Johan Moyersoen* — Marieke Huysentruyt°

Crowding In, Crowding Out.
The Janus-Faced Role of Group Diversity
in Collective Action

INTRODUCTION

In March 2004 the United States and the European Union, pledged respectively $ 400 million and $ 384 million in aid for Cyprus, under condition that the Greek- and Turkish-Cypriots back the UN peace plan in the referendums scheduled on April 24, 2004[1]. Despite the huge reward to end the division in Cyprus, the Greek Cypriots voted in the referendum against the unification. The Greek Cypriots voted 75.8% against the peace plan, whereas the Turk Cypriots voted 64.9% in favor of the UN proposal. As a result, the effort of the international community to bring the two different states together in a collective action to unify the country and to end the militarization on the island failed. This paper aims to gain insight whether the policy of the EU and the USA to reward (=peace dividend) the different actors to sign the peace plan and to unify could have had a reverse effect and hampered the unification process. In more general terms, the paper aims to scrutinize how

* School of Geography and the Environment, University of Oxford.
° London School of Economics and Political Science.

[1] http://news.bbc.co.uk/1/hi/world/europe/3628579.stm

funding schemes that explicitly reward coalition diversity affect the partnering agents, their willingness to voluntarily contribute and their ability to achieve the socially optimal joint provision of the public goods project? Do these schemes indeed make it easier to establish *diverse* partnerships?

For good or for bad, *'group diversity'* has become increasingly the *'cure-all'* remedy to alleviate all sorts of collective action problems in society. Group diversity boosts the self-efficacy of organizations (Bandura and Wood, 1989), mobilizes in the community the expertise to solve complex and fuzzy problems (Lowndes and Skelcher, 1998), gives associations the capacity to reach out to the broader society and to explore novel opportunities (Granovetter, 1974), promotes entrepreneurialism within organizations (Burt, 1992) and mitigates conflict between groups. Further, group diversity is perceived beneficial to regenerate the economy of a region and boost innovation and creativity within groups (Goldenberg and Mazursky, 2002). To make one underlying mechanism more precise, consider the following example. Experimental tests have shown that in a problem-solving workshop heterogeneous groups are far more effective than homogeneous groups to find reasonable solutions for complex problems (Surowiecki, 2004). The difference of approaches enables the heterogeneous group to test out and to deliberate on different trajectories of reasoning and synergies. The homogeneous group, instead, is *locked in* in a more narrow set of approaches as all group members have similar beliefs, regards and mental frameworks (Woolcock, 1998). Group diversity, thus, can positively affect the collective outcome, over and above the individuals' human capital contributions. This literature essentially suggests

that group diversity generates a multiplier effect, adding to the public good production in collective action.

At the same time, considerable research has found that diversity inflicts conflict and jeopardizes the cooperation processes of collective action (Bandiera et al., 2004). For example, Dayton-Johnson revealed in an empirical study on farmers self-managed irrigation systems in Mexico, called *unidad de riego*, that social heterogeneity, measured by the number of different villagers using the same irrigation system is significantly negatively correlated with the infrastructure maintenance of the irrigation system (Dayton-Johnson, 2000). The complexity to agree on the characteristics of the relevant public good (Esteban and Ray, 1999), the aversion of participants to work together with people unlike themselves (Alesina and La Ferrara, 2000), and the difficulty for other group members to impose sanctions on free-riding participants (Miguel and Gugerty, 2004) explain why group heterogeneity hampers the public good delivery in collective action. Further, the different appreciations of the public good in diverse partnerships (Vigdor, 2001) and the skewed relationship in a partnership with unequal levels of wealth (Baland and Platteau, 2002) have also been shown to impede the coordination processes in collective action with divers groups.

In an attempt to both capitalize on the positive effects of diversity and counterbalance the coordination difficulties within heterogeneous groups, policymakers around the globe are increasingly inclined to explicitly reward group diversity in collective action initiatives. For instance, funding schemes directly vary the size of support as a function of an *ex ante* specified measure of

group diversity.

For a given coalition, substantial evidence suggests, as listed above, that group diversity can improve the public goods outcome. However, *ex ante* it is not clear how the multiplier effect impacts group formation; that is to say, the matching of diverse agents. In some sense, tying the level of support to the degree of group diversity presupposes that diversity rewards stimulate stable, superior coalition outcomes. In this paper, we question this presumption and attempt to theoretically evaluate how such

Can group diversity mitigate the problems of collective actions?

policies might affect the individuals' incentives to collaborate in the context of a public goods project.

Our main finding is that there exists a *non-monotonic relationship* between the rewards to group diversity and the hidden costs of ensuring that each collaborating partner offers his or her socially optimal contribution. That is to say, for very high levels of coalition diversity, individual incentives to deviate (from the socially optimal strategy) fall with a marginal increase in coalition diversity; yet for low levels of coalition diversity, individual incentives to deviate actually increase with a marginal rise in diversity. In the latter case, the multiplier effect of group diversity weakens individual incentives to contribute optimally to the public good project. The diversity rewards in effect *crowd out* individual efforts to contribute voluntarily. This adverse effect, suggested by our model, has been widely overlooked[2]. Our results question

---

[2] Bruno Frey and co-authors (Frey and Oberholzer-Gee, 1997; Frey et al., 2001) have suggested

the effectiveness of a wide range of public policy instruments, currently used by local, national and global policy agencies.

