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FINANCING GLOBAL AND REGIONAL PUBLIC GOODS THROUGH ODA: ANALYSIS AND EVIDENCE FROM THE OECD CREDITOR REPORTING SYSTEM

by

Helmut Reisen, Marcelo Soto and Thomas Weithöner

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RÉSUMÉ

Le niveau actuel de l'APD est bien inférieur aux sommes nécessaires pour financer les Objectifs de développement du millénaire. Le chiffre de 50 milliards de dollars supplémentaires par an — soit à peu près le montant total de l'APD mobilisée par les donateurs du CAD — est souvent avancé (par ex. dans le rapport Zedillo). Il correspond à l'addition des besoins de financement évalués pour lutter contre les maladies transmissibles (7 à 10 milliards de dollars) et la mortalité maternelle et infantile (12 milliards), pour promouvoir l'école primaire (10 milliards) et pour réduire de moitié la pauvreté dans le monde (20 milliards). Du fait de cette rareté des financements publics, il apparaît encore plus important d'investir dans les biens publics mondiaux : en effet, on estime qu'il est moins coûteux de sortir une personne de la pauvreté *via* la recherche agronomique et l'expansion du commerce mondial que par les mécanismes traditionnels de l'aide aux pays pauvres. Cela soulève des questions fondamentales d'ordre stratégique pour les donateurs, notamment concernant les principes de l'attribution de l'aide, sur lesquelles se penche ce Document de travail. Premièrement, l'aide doit-elle être en partie affectée aux biens publics mondiaux ? Deuxièmement, quel serait l'impact sur l'aide aux pays les plus pauvres et sur l'aide-projet d'un rééquilibrage des dépenses d'APD en faveur des BPM ?

A partir de définitions des biens publics internationaux, mondiaux et régionaux, nous attribuons à chacune de ces catégories les engagements de dons enregistrés dans le Système de notification des pays créanciers de l'OCDE (soit environ 15 pour cent pour les biens publics mondiaux et 15 pour cent pour les biens publics régionaux), les 70 pour cent restant étant consacrés à l'APD traditionnelle. Nous présentons ensuite un modèle très simplifié des biens publics adapté à la relation particulière donneur/bénéficiaire, qui permet de mettre en lumière le compromis entre une APD affectée à la fourniture de BPM et l'autonomie des bénéficiaires dans les réformes, permise par un libre usage des financements. L'analyse empirique porte sur un ensemble de données relatives à la période 1997-2001 et s'efforce de quantifier les coefficients de compensation de l'impact des hausses des promesses d'APD, tant pour les pays les plus pauvres que pour l'aide traditionnelle. Bien qu'il soit véritablement impossible de parler d'évincement, le coefficient moyen de compensation entre l'aide attribuée aux BPM et l'aide traditionnelle est largement supérieur à zéro puisqu'il atteint 25 pour cent. Nous montrons également que le financement des BPM par l'APD n'affecte pas l'aide aux pays pauvres de façon significative.

SUMMARY

The present level of ODA falls short of the amount needed to finance the *Millennium Development Goals* (MDGs). The figure of additional $50 billion per year, roughly the present total of ODA spent by DAC donors, is often quoted (e.g. by the Zedillo Report); it results from the sum of the fight against communicable diseases ($ 7-10 billion), primary schooling ($10 billion), infant and maternal mortality ($12 billion) and halving world poverty ($20 billion). The scarcity of public resources raises the importance of investing in international public goods as the cost of lifting one person out of income poverty, for example through agricultural research and global trade expansion, is estimated to be much lower than the cost of the same impact through traditional aid to poor countries. This raises important issues for donor strategies, in particular principles of aid allocation, which this paper aims to address. First, should aid be partly earmarked towards international public goods? Second, what is the impact on aid to the poorest countries and on traditional aid projects if ODA is allocated towards deleting the underprovision of international public goods?

Based on definitions for international, global and regional public goods, data on grant commitments from the OECD Creditor Reporting System will be attributed to these categories(roughly 15 per cent for global and 15 per cent for regional public goods) as well as to other, traditional, ODA (the remaining 70 per cent). The paper then presents a highly stylised model of public goods, adapted to the special donor-recipient relationship, to highlight the trade-off between ODA earmarked for the provision of international public goods and reform ownership in recipient countries through free use of resources. In the empirical analysis, the paper quantifies in a panel data analysis for the period 1997-2001 the offset coefficients for the impact of higher ODA commitments on both aid to the poorest countries and on traditional aid. While the hypothesis of extreme crowding-out is strongly rejected, the *average offset coefficient* between GPG-related ODA and traditional aid is also significantly higher than zero, namely 25 per cent. The paper also shows that there is no significant crowding-out of aid in poor countries caused by the provision of global public goods through ODA.

