market' (Andreoni 2006).
- It is well known that one fundamental downside of this decentralized organization of the nonprofit sector is that competing for donations can be socially wasteful.

- "[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 go in and when to leave, and it forsakes cooperation with its peers for advertising its brand name." (De Waal, 1997)
- Occasionally, nonprofit organizations are able to design voluntary cooperative agreements, (e.g. *American United Way*) or umbrella organizations that conduct joint fundraising appeals during humanitarian emergencies.
- However, constructing sustainable cooperation agreements that involve a substantial number of competing nonprofits is difficult.

Motivation of the paper

- This issue raises several questions: why voluntary coordination between nonprofits is so difficult to attain? What can be done to facilitate such cooperation and to make it more sustainable?
- In this paper, we provide the first analysis of these questions. To do so, we build a model of endogenous nonprofit alliance formation, by exploiting game-theoretic tools used in the recent literature on endogenous coalition formation (Bloch 2003, Yi 2003, Ray 2007, Marini 2009).
- In our two-stage model, at Stage 2 nonprofits engage in individual fundraising activities imposing externalities on the each other's output.
- At Stage 1, nonprofits can form alliances, i.e. credibly commit to levels of fundraising that internalize the externalities among alliance members.

- The alliance formation takes place via the following process: each nonprofit announces an alliance to which it would like to belong; then, an alliance is formed according to a certain alliance-formation rule.
- We study two main classes of alliance formation rules: *unanimity* rule (von Neumann and Morgenstern 1944, Hart and Kurz 1983) and a milder rule, which we call *aggregative* rule, which only requires, for an alliance to form, that all its members have announced the same alliance.
- Given these rules, we investigate whether the grand coalition of nonprofits or other intermediate alliance structures are *stable* according to standard individual or coalitional equilibrium concepts.

Main results

- We find that three key characteristics determine the stability of the voluntary coordination (i) the alliance formation rule; (ii) if deviations can be done individually or by groups; (iii) the extent to which fundraising efforts are *strategic complements* or *substitutes*.
- The latter feature, in particular, is determined by the technology of fundraising and whether donors perceive the nonprofits' projects as similar or differentiated.
- If nonprofits projects are seen as highly differentiated, if the issues are new and unknown to donors and if fundraising technologies allows for poor targeting of donors, the stability of fundraising coordination is extremely difficult to achieve.
- If instead the issues are well-known, fundraising technology allows for good targeting and donors consider the beneficiaries of projects as being the same group (as during humanitarian emergencies), the full coordination of fundraising activities can become a stable outcome.

A *continuum* of donors of total size L . Each donor has linear-quadratic utility function:

$$U(C, \mathbf{d}) = C + \sum_{i=1}^n \omega_i d_i - \frac{\gamma}{2} \sum_{i=1}^n d_i^2 - \frac{1}{2} \left(\sum_{i=1}^n d_i \right)^2$$

$C = \text{numeraire}$; $\mathbf{d} = (d_i)_{i=1, \dots, n}$ vector of donations to n projects; ω_i weight attached to project i by each donor; $\gamma > 0$ degree of differentiation between donations to different projects. Weights ω_i can be affected by the fundraising effort $y_i \geq 0$ of each nonprofit $i = 1, \dots, n$ as:

$$\omega_i = \omega + y_i + \Delta(\sum_{j \neq i} y_j)$$

Fundraising by a nonprofit i increases the perceived importance of the project for a donor; $\Delta \begin{matrix} \leq \\ \geq \end{matrix} 0$ expresses an "awareness" spillovers effect coming from rival fundraising.

Nonprofit organizations

By the constrained maximization of each donor's utility, we obtain

$$d_i = \frac{\omega_i (\gamma + n - 1) - \gamma - \sum_{j \neq i} \omega_j}{\gamma (\gamma + n)}.$$

Let $N = \{1, \dots, n\}$ be a set of nonprofits, each one founded by a social entrepreneur who builds her organization around a project. A nonprofit is assumed to maximize the output of its project:

$$Q_i(F_i, \tau_i) = F_i \cdot \tau_i,$$

where F_i are the funds (money) and τ_i the time devoted to the project. Each social entrepreneur has 1 unit of time, that she can use it either to work on the project or to collect funds:

$$1 = \tau_i + y_i$$

where y_i denotes the time devoted to fundraising.