The remainder of this paper is structured as follows. The next section sketches a number of concrete scenarios to which our model can be applied. Section three discusses the set-up of our model. Three subsections examine the individuals' allocation decisions under a non-cooperative partnership, a cooperative partnership, a 'cooperative' partnership with unilateral deviation. Section four concludes.

DIFFERENT RELEVANT SCENARIOS OF COLLECTIVE ACTION WHERE GROUP DIVERSITY HAS A POSITIVE EFFECT ON THE PUBLIC GOOD DELIVERY

Already in 1908, Georg Simmel emphasized the importance to reach out to the broader community to improve the public good provision within the community:

> "…there arise[s] a need and an inclination to reach out beyond the original, spatial, economic, and mental boundaries of the group and… to supplement the original centripetal forces of the lone group with a centrifugal tendency that forms bridges with each other groups." (Simmel, 1971, p 253).

Yet, it is only in the last decades that a multitude of research gives evidence that in a wide variety of projects and circumstances group diversity in

---

that the willingness of individuals to contribute to public goods may be undermined by explicit payment. Furthermore, the hypothesis that explicit incentives (not necessarily monetary incentives) may crowd out civic virtue, incentives to work hard, willingness to do something for free, or the pleasure and satisfaction derived from certain actions has been analyzed by numerous scholars, psychologists (Deci et al., 1999) and economists (Seabright, 2002; Benabou and Tirole, 2003) alike.

collective action has an *endogenous* multiplier effect on the public good provision. Moreover, inspired by the observation of the *endogenous* effect of coalition diversity on the public good provision, policy makers increasingly initiated funding programs to *exogenously* reward group diversity. As a result, the general model that we propose gives us insight onto a broad spectrum of projects of collective action where coalition diversity improves either *endogenously* or *exogenously* (or a combination of the two) the public good provision. To illustrate the different sorts of projects we had in mind when conceptualizing the model, let us consider three different case studies.

a. The Urban Regeneration Project, LimiteLimite

The first case is an urban regeneration project, called LimiteLimite, where a small group of individuals succeeded to mobilize a diverse partnership to revive the Brabant neighbourhood (Brabantwijk) (Moyersoen and Swyngedouw, 2004). The Brabantwijk is a highly diverse and multi-cultural, yet deprived, neighbourhood in Brussels. The main driver of the project, LimiteLimite, consisted of the construction of a nine-meter high and artistically designed tower and meeting centre in the Brabantwijk. The building of the tower initiated a chain of spin-off initiatives, such as, among others, a neighbourhood festival, a flower and decoration project, visual projects staged by the local art school, a monthly breakfast for the women in the neighbourhood, etc… Starting in 1997 with a small group of initiators, LimiteLimite evolved incrementally, through realizing a series of small projects, to become an unparalleled diverse (inclusive) partnership that

brought together a variety of locally active actors (neighbourhood groups, sport associations, schools, etc…) and agents from the metropolitan level (firms, regional government, higher education institutions, national foundations) (Moyersoen and Swyngedouw, 2004). The core-group conceptualized the tower-project in such a way that it was too big for the neighbourhood groups - as it had not the artistic- or technical expertise and financial resources — and too locally embedded for the metropolitan groups to

Financiers, private and public organisations play an active role in promoting 'diversity'

get grip on the project— as it was located beside a youth—and neighbourhood centre. Hence, each concrete step resulted in a diverse partnership between actors from the local and the metropolitan level. Furthermore, these processes of diverse partnership formation fostered the development of a solid institutionalised, inclusive partnership, including all different participants of the project.

As a result, in LimiteLimite, the realization of each stage of the project was a product of the cooperation of heterogeneous actors in the collective action[3]. If a group of actors would opt out the collective action, it would jeopardize considerably the public good provision as it deprives the project from vital knowledge to build the tower and meeting place and to endeavour

---

[3] The account of the collective action, LimiteLimte, has many similarities with the concept of territorial innovation models (Industrial Districts, Learning regions, Milieux Innovateurs, New Industrial Spaces, Local Production Systems, etc.) in regional economics. In most territorial innovation models the capacity of a region or an agglomeration to bring together a diverse set of actors in a development dynamic is perceived as key for urban growth (Storper, 1997).

inclusive governance. As a result, group diversity in collective action projects as LimiteLimite, generates a public good provision larger than just the sum of the contributions of the actors.

b. EU-Major Funding Programs

Today, funding agencies increasingly encourage *heterogeneity* in partnerships for the delivery of public goods services. Frustrations with ill-integrated development practices have given way to a heightened appreciation of 'diversity', broadly conceived, in policy-making circles across the globe. Financiers, private (foundations) and public (EU; international organizations such as IMF, Worldbank and UN agencies) alike, play an active role in promoting 'diversity' by tying the size of their support to some *ex ante* specified measure of project diversity. In effect, these funding strategies embody a subtle, new form of aid conditionality. These strategies can be readily summarized as follows:

(i) Firstly, the financiers assess the degree to which the project involves *all* relevant stakeholders (in effect, espousing the 'multi-stakeholder' approach). For EU-funding, diversity measured in terms of the *nationalities of the partners* (with an extra premium when a former Eastern European country is involved) is often not only a precondition for financial support (policy target or eligibility criterion), but also a criterion for extra rewards. Also, many EU grant-adverts emphasize that "linkages between diverse organizations (academic institution, NGO, etc.) are especially welcome". Similarly, development agencies increasingly

screen project proposals on the basis of the organizational heterogeneity the project manages to mobilize or bring together. For instance, finding a sufficiently diverse panel of partner organizations (local NGO, local government support, women groups, businesses, etc.) in a public goods initiative has become key to raising more financial support.