PREFACE

The scarcity of public resources in donor countries and the rapidly approaching deadline of 2015 for the International Development Goals raise important issues for the principles of aid allocation. First, should aid be partly earmarked towards international public goods, in view of the evidence that the cost of lifting one person out of poverty is estimated to be much lower for global public goods (such as agricultural research) than the cost of the same impact through traditional aid to poor countries? This policy question was explicitly introduced and emphasised as a new element of aid allocation at a joint OECD DAC/Development Centre Experts' Seminar (*Aid Effectiveness and Selectivity: Integrating Multiple Objectives into Aid Allocations*), held in Paris on 10 March 2003. The summary record to that seminar concluded for the provision and financing of Global Public Goods that "more policy analysis and related work is required, including on appropriate incentives and financing mechanisms" (OECD, 2003).

The paper presents a highly stylised model of public goods to show that if ODA is used by developing countries at will they would prefer to use it on local goods. Poor countries may derive relatively less utility from the provision of global public goods (and relatively more from spending ODA on local goods) than donors. Hence, global public goods might be under produced.

Second, what is the impact on aid to the poorest countries and on traditional aid projects if ODA is allocated to the provision of international public goods? The two concerns, namely that more ODA spending on global public goods might benefit the relatively better-off developing countries to the detriment of the poorest countries and that traditional aid projects might be crowded out, have limited the financing of global public goods through ODA. The present paper finds some evidence of crowding out, insignificant though in the case of crowding out of aid to the poorest countries, and significant in the case of traditional aid, with an offset coefficient of 25 per cent. These results favour the separation of traditional ODA and spending on the provision of international public goods, to both maximise "ownership" of ODA partner countries and the provision of international public goods.

I. INTRODUCTION

Since the late 1990s, the UNDP Office of Development Studies has raised the awareness of the development and donor communities that the enhanced provision of international public goods will be of critical importance to achieving the Millennium Development Goals (MDGs)[1], notably the objectives of reducing poverty (Kaul *et al.*, 1999). The UN conference on Financing for Development held in Monterrey, Mexico, in March 2002 has challenged the donor community to put in place the means and the structures required to mobilise the finance needed to support these Goals, which, among others, stipulate to reduce world poverty by half by the year 2015. Available evidence (Dyer *et al.*, 2003) suggests that the impact of investing in international public goods can be high and is important for achieving the MDGs: for example, the cost of lifting one person out of income poverty through agricultural research and global trade expansion is estimated to be much lower than the cost of the same impact through aid to poor countries.

The *Zedillo Report* by a Panel established by the UN Secretary General in 2000 and chaired by the former President of Mexico, Ernesto Zedillo, estimated that at least $20 billion per year — four times the current spending level — would be required to begin addressing the need for global public goods in a more satisfactory manner. Some donors have documented the concern that international public goods (IPGs) remain severely under-supplied. Sweden's Ministry of Foreign Affairs has presented a wide ranging book with a discussion of the concepts, financing and mechanisms of provision (Sagasti and Bezanson, 2001). The International Task Force on Global Public Goods was created by an agreement between France and Sweden signed on 9 April 2003. The task force's mandate is to assess and clarify the notion of international public goods, global and regional, and make recommendations to policy makers and other stakeholders on how to provide and finance them.

This policy background raises the importance of defining, analysing and determining the *allocation* of official development assistance (ODA) between traditional development projects and international public goods, given donors' budget constraints. To date, global actions and funding have tended to occur on an *ad hoc* basis, in response to highly visible emergencies (such as HIV) or as a result of catalytic actions by philanthropic organisations. The UK Department for International Development (DFID)

1. These Goals are: *i)* Eradicate extreme poverty and hunger; *ii)* Achieve universal primary education; *iii)* Promote gender equality and empower women; *iv)* Reduce child mortality; *v)* Improve maternal health; *vi)* Combat HIV/AIDS, malaria and other diseases; *vii)* Ensure environmental sustainability; *viii)* Develop a global partnership for development. For each of these goals, targets and indicators have been defined. For details, see www.unmillenniumproject.org.

has recently undertaken a Strategic Review of Resource Allocation Priorities, including its future commitments to international public good expenditure[2]. This choice was explicitly introduced and emphasised as a new element of aid allocation at a joint OECD DAC/Development Centre Experts' Seminar (*Aid Effectiveness and Selectivity: Integrating Multiple Objectives into Aid Allocations*), held in Paris on 10 March 2003 (OECD, 2003). It was recognised at the seminar that the analytical work done so far on this issue is "limited and preliminary". The summary record to that seminar concluded for the provision and financing of Global Public Goods that "more policy analysis and related work is required, including on appropriate incentives and financing mechanisms". The seminar Chair stated that the discussion on aid allocation, including for global public goods, was likely to become a more central part of the DAC agenda in the future, as a result of the DAC/Centre seminar, of DFID's strategic review analysis and of the Swedish-French Task force on global public goods.