Nonprofit organizations

Thus, we have, for each nonprofit

$$Q_i = [(1 - c)D_i - f] (1 - y_i),$$

where $D_i = Ld_i$ is the revenue collected from donors, $0 \leq c < 1$ the cost of collecting each unit of donation, and $f > 0$ a setup cost. The output of every nonprofit can be expressed as function of the fundraising efforts of all nonprofits:

$$Q_i(y_i, y_{-i}) = (1 - c) (\alpha + \delta y_i - \beta \sum_{j \neq i} y_j) (1 - y_i),$$

where

$$\alpha = \frac{L(\omega-1)}{\gamma+n} - \frac{f}{1-c} \geq 0, \quad \delta = \frac{L(\gamma+n-1+\gamma\Delta)}{\gamma(\gamma+n)} > 0, \quad \beta = \frac{L(1-\gamma\Delta)}{\gamma(\gamma+n)} \leq 0.$$

β key parameter: $\beta > 0$ if $\gamma\Delta < 1$, fundraising efforts are *strategic complements* and cause *negative externalities*; $\beta < 0$ for $\gamma\Delta > 1$, fundraising efforts are *strategic substitutes* and cause *positive externalities*.

Nonprofit alliances formation

Nonprofits can form alliances $A \subset N$. Alliance structures $S = (A_1, \dots, A_k, \dots, A_m)$, are feasible partitions of nonprofits. Alliances payoffs are given by $Q_{A_k} = \sum_{i \in A_k} Q_i(y_i, y_{-i})$. Within alliances, nonprofits equal split the output.

Let assume an announcement game in which every nonprofit i announces (σ_i) an alliance $A_k \subset N$ to which it would like to belong.

Unanimity rule: $S^U(\sigma) = \{A_1(\sigma), A_2(\sigma), \dots, A_m(\sigma)\}$: every nonprofit i belongs to A_k ($k = 1, 2, \dots, m$) iff $\sigma_i = \{A_k\}$ for all $i \in A_k$ and stays as singleton otherwise.

Aggregative rule: $S^A(\sigma) = \{A_1(\sigma), A_2(\sigma), \dots, A_m(\sigma)\}$: every nonprofit i belongs to A_k ($k = 1, 2, \dots, m$) iff $\sigma_i = \sigma_j$ for all $i, j \in A_k$ and stays as singleton otherwise.

We look at the profiles of announcements σ that are Nash or strong Nash equilibria under either the *unanimity* or the *aggregative rule*.

Results: Nash Stability of Nonprofit Alliance Structures

Proposition

Under the unanimity rule of coalition formation: (i) the grand coalition $\{N\}$ is Nash stable for any $\beta \in (\underline{\beta}, \bar{\beta})$; (ii) All feasible alliance structures are Nash stable when fundraising efforts are strategic complements ($\beta > 0$); (iii) the alliance structures of the form $S = (\{A\}, \{j\}_{j \in N \setminus A})$ fail to be Nash stable if $\underline{\beta} < \beta < \hat{\beta}(n, a) < 0$, i.e. if fundraising efforts are strongly substitutes.

Proposition

*Under the aggregative rule of coalition formation, the grand coalition of nonprofits $\{N\}$ is Nash stable **if and only if** fundraising efforts are strongly strategic complements, i.e. $\beta \geq \beta^*$, with*

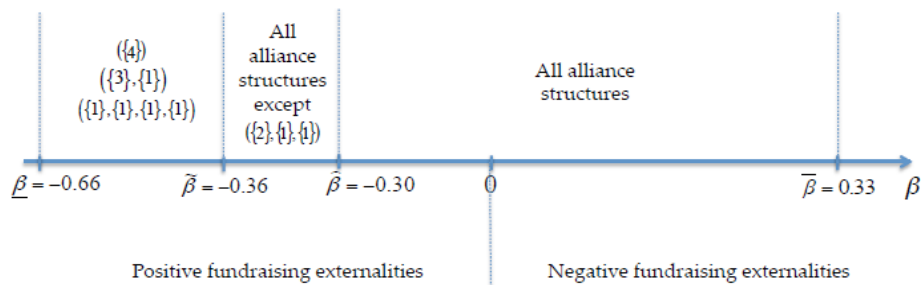
$$\beta^* = \frac{\delta(8n-10-2n^2) + 2\delta\sqrt{28-44n+27n^2-8n^3+n^4}}{n-1}.$$

Four Nonprofit Example: Nash Stability

$N = \{1, 2, 3, 4\}$, $L = 1$, $\alpha = 0$, $\delta = 1$, $\underline{\beta} = -2/3$ and $\bar{\beta} = 1/3$.