(ii)   Secondly, the financiers evaluate the aggregate (sum total, measured in monetary units) of all the individual contributions that the project has already successfully secured.

(iii)   Finally, the financiers multiply the total of contributions thus far secured by a certain factor as fixed from the outset (before any project proposals are submitted). For instance, certain funding schemes promise to double the total level of contributions already agreed to by the different stakeholders. The diversity multiplier is strictly increasing in the relevant indicator of partnership diversity. In other words, greater linguistic, ethnic, or institutional diversity thus forms the basis for a higher 'funding multiplier'[4].

For EU programs, the 'mixed partnership' has become a basic principle for funding. The Socrates II Grundtvig program, one of the EU's major funding programs for education and training, indeed emphatically advises its

---

[4] Our stylized mechanism of rewards for coalition diversity resembles the underlying logic of matching or challenge schemes. Challenge grants are pledge gifts from a leader that will be fulfilled only if the followers collectively give a stated amount, usually several times the leadership pledge. In our case, however, the financier's transfers are granted unconditionally. But like under matching schemes, the size of the pledge depends on the sum total of private contributions committed to the initiative as well as the diversity of actors the project successfully involves.

applicants to set up "mixed partnership between universities, associations and organizations from both the formal and the non-formal sectors"[5]. Structural funds programs like Objective II and its successor Objective III, also explicitly promote meso-level partnerships. In the same vein, the Leader II program aims to forge cross-border, cross-sector cooperation between NGOs, local authorities, research institutes, specialized agencies, etc. Multilateral funding programs, like Socrates, Leader II and Objective III, deploy similar strategies to determine their level of project support as a function of the partnership diversity involved.

c. Peace Settlements in Inter- and Intra-state wars

The disarmament treaties between the US and USSR during the cold war — such as SALT I and Salt II (=Strategic Arms Limitation Treaties) respectively in 1972 and 1979, the INF (=Intermediate-range Nuclear Force) agreement in 1987 and the START I (=Treaty on the Reduction and Limitation of Strategic Offensive Arms) treaty in 1991— had a much broader public good effect than just diminishing the stock of arms between the two countries. The peace treaties generated a peace dividend over and above the actual agreement in terms of, amongst others, increased cooperation between East- and West-European countries, savings of military expenditures, democratisation process in countries which were before the end of the Cold War under the USSR

---

[5]   http://europa.eu.int/comm/education/programmes/socrates/grundtvig/proposal_en. html For European Union see also Leader II, and Objective II program and evaluation nondiscriminatory employment http://europa.eu.int/comm/employment_social/ fundamental_rights/pdf/prog/ecws_en.pdf.

influence umbrella, reduction of military service in most Western-European countries, etc. As a result, we can conceive a peace treaty as a particular case of group diversity in collective action where group heterogeneity (=the belligerent groups) engenders a multiplier effect in terms of a peace dividend on the public good provision. Moreover, initiatives like the Post-Conflict Fund of the World Bank aim to increase the positive effect of the peace dividend in the public good provision[6]. The Post-Conflict Fund, amongst others, provides financing for reconstruction initiatives in post-war societies. The Post-Conflict Fund plays an important role in Africa's Great Lakes region, Afghanistan, the Balkans, Iraq, Liberia, Sierra Leone, and other war-torn regions.

Although the intrinsic qualities of diversity are generally perceived as a *force for good*, the paper gives evidence that this positive quality of diversity can under certain conditions generate adverse effects. The value-added quality of group diversity can hamper the agents willingness to voluntary contribute and their ability to achieve the socially optimal joint provision of a public good project. Our study identifies the conditions when the diversity multiplier in collective action -like in the case of an urban regeneration initiative, funding schemes of major EU funding programs and even peace treaties- can backfire and lead the actors to deviate or even opt out of the collective action project.

From a methodological perspective, our study begs to differ from most theoretical approaches to heterogeneity and public goods provision. In our view, the latter approaches suffer from a "what you put in the model is what you get out of it" fallacy. In other words, the particular conceptualization of

---

[6]   http://lnweb18.worldbank.org/ESSD/sdvext.nsf/67ByDocName/ConflictPreventionand Reconstruction.

diversity one chooses immediately limits and dictates the set of predictions and behavioral findings. While institutions on how the costs or benefits from collective action relate to the diversity amongst contributing agents might well abound, the micro-foundations of such modeling choices remain unearthed. Be diversity modeled as a by-product of collective action from which club or contributing members derive private returns or as a costly factor due to lack of information or commonly shared social conventions, every specific conception of diversity can straightforwardly be accommodated in a theoretical model. Yet, such conceptions are imposed onto a model, rather than derived from the logic of individual and collective decision-making.