The present paper aims at providing help for thinking through at least six important issues. First, it will (re)define the concept of international, global and regional public goods on the basis of taxonomy elaborated in the theory of public finance. Sharp definitions are necessary to avoid confusion about the actual allocation of ODA between traditional development objectives and the provision of international public goods; they are a prerequisite for establishing sound evidence on possible *aid diversion,* where ODA would be diverted to fund GPGs that do not predominantly benefit developing countries.

Second, based on the definitions, data from the OECD Creditor Reporting System (CRS) will be used to attribute ODA to the provision of global public goods, regional public goods (RPGs), and traditional aid for the five most recent years of data availability, 1997-2001. This section will then present a descriptive set of graphs for this recent observation period, in order to show the evolution of ODA allocation between the three broad categories; for DAC donors, the respective percentage shares have averaged at around 15 per cent (GPGs), 15 per cent (RPGs), and 70 per cent (other aid) during that observation period.

Third, the paper presents a highly stylised, standard model of public goods, adapted to the special donor-recipient relationship. The model highlights the trade-offs between free and earmarked donations and hence the underlying tensions between deleting the under-provision of international public goods (where a maximum effect per ODA dollar is reached by earmarking) and recipient countries' "ownership" (where free transfers maximise the utility of the ODA dollar for the poor).

Fourth, the model is estimated with CRS data in order to quantify the donors' interest in the provision of international public goods. The estimation shows clearly the strong association between the provision of international public goods and donors' income and budget balances.

Fifth, the paper deals with a special concern of the donor community, namely that the provision of international public goods might discriminate against ODA allocated to the poorest countries. Such concern has arguably reigned in ODA spending on international public goods. While the hypothesis of extreme crowding-out is strongly

2. Available at http://www.dfid.gov.uk/Pubs/files/dfid_resource_allocation_main.pdf.

rejected, the *average offset coefficient* between GPG-related ODA and traditional aid is also significantly higher than zero, namely 25 per cent. However, the data presented here cannot support the concern that an increase in ODA spending allocated to international public goods is associated significantly with a bias toward lower (or higher) per capita income levels of the recipient countries.

Finally, the paper concludes: its results favour the separation of traditional ODA and spending on the provision of international public goods, to both maximise "ownership" of ODA partner countries and the provision of international public goods.

II. DEFINING GLOBAL PUBLIC GOODS: INTERNATIONAL, REGIONAL AND GLOBAL

A definition as sharp as possible of what constitute international public goods is necessary for several important reasons:

— The definition is a precondition to establish evidence on the current sources of financing global public goods and, in particular, the extent of ODA spent on the provision of international public goods; estimates currently available on CRS basis range from 3.7 per cent (Anand, 2002) to 25 per cent (K. Raffer, 1999) for the share of ODA spent on GPGs, with such an extreme range of estimates being largely explained by differences in definitions.

— Governments in general and donors specifically are in need of clear concepts to separate finance for humanitarian and technical assistance from finance for global public goods if severe under-funding in either of these categories is to be avoided — under-funding that would be likely to threaten the realisation of the MDGs.

— Public goods (which generally are not provided by the market) are often not sufficiently distinguished from *merit goods* (such as education, which are provided by the market but where the social benefits exceed the private benefits); the lack of distinction implies a virtual boundless assignment of policy problems to the public sector, broils organisational responsibilities and accountabilities, and hinders the search for cost-efficient policy solutions.

The necessity of finding a proper definition of GPGs has been recognised by many authors. Morrissey *et al.* (2002) classify GPGs into those that yield direct utility, those that help to reduce risks, and those that enhance capacity. However, when it comes to matters of provision and finance, this distinction is not very helpful. The approach of Sandler (2001), who focuses on the question of how beneficial a particular GPG is to a particular generation, group of people, or group of countries, seems more fertile. We take this concept as a starting point, although restricting attention to goods that serve some agents and do not harm any other agent.