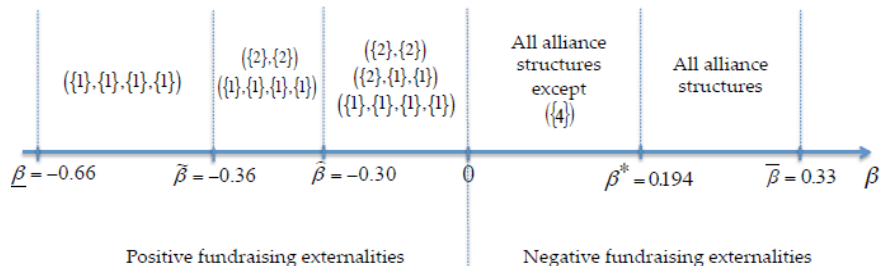
$S = [(\{4\}), (\{3\}, \{1\}), (\{2\}, \{2\}), (\{2\}, \{1\}, \{1\}), (\{1\}, \{1\}, \{1\}, \{1\})]$

Figure 1. Nash stable alliance structures under unanimity rule



Four Nonprofit Example: Nash Stability

Figure 2. Nash stable alliance structures under aggregative rule



Results: Coalitional Stability of Nonprofit Alliance Structures

Proposition

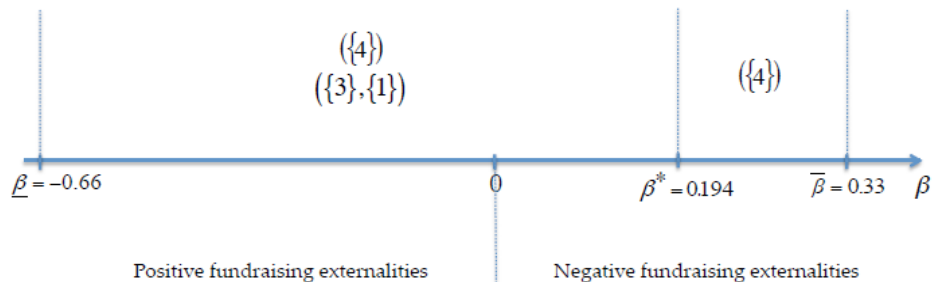
Under the unanimity rule of coalition formation: (i) the grand coalition is always coalitionally stable; (ii) If $\beta \geq \beta^ > 0$ the grand coalition is the **unique** alliance structure of the form $S = (\{A\}, \{j\}_{j \in N \setminus A})$ to be coalitionally stable; (iii) If β is sufficiently small (i.e. $\beta^* > \beta^{**} > \beta > 0$), other alliances structures of the form $S = (\{A\}, \{j\}_{j \in N \setminus A})$ can become coalitionally stable.*

Proposition

Under the aggregative rule of coalition formation, the full coordination is coalitionally stable if a majority breaking protocol hold in N .

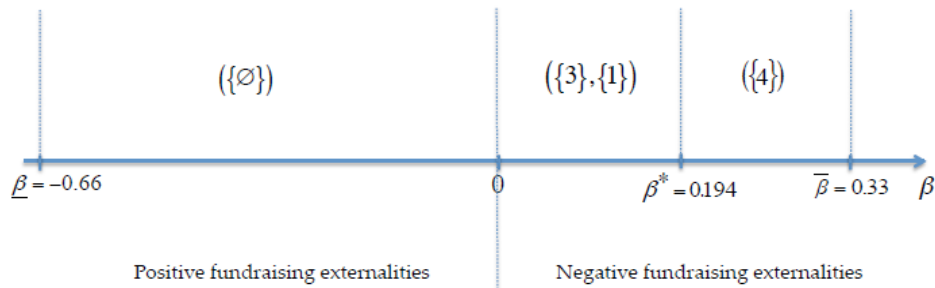
Four Nonprofit Example: Coalitional Stability

Figure 3. Coalitionally stable alliance structures under unanimity rule



Four Nonprofit Example: Coalitional Stability

Figure 4. Coalitionally stable alliance structures under aggregative rule



Concluding Remarks

- Public policies that affect the strategic interaction between nonprofits, and, in particular, the degree of strategic complementarity/substitutability of nonprofits' fundraising actions can be used to enhance nonprofit cooperation.
- For instance, if the awareness campaigns about the issues towards which nonprofits operate is done by public sector entities (e.g. the ministry of health), then such a policy reduces the awareness spillovers of fundraising activities of nonprofits (Δ decreases).
- Alternatively, if government subsidizes the cost of fundraising campaigns via a technology that allows for precise targeting of donors, e.g. consumer-analytics based solicitations via Internet (as compared to non-targeting technologies, such as direct mailing), this also would reduce the spillovers (and thus lower the value of Δ).