THE MODEL

In this section, we present a simple model, which focuses on the interaction between a partnership's private provision of a public goods project and the exogenously fixed rewards for coalition diversity. While our model will be relevant to most cases similar to those highlighted in the previous section, for the sake of a common anchor, we shall often use the illustration of the funding schemes in this exposition. We consider the case of a partnership of two agents, but at the cost of more complex notation, it could be a group of any size. Partners can invest in the public goods project. Total investment in the public goods project is a function of (i) all individual contributions (for ease, we rescale all contributions in monetary terms and assume contributions are simply additive, perfect substitutes) and (ii) the diversity multiplier. Let

f: $R \rightarrow R$ denote the function, which maps the 'partnership diversity parameter'[7] into a 'funding multiplier', such that *f*(*d*)=Δ and with *f*(0)=1 (zero diversity means no additional funding) and $f'_\varnothing 0$ and Δ is bounded from above (feasibility). We assume that for any fixed number of partners (in our example, two), a more diverse coalition composition corresponds with a higher funding multiplier[8].

Let us focus on a simple, additive public goods production function with constant returns to scale. In the two-agents-case, the final public goods outcome is thus generated by the sum of the individual contributions (perfect substitutes), multiplied by a `funding multiplier'[9].

---

[7] Our basic analysis does not depend on a particular computation of the diversity parameter. One may think of a Weitzman value of diversity (1992) or a multidimensional inequality index (a multidimensional generalization of the Gini-coefficient or multidimensional generalization of Atkinson's one-dimensional inequality index; List, 1999). In fact, an interesting extension of this study is to examine more closely how donors precisely construct their value judgement of diversity, that is, to estimate both the mapping function *f*(.) as well as to specify their calculation of diversity (*d*).

[8] We only need the function *f*(.) to be an increasing function of the diversity parameter, d, within relevant bounds. It may well be concave or convex or take on some other quadratic shape. We mention the qualification within relevant bounds only to signal that we do not presume infinite rewards for infinitely large and diverse coalitions. For instance, it could well be that the funding multiplier is set such that above some threshold value *D'* its value drops (steeply), because at that point the diversity of the coalition is considered too costly, possibly undermining the project feasibility. In our analysis, we rule out such proposals on the grounds of being incredible and unrealistic.

[9] An alternative interpretation is the *ad hoc* assumption that coalition diversity introduces a change in productivity of contributions. Accordingly, diverse views, experiences, thoughts or backgrounds positively impact the final public good outcome. Such an assumption precludes the need to specify individual utility as a function of the identity of self and other, that is $U_i(x_i, q_i, i, j)$. The difficulty with the latter expression is that we cannot separate the arguments *i* and *j* from the impact of individual consumption. In our analysis, we do not wish to derive the conditions under which such an assumption may be appropriate. Instead, we wish to explore how the propensities to achieve a socially optimal outcome are influenced by changes in the diversity index.

$$X\left(q_i, q_j, \Delta\right) = \Delta(q_i + q_j) \tag{1}$$

Where $X(.)$ denotes the public goods production function, q_i, q_j are the contributions to the public good of the agent's i and j respectively, and Δ captures the multiplier effect of diversity.

Each agent is endowed with (possibly) different levels of wealth, denoted as y_i and y_j for respectively agents i and j. Each must decide how much to contribute to the public goods project, q_i, q_j with $y_i \geq q_i$, and $y_j \geq q_j$. We assume that individuals have identical preferences over public and private goods consumption[10]. In other words, the weights each individual attaches to the public goods and private goods consumption are equal. We will denote the agents' preference weight for respectively the public and the private good as α and $(1\text{-}\alpha)$ where $0 \leq \alpha \leq 1$. The income that is not invested in the public goods project is spent on private consumption: $y_i - q_i$ for actor i and $y_j - q_j$ for actor j. For each good (public and private), individual pleasure or benefits from consumption (and production, in the case of the public goods project) are (plausibly) assumed concave. We can now readily represent the individual strictly quasi-concave utility function as[11]:

$$U_i = \alpha\sqrt{\Delta\left(q_i + q_j\right)} + \left(1 - \alpha\right)\sqrt{y_i - q_i} \tag{2}$$

---

[10] We adopt this assumption for expositional purposes. Allowing for heterogeneous individual tastes would complicate our analysis, detracting us from the main story we wish to unveil. The analysis can readily be extended with the case of heterogeneous preferences over or valuations of the public goods outcome and private consumption.

[11] Again, we use the square-root functions for expositional purposes. The individual utility functions in effect reflect standard rational preferences.

The sequence of events is as follows:

- Agents are matched in pairs. All individuals hold identical preferences. Individual type (wealth) and group identity (diversity) are common knowledge. The diversity award $[\Delta = f(d)]$ is also fixed and known to everyone.

- Agents simultaneously decide how much to contribute to the public goods project.

- The diversity award anticipated by the agents from the outset and the public goods project are realized.