A proper definition of GPGs should be based on classical public finance conventions, especially the concepts of *non-rivalry between users* and *non-exclusion from use*. Non-rivalry implies that a good can be used by more than one user simultaneously or more than one time. Non-exclusion means that the good is available to more than one user at no or at negligible extra cost. Public goods are not (or insufficiently) provided by the market — where marginal utility must equal marginal cost for the provision to be efficient — because of the free-rider problem among potential users. Users are not willing to reveal their preferences and pay accordingly. The

incentive problem is aggravated by the fact that public goods are rarely "pure", and measures that are beneficial on the global scope may at the same time be harmful to a particular group of agents, or vice versa.

Contrary to the view expressed in Anand (2002), it appears to be indispensable to include future generations in the definition of GPGs. Otherwise, the notion of development becomes almost meaningless since most development activities are deemed to serve at least partly future generations[3]. Given the long lags in the production of GPGs (witness climate change), the financing of GPGs today amounts in effect to a resource transfer to future generations. And as *current* generations in poor countries live in great poverty, they may prefer to consume and to grow now rather than to provide global public goods with their limited resources (Schelling, 2002).

A definition of GPGs should also be confined to considerations of allocation, i.e. leave out issues of distribution. This implies that if intergenerational concerns are to be accounted for, then this must be based on future utility estimations. Allocative efficiency requires that the *sum* of the marginal utilities of all present and future users and every country equal the marginal cost of the GPG. In the light of these considerations, the paper approaches the definition of GPGs in a recursive four-step manner as follows:

Definition 1- *A **Public Good** is a commodity, measure, fact or service:*

— *which can be consumed by one person without diminishing the amount available for consumption by another person (non-rivalry);*

— *which is available at zero or negligible marginal cost to a large or unlimited number of consumers (non-exclusiveness); and*

— *which does not bring about disutility to any consumer now or in the future (sustainability).*

The degree of non-exclusiveness determines the Public Good's degree of purity.

Definition 2 - *An I**nternational Public Good** (IPG) is a Public Good which provides benefits crossing national borders of the producing country.*

Definition 3 - *A **Regional Public Good** (RPG) is an International Public Good which displays spill-over benefits to countries in the neighbourhood of the producing country, in a region which is smaller than the rest of the world.*

Definition 4 - *A **Global Public Good** (GPG) is an International Public Good which, while not necessarily to the same extent, benefits consumers all over the world.*

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3. Kaul (1999) also stresses the importance of including future generations in the definition: "Global public goods must meet two criteria. The first is that their benefits have strong qualities of publicness, i.e. they are marked by non-rivalry in consumption and non-excludability. These features place them in the general category of public goods. The second criterion is that their benefits are quasi-universal in terms of countries (covering more than one group of countries); people (accruing to several, preferably all, population groups), and generations (extending to both current and future generations, or at least future generations). This property makes humanity as a whole the *publicum beneficiary* of global public goods." (pages 2-3)

Not all of the eight Millennium Development Goals constitute pure global public goods; and in turn, there may be GPGs relevant for development that are not included in the MDGs. In a recent study, the UK Department for International Development (DFID) has identified *key development* GPGs, on the basis of matching the GPGs with the MDGs (Speight, 2002):

— knowledge generation and dissemination;

— communicable disease eradication;

— the global commons;

— a free and open trade system;

— international financial stability.

Important other GPGs are narcotics control and global peace. Drug consumption and its consequences are a major problem for some countries that are not necessarily producers (the US being the best example). In this sense, the fight against drug production may have positive cross-border externalities. Peace-keeping operations create external benefits as they create security, not least for the affected and neighbouring economies. In the light of the definitions given above, the following GPGs were added to the DFID list:

— protection from crime and narcotics;

— global peace.

The concept developed here, similar to the DFID approach, stresses the spatial dimension of spill-over. Conversely, the World Bank prefers a classification of GPGs into "core" and "complementary" activities[4]. While this distinction is very useful to underline the need of certain conventional aid measures for GPGs to foster development, it is of little help when discussing innovative ways of financing GPGs[5]. Many "complementary" activities are of national or regional dimension only; this might even be true for some "core" activities. To give an example, the World Bank defined post-conflict peace building and reconstruction relief as "core" although the spatial dimension of this IPG is certainly limited. While global peace as itself is clearly a GPG, any measures aiming at establishing or preserving peace between conflicting parties benefit primarily the citizens of the countries that are involved in a (potential) conflict. Therefore, one should

4. See World Bank (2001): "...an important distinction is that between core and complementary activities. Core activities aim to produce international public goods. These activities include global and regional programs undertaken with a transnational interest in mind, as well as activities that are focused in one country but whose benefits spill over to others. Complementary activities, in turn, prepare countries to consume the international public goods that core activities make available — while at the same time creating valuable national public goods." (page 110)

5. This view is shared by Speight (2002): "Problems in discussions of providing GPGs often arise because this distinction between core and complementary activities does not align itself clearly with the difference between funding and activity at the global and national levels..." (page 5). She also points to the often misleading use of the term GPG: "[It should be prevented that] the idea of GPGs being used to gather global funding for areas which ... do not necessarily require global actions or funding but are sometimes described as GPGs (such as education, governance, multilateral agencies or even poverty reduction itself)." (footnote 11, page 17)

distinguish between institution building that improves global conflict prevention, and concrete (UN) missions. The latter would rather fit the definition of RPGs. The same is true for expenditures for land mine clearance and alike.

The example shows that focusing on the spatial dimension of public goods (rather than their functional properties) has the advantage of making the principle of subsidiarity applicable: wherever a nation or region (e.g. via a regional development bank) can provide a public good, it should assume the responsibility to do so. GPGs, on the other hand, should be provided on a global scale.

III. ODA AND INTERNATIONAL PUBLIC GOODS: THE CRS DATA SET

This empirical analysis makes use of data from the OECD Creditor Reporting System (CRS). The CRS dataset is unique as it is based on common definitions agreed by all DAC donors: this is important for any empirical analysis on the sectoral allocation of aid. Thus, the CRS data are the only source of information available on ODA that provide true comparability across donors. The CRS data cover official development assistance (ODA), official aid (OA), and other lending to developing countries and countries in transition. It is noteworthy, however, that the CRS data show commitments rather than actual spending, that there can be a time lag in reporting, and that some donors tend to report incompletely. In the CRS, data on the sector of destination are recorded using 5-digit purpose codes. The first three digits of the code refer to the corresponding sector or category, each code belonging to one and only one category. The last two digits are sequential and not hierarchical, i.e. each code can be selected individually or grouped to create sub-sectors. Tables A1 and A2 in the annex illustrate the classification of the ODA that is committed to global and regional public goods, as defined in section 2. The classification is needed for the subsequent empirical analysis of this paper. The residual ODA is defined as “Other aid” (OA).

Before proceeding with the empirical analysis, let us briefly examine the current situation in ODA flows. The observation period selected for the empirical analysis runs from 1997 to 2001, the latest year for which CRS data are currently available. This time frame results from a compromise between the aim of using most recent data and obtaining as many observations as possible. Only grants are considered and so concessional are dropped from the data.

Figure 1 shows the evolution of commitments on Regional Public Goods (RPG), on Global Public Goods (GPG) and on Other Aid (OA), over from 1997 to 2001. We can see that while overall ODA was rather volatile, the ODA financing of GPGs has been constantly increasing since 1998. Conversely, spending on RPGs seems to have reached a top in 1999 and has been slightly decreasing since then. Total ODA spending on international public goods, therefore, has remained flat as a percentage share of ODA. The figure also shows that the share of GPG in total aid has been fairly stable over the period 1997-96 (around 16 per cent). This result ranges above the earlier World Bank estimate (World Bank, 2001), which in its 2001 Report on Global Development Finance calculated a 12.5 per cent share of ODA (from 1994–98) spent on GPGs. However, as the share of RPGs oscillated also around 15 per cent of ODA during the observation period, donors have spent around 30 per cent of ODA on the provision of international public goods during the observation period 1997-2001.