Next, we will scrutinize the effect of the diversity multiplier in subsequently the case of a non-cooperative partnership, a cooperative partnership, a 'cooperative' partnership with unilateral deviation.

a. Non-cooperative Partnership

In a non-cooperative partnership, both agents independently choose their q_{j*}^{NC} optimal contribution without coordination. Taking agent j's contribution q_i^{NC} as fixed, agent i must decide on his best response strategy— the contribution that maximizes his payoff. His decision problem becomes:

$$\underset{q_{i*}^{NC}}{Max}\left[\alpha\sqrt{\Delta(q_i^{NC}+q_{j*}^{NC})}+(1-\alpha)\sqrt{(y_i-q_i^{NC})}\right] \tag{3}$$

$$S.t. q_{j*}^{NC}=Arg\max\left[\alpha\sqrt{\Delta(q_j^{NC}+q_{i*}^{NC})}+(1-\alpha)\sqrt{(y_j-q_j^{NC})}\right] \tag{4}$$

Because the individual's objective function is quasi-concave, the first order

condition is a necessary and sufficient condition to pin down agent i's and j's optimal contributions:

$$q_{i*}^{NC} = \frac{(1-\alpha)^2(y_i - y_j) + \Delta\alpha^2 y_i}{2(1-\alpha)^2 + \Delta\alpha^2}$$

(5a)

$$q_{j*}^{NC} = \frac{(1-\alpha)^2(y_j - y_i) + \Delta\alpha^2 y_j}{2(1-\alpha)^2 + \Delta\alpha^2}$$

(5b)

Not surprisingly, the optimal non-cooperative contribution increases at a constant rate in individual wealth. In other words, *wealthier* agents, *ceteris paribus*, make higher public contributions. At the same time, individuals matched with a *wealthier* agent effectively reduce their optimal contribution. Individuals take a free ride on each other's contributions, and are tempted more so when their partner is wealthier. The agent who is the wealthier of the two contributes higher equilibrium sums.

Also, the marginal effect of the agent's preference for the public goods (α) on the agent's contribution is unambiguously positive. This marginal effect is decreasing so long as Δ (the group's diversity parameter) lies below a preference-specific threshold value[12], and increasing otherwise.

Finally, the optimal non-cooperative contribution is increasing at a decreasing rate in the funding multiplier. In other words, the external rewards

---

[12] Notice, since we have assumed that all individuals have identical preferences, this threshold diversity value is the same for all pairs.
The diversity threshold is defined as: $\hat{D} = -\dfrac{2\left(1 + \alpha^2(-3+2\alpha)\right)}{\alpha^2(-3+2\alpha)}$

provoke greater, voluntary contributions. The economic logic behind this result is that the funding multiplier effectively plays the role of a scale parameter in the production function of the public good. A higher funding multiplier, as mentioned earlier, means a higher return to the individual's investment.

Proposition 1:

A higher funding multiplier provokes greater private investment in the public goods project (at a decreasing rate), that is, a higher Δ crowds in non-cooperative investment.

b. The cooperative game

Let us now consider the partnership outcome (given a funding scheme that positively rewards coalition diversity), when both agents cooperatively decide how much to invest in the public goods project. They mutually take account of the joint surplus associated with their allocation choices. We can rewrite the optimization problem as:

$$\underset{q_i, q_j}{Max}(U_{i+j}^C) = \underset{q_i, q_j}{Max}\left[2\alpha(q_i^C + q_j^C) + (1-\alpha)\left(\sqrt{y_i - q_i^C} + \sqrt{y_j - q_j^C}\right)\right]$$

(6)

Like before, because of the quasi-concavity of the agents' joint objective function, the first order condition is necessary and sufficient to pin down each agent's optimal equilibrium contribution. The optimal contributions of agent *i*

and *j* can be readily derived:

$$q_{i*}^{C} = \frac{1}{2}\left[\frac{4\Delta\alpha^2 y_i + (y_i - y_j)(1-\alpha)^2}{2\Delta\alpha^2 + (1-\alpha)^2}\right] \tag{7a}$$

$$q_{j*}^{C} = \frac{1}{2}\left[\frac{4\Delta\alpha^2 y_j + (y_j - y_i)(1-\alpha)^2}{2\Delta\alpha^2 + (1-\alpha)^2}\right] \tag{7b}$$

When we compare these expressions with their counterparts under a non-cooperative partnership, we can readily observe that the free-rider effect has now diminished (that is, the negative marginal effect of the other's contribution on one's own is smaller under cooperation). Also, wealthier agents contribute more to the collective good in a cooperative partnership than in a non-cooperative one (the positive marginal effect of individual wealth is now higher). Indeed, the difference between the optimal cooperative and non-cooperative investments for each agent is strictly positive.

The socially optimal individual contribution is increasing (decreasing) in one's own (the other's) budget at a constant rate, and increasing in the public goods preference parameter. A higher diversity multiplier increases the socially optimal individual contribution at a decreasing rate (the proofs of these statements are straightforward).

Proposition 2:

A higher funding multiplier provokes greater private investment in the public goods project (at a decreasing rate), that is, a higher Δ crowds in cooperative investment.