Figure 1. **Evolution of ODA**

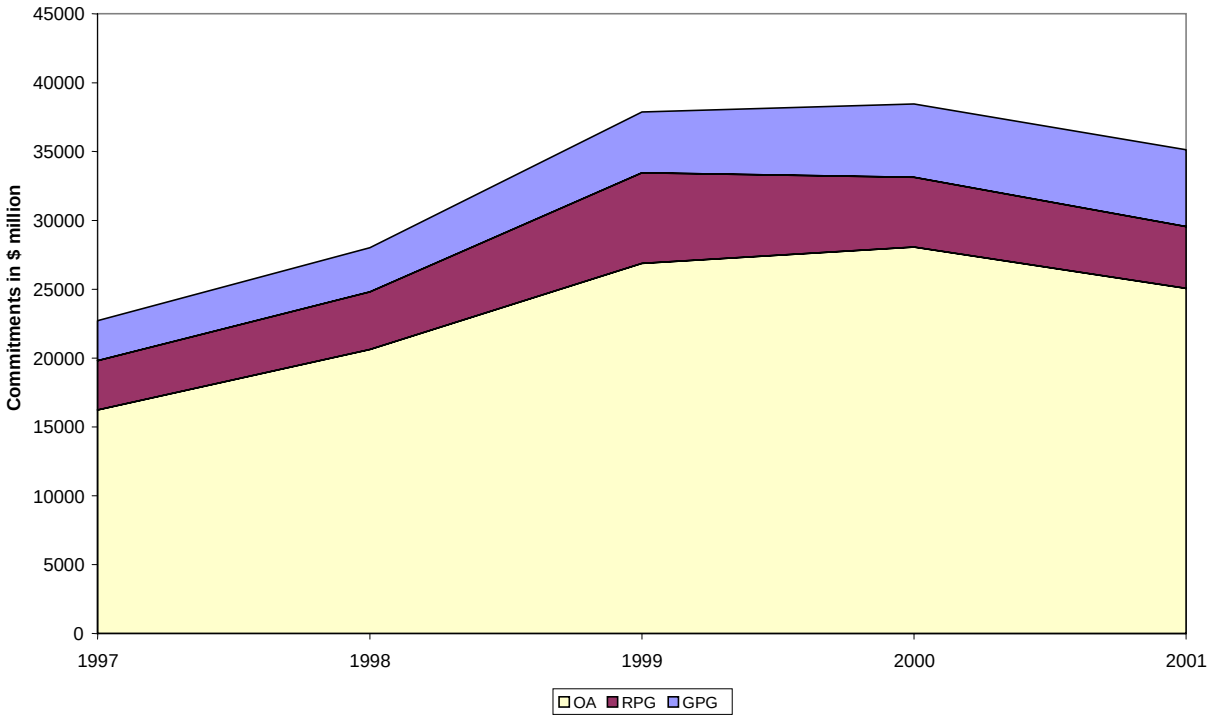
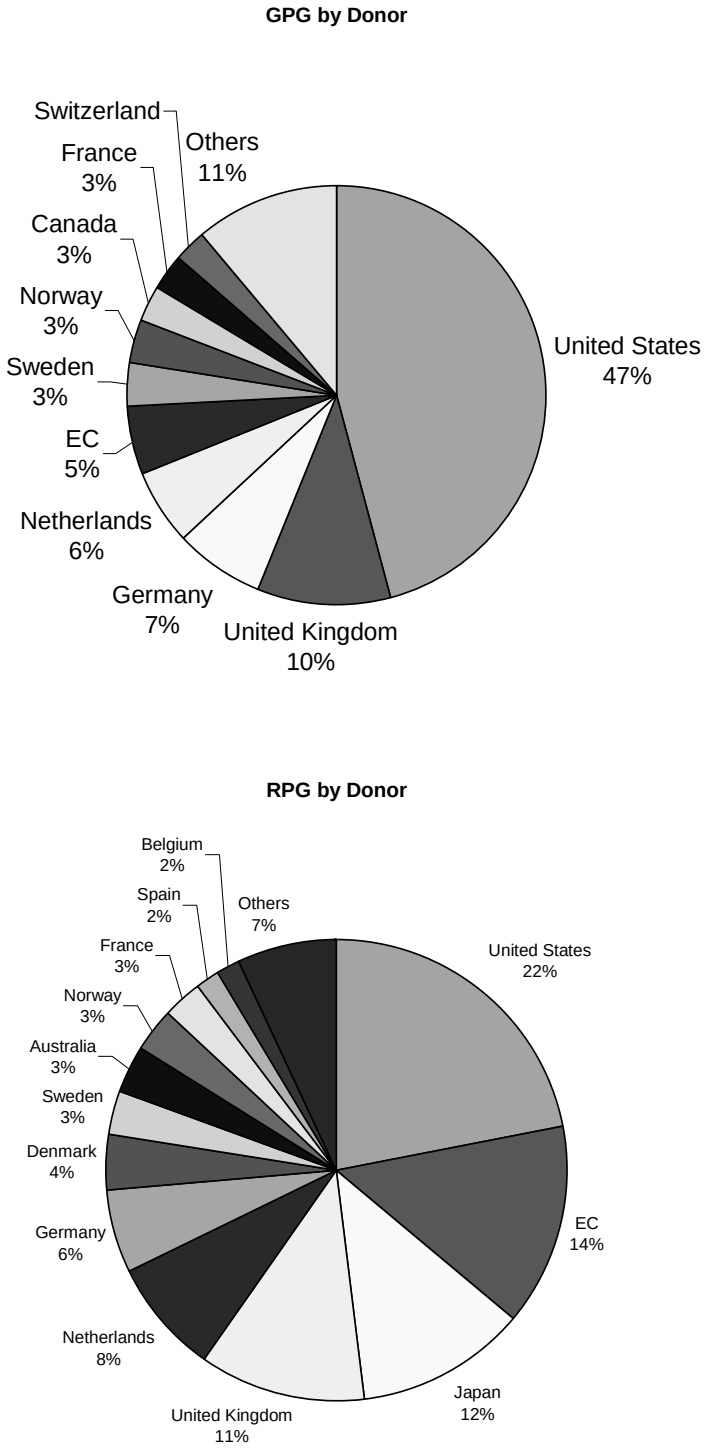
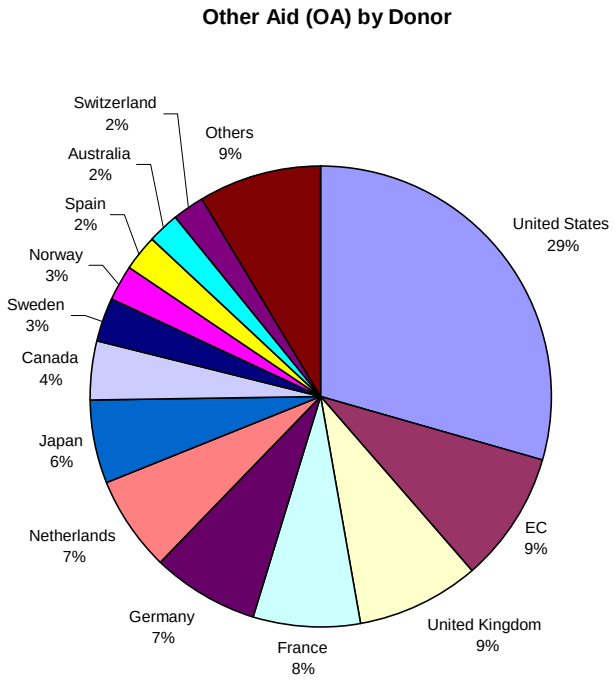


Figure 2 displays the most important contributors to the current provision of GPGs, RPGs and OA. The United States finance almost half of all DAC donor commitments to GPG provision; this is largely explained by US funding for fighting drug production in Latin America. Other important contributors to the provision of global public goods are currently the United Kingdom (10 per cent of total DAC commitments for GPGs), Germany (7 per cent) and the Netherlands (6 per cent). The United States finance about a fifth of all DAC commitments for the provision of RPGs, and only 30 per cent of other forms of aid. The EC, a multilateral donor, occupies an important role in the provision of RPGs (14 per cent of DAC commitments), while its part of DAC spending on GPGs (5 per cent) and OA (9 per cent) is relatively modest. Japan is also strongly committed to RPGs (12 per cent of DAC spending) but contributes a minor share of total spending on GPGs.

Figure 2. **GPG, RPG, and Other Aid by Donor**

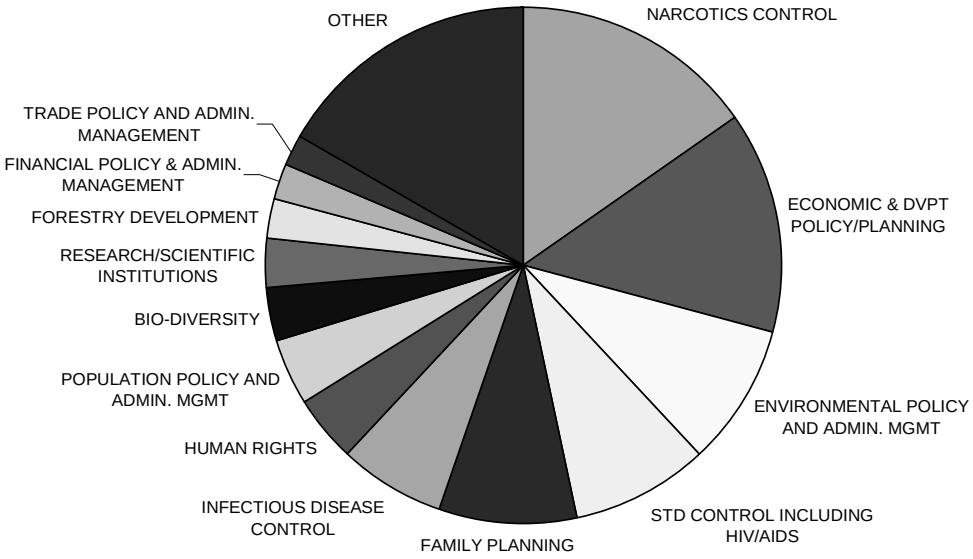




Source: OECD Creditor Reporting System.