Finally, let us characterize the indirect utilities associated with the cooperative partnership. Like in the previous case, we find that indirect utilities are the same for each agent in a match (that is, the partnership outcome is again extreme egalitarian) and equal:

$$V_{i*}^C = V_{j*}^C = \left(\Delta \alpha^2 + \frac{(1-\alpha)^2}{2} \right) \sqrt{\frac{2(y_i + y_j)}{(1-\alpha)^2 + 2\Delta\alpha^2}} \tag{8}$$

Each individual's indirect utility under a collaborative partnership is increasing at a decreasing rate in the sum total of wealth owned by each partner and funding multiplier.

c. Cooperative partnership with unilateral default

We now examine an agent's optimal deviating strategy from the socially optimum cooperative outcome. Taking the socially optimal contribution of agent j as given, what would agent i's selfish (non-cooperative) best response be? Notably (and as will become clear soon), this reasoning solely serves expositional purposes. Since the decision problems of the two partners are symmetrical, the solution to the defaulter's optimisation problem below will never be part of an equilibrium outcome[13]. The agent who wishes to unilaterally deviate from the cooperative strategy faces the following decision

---

[13] In effect, the game played by the two partners conceals the same logic as that of a Prisoner's Dilemma game. This subsection analyses the cross-diagonal payoffs, whereby one of the partners thinks and acts cooperatively and the other does not (defaults on her cooperative strategy)

problem:

$$Max_{q_i^D} \left[\alpha \sqrt{\Delta(q_i^D + q_{j*}^{C'})} + (1-\alpha)\sqrt{y_i - q_i^D} \right] \tag{9a}$$

$$q_{j*}^{C'} = ArgMax\left(U_{i+j}^C \big| q_i = q_{i*}^C\right) \tag{9b}$$

The cooperative agent's contribution still equals his socially desirable investment derived in the previous section. His payoffs or indirect utility associated with the thus produced public goods project will of course now differ.

$$V_{i*}^D = \frac{\sqrt{2}}{2} \sqrt{\frac{\left(\Delta\alpha^2 + (1-\alpha)^2\right)\left(4\Delta\alpha^2 + (1-\alpha)^2\right)(y_i + y_j)}{(1-\alpha)^2 + 2\Delta\alpha^2}} \tag{10}$$

This expression for the defaulter's indirect utility –this case agent i - given that his partner (agent V_{i*}^D j) expects him to cooperate, suggests that a greater taste for the public good and higher aggregate income further increase the defaulter's payoff at a decreasing rate. We also find that the agent i's indirect utility with unilateral default, is at least as high as the indirect utility under full cooperation.

Let us define T_{i*} and T_{j*} as follows:

$$T_{i*} \equiv V_{i*}^D - V_{i*}^C \tag{11a}$$

$$T_{j*} \equiv V_{j*}^D - V_{j*}^C \tag{11b}$$

The values of T_{i*} and T_{j*} thus denote the utility gains each agent could achieve from unilaterally deviating from the cooperative, socially superior strategy - where $T_{i*} \geq 0$ and $T_{j*} \geq 0$. Hence, each agent who is paired in a cooperative partnership has an incentive to unilaterally deviate[14]. This condition holds true for all non-trivial parameter values. The figure below plots the gains from unilaterally deviating as a function of individual preferences for the public goods project.

We observe that the individual gains from a unilateral deviation first increase and subsequently diminish in the individual's public goods preference parameter (α). Only individuals with intermediary public good preferences values are able to reap significant gains from unilateral deviation. Incentives to deviate are thus minimal for individuals who value the project extremely high or for those who care awfully little for the project. We can also interpret these utilities as the implicit taxes borne by the partners for the cooperative partnership to be sustained. Hence, successful cooperative partnerships must be capable of compensating the partners for these implicit taxes so as to offset individual incentives to default.
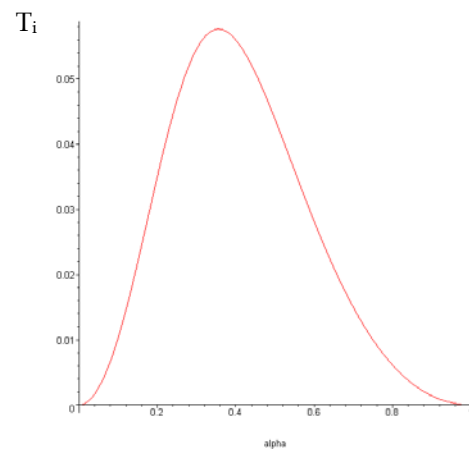

These implicit taxes are increasing at decreasing rates in the sum total of wealth owned by each agent. So in our model with explicit rewards for

---

[14] His utility gains from a unilateral deviation are indeed strictly positive as long as: $4\left(\Delta\alpha^2\right)^2 \phi\, 0$

coalition diversity, collaboration between wealthier individuals requires higher compensation payments. Notice, only the sum of incomes enters the agent's indirect utility function, no matter whether he or she is unilaterally deviating from the cooperative investment strategy. This is the sense in which Bergstrom et al.'s *neutrality theorem* (1986) applies to our implicit compensations. In other words, the degree of income inequality between the two collaborating agents has no impact on the size of the implicit compensation payments. Further, the implicit tax is increasing at a decreasing rate in the sum total of wealth owned by the two agents[15].

Finally, our analysis reveals a '*non-monotonic relationship*' between the implicit tax and the financier's funding multiplier. In other words, there exists a threshold level of diversity below which the marginal effect of Δ on the size of T_{i*} is increasing, and above which the opposite holds true. This threshold is a decreasing function of the agent's

---
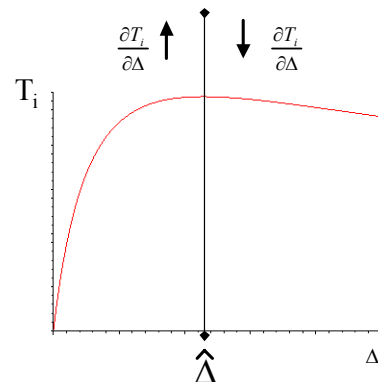
[15] In reality, the compensation for these implicit taxes can take on various forms: It could be that a third party, who is brokering the collaboration, offers these compensations. It could also be the case that something else is offsetting individual incentives to deviate. These other benefits could include (i) emotions like one's happiness from acting in an honest and fair manner vis-à-vis someone who differs along a salient dimension, (ii) the reputational benefits from acting as a trustworthy individual, (iii) private, associative rewards from having collaborated with diverse `others' (We explore this idea in a working paper called *Collective action, endogenous matching and disingenuous mercenaries*, 2003), (iv) network benefits or information externalities from tapping into a network of contacts and information very different from one's own or (v) fairness concerns. For high, positive diversity effects, these implicit taxes fall, making the sustenance of a socially optimal outcome easier to achieve.

preference parameter α. In other words, a lower valuation of the public goods project increases the threshold, making it more likely that the marginal effect of diversity increases the necessary compensation payment, making it more difficult to sustain the cooperative outcome. Higher values of α, by contrast, shift the threshold diversity downwards making it more likely that the marginal rise in Δ lowers T_{j*}, and hence, making it more likely a cooperative, socially desirable public goods outcome emerges. The figure above maps this non-monotonic relationship between the *implicit tax* and *coalition diversity*.

With

$$\Delta \pi \hat{\Delta} \Rightarrow \frac{\partial T_i}{\partial \Delta} \phi \, 0 \tag{12a}$$

$$\Delta \phi \hat{\Delta} \Rightarrow \frac{\partial T_i}{\partial \Delta} \pi \, 0 \tag{12b}$$

Proposition 3:

The multiplier effect of diversity on the public good provision can weaken individual incentives to cooperate (that is, strengthen incentives to deviate from the cooperative investment strategy) when group diversity or the funding multiplier is low. This crowding out effect is more likely to occur when partners underestimate the value of the project (that is, are weakly motivated).

d. Discussion

This key result is fascinating because it points out when precisely financial incentives by way of rewarding coalition diversity, can backfire and weaken

incentives to optimally invest in the project from a social planner's point of view. Contrary to the widely held presumption that a positive multiplier effect for coalition diversity always benefits the public goods project, we find that this is not necessarily the case. In fact we reveal a mechanism via which explicit rewards to coalition diversity can destabilize the cooperative, voluntary production of a public goods project. Indeed, these exogenously fixed rewards can interfere with each individual's investment decision in two distinct ways. On the one hand, for rather small funding multipliers or levels of group diversity, a marginal rise in the diversity rewards increases individual incentives to deviate from a cooperative investment strategy. For such cooperative partnerships, the introduction of higher diversity rewards destabilizes the partnership. The implicit compensations needed to sustain the cooperative partnership increase, making further cooperation more unlikely. On the other hand, for very high existing funding multipliers or levels of group diversity, a marginal increase in diversity rewards or coalition diversity weakens individual incentives to default, thus strengthening incentives to cooperate.

Are rewards to coalition diversity costly (or beneficial) for sustaining cooperative, voluntary production of public goods? The answer that emerges from our study is: It depends. In particular, it depends on the extent of group diversity, the funding rule the financial program uses and the partner's preferences over the project. A marginal rise in the funding multiplier (based on group diversity) can both increase and decrease the implicit costs of a socially superior outcome. The higher individuals' appreciation of the public

goods project, the more likely, however, the multiplier effect of coalition diversity effectively will reduce the implicit costs of cooperation and hence appease difficulties of achieving the socially optimal public goods outcome.

CONCLUSION

This short paper showed how a positive multiplier effect of group diversity in collective action on the public good delivery can weaken individual incentives to voluntarily and cooperatively contribute to a public goods project. While a higher diversity multiplier effectively *crowds-in* higher private investment, it can also *crowd-out* individual incentives to cooperate and jointly decide on a socially superior investment strategy. For finance strategies with small diversity multipliers or groups with low levels of diversity, a marginal increase in diversity rewards, indeed, increases the *implicit compensation* needed to sustain the cooperative public goods outcome. In such cases, higher explicit rewards reduce the likelihood that the cooperative partnership can be sustained. The *crowding-out* effect acts through the implicit taxes borne by each partner to offset incentives to unilaterally deviate from the socially superior, cooperative investment strategy. For very diverse groups, in contrast, we find that increasing the explicit rewards for coalition diversity has a double positive effect: Firstly, individuals increase their individual contributions (investment effect, direct effect on individual contribution behaviour). Secondly, individuals have less of an incentive to deviate from their cooperative investment strategies (crowding-in effect, indirect effect on partnership stability).

From a theoretical perspective, our analysis' sole contribution was to draw out and pin down the notion of 'implicit compensations' under voluntary partnerships. Our simple framework has nevertheless allowed us to systematically scrutinize the impacts of financial support tied to coalition diversity, and to emerge with several, clear-cut public policy recommendations. For one, our study made clear that the introduction of higher explicit rewards for group diversity can only lower barriers to cooperative public goods investment, when the targeted groups are already sufficiently divers or highly committed to the initiative. In other words, both the type of partnerships suitable for the delivery of the public good and the extant market of coalitions must be closely assessed before designing the funding multiplier. If the typical coalition involves low levels of heterogeneity (as measured by the funding scheme), then introducing higher explicit rewards to coalition diversity can backfire and make cooperation more difficult. In such cases, other strategies, like education and training programs, might be called for before making extra financial rewards conditional upon group heterogeneity. Furthermore, motivation of partnering agents played a key role not only in the formation of individual contributions, but also in the likelihood that the exogenous funding measure promotes cooperative investment. Financiers, who are debating the use of diversity rewards, must thus try to ascertain the commitment and motivation of the collaborating candidate coalitions, so as to pre-empt the adverse consequences of their aid-conditionality.

Finally, our deliberate focus on the individual and collective choices

within fixed groups still leaves a lot of interesting questions with respect to the actual matching or group formation procedure and the optimal policy choice unanswered. Ideally, the donors who value coalition heterogeneity only finance cooperative, diverse partnerships. But how can they screen the non-cooperative groups out, especially when their funding strategy fosters the emergence of precisely those coalitions? How will the exogenous rewards for coalition diversity influence the types of matches or coalitions that will tender for funding? What happens to our main results when we introduce preference heterogeneity, informational asymmetries or the option to renegotiate the funding rule, or allow partnering agents to offer side-payments? These will be the subjects of future study.

Bibliography:

Alesina A. and La Ferrara E., *Participation in Heterogeneous Communities*, "Quarterly Journal of Economics" 115 (3), 2000, pp. 847-904.

Baland J.-M. and Platteau J.-P., *Collective Action on the Commons: the Role of Inequality*, in Baland, J.-M., Bardhan, P. and Bowles S. (ed.), *Inequality, Collective Action and Environmental Sustainability*, Russell Sage Foundation & Princeton University Press.

Bandiera O., Barankay I. and Rasul I., *Cooperation in Collective Action: A Review of the Evidence and Some Results*, Working paper, 2004.

Bandura A. and Wood R., *Effect of Perceived Controllability and Performance Standards on Self-Regulation of Complex Decision-Making*, "Journal of Personality and Social Psychology", 56 (5), 1989, pp. 805-814.

Burt R. S., *Structural Holes: The Social Structure of Competition,* Cambridge, Mass; London: Harvard University Press, 1992.

Dayton-Johnson J., *Determinants of Collective Action on the Local Commons: A Model with Evidence from Mexico*, "Journal of Development Economics", 62, 2000, pp. 181-208.

Esteban J. and Ray D., *Conflict and Distribution*, "Journal of Economic Theory", 87 (2), 1999, pp. 379-415.

Festinger L., Schachter S. and Back K. W., *Social Pressures in Informal Groups : A Study of Human Factors in Housing,* New York: Harper, 1950.

Frey B., Bohnet I. and Huck S., *More Order with Less Law: On Contract Enforcement, Trust and Crowding*, "American Political Science Review" 95 (1), 2001, pp. 131-144.

Goldenberg J. and Mazursky D., *Creativity in Product Innovation*, Cambridge: Cambridge University Press, 2002.

Granovetter M. S., *Getting a Job : A Study of Contacts and Careers*, Cambridge, Mass: Harvard University Press, 1974.

Huysentruyt, M. and Moyersoen, J., *Collective Action, Endogenous Matching and Disingenuous Mercenaries*, Working paper, 2003.

Lowndes V. and Skelcher C., *The Dynamics of Multi-Organizational Partnerships: An Analysis of Changing Modes of Governance. "Public Administration"*, 76, 1998, pp. 313-333.

Massart B., *LimiteLimite: Une Tour pour revitaliser un quartier*, "Alter Echo", 19/06/1999.

Miguel E. and Gugerty M. K., *Ethnic Diversity, Social Sanctions and Public Goods in Kenya*, Mimeo, 2004.

Moyersoen J. and Swyngedouw E., *The Role of the Tertius as Initiator of Urban Collective Action: Limits and Conditionalities*, Working paper, 2004.

Portes A. and Sensenbrenner J., *Embeddedness and Immigration: Notes on the Social Determinants of Economic Action*, "American Journal of Sociology", 98 (6), 1993, pp. 1320-1350.

Simmel G., *On Individuality and Social Forms: Selected Writings.* Chicago; London: University of Chicago Press, 1971.

Storper M., *The Regional World: Territorial Development in a Global Economy*, New York; London: Guilford Press, 1997.

Surowiecki J., *The Wisdom of Crowds: Why the Many are Smarter Than the Few.* London: Little, Brown, 2004.

Vigdor J. L., *Community Composition and Collective Action: Analyzing Initial Mail Response to the 2000 Census*, Working paper, 2001.

Weitzman, M. L., *On Diversity*, "Quarterly Journal of Economics" 107 (2), 1992, pp. 363-405.

Woolcock M., *Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework*, "Theory and Society", 27 (2), 1998, pp. 151-208.