Figure 3 illustrates the repartition of GPG commitments over sectors. We can see that the largest sectors, narcotics control and economic policy and planning, consume each about 15 per cent of total GPG commitments.

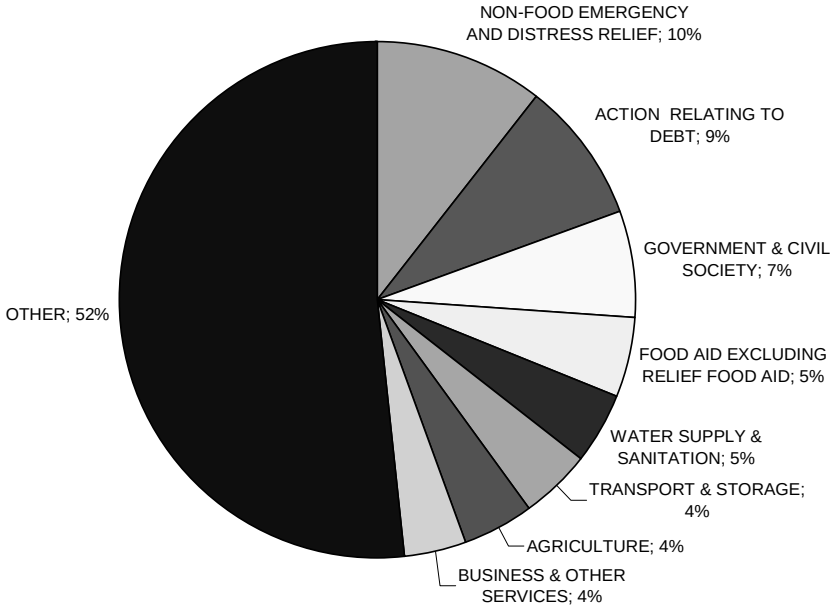
Figure 3. **GPG Commitments by Sectors**



Source: OECD Creditor Reporting System.

Figure 4 presents the main items of aid not classified as global public goods in the paper as their benefits accrue predominantly to the recipient country. The largest single item is non-Food Emergency and Distress Relief, which represents 10 per cent of total aid other than GPG (i.e. some $15 billion over the period 1997-2001).

Figure 4. **Non-GPG Commitments by Sectors**



Source: OECD Creditor Reporting System.

IV. MODELLING THE TRADE-OFF BETWEEN OWNERSHIP AND GPG SUPPLY

This section presents a highly stylised, standard model of public goods, adapted to the special donor-recipient partnership. The model and its empirical estimation will be useful for gauging the extent of the underlying tensions between deleting the under-provision of global[6] public goods (where a maximum effect per ODA dollar is reached by earmarking) and recipient countries' "ownership" (where free transfers maximise the utility of the ODA dollar for the poor).

Suppose that both the "rich" donor and the "poor" recipient country draw additively separable utility from a private good *x* and a (global) public good *z*, which can only be provided by the poor country (e.g. preservation of the rain forest). In addition to the utility derived from the two goods, the (rich) donor country "cares" about the (poor) recipient country, i.e. it is better off when the utility of the poor country increases. Assuming log utility functions for the sake of a closed solution, let us define:

$$U_p = \ln(x_p) + v_p \ln(z) \quad (1)$$

$$U_r = \ln(x_r) + v_r \ln(z) + \alpha U_p \quad (2)$$

The parameters $v_r > 0$ and $v_p > 0$ measure the relative importance that the global public goods has on the two countries. The parameter $\alpha \geq 0$ measures how much the rich country "cares" about the welfare of the poor country.

IV.1. Free Transfers

The analysis starts with the case of traditional development aid. The donor country transfers a certain voluntary amount $t \geq 0$ to the poorer country and lets the latter decide upon the use of the received funds. In the model's framework, this implies a two-stage game, to be solved with the concept of backward induction. The recipient country decides how much it wants to spend on the public good and maximises its utility (equation (1)) subject to the budget constraint:

$$\bar{Y}_p + t = x_p + z\,, \quad (3)$$

6. The model is less helpful for analysing trade-offs and policy choices pertaining to *regional* public goods as their consumption by the poor partner countries does not enter the utility function of donor countries in the same way the poor-country consumption of *global* public goods does.

where $\bar{Y}$ denotes the (exogenous) income of a country. Substituting the constraint into (1) and optimising for z yields:

$$z = \frac{v_p(\bar{Y}_p + t)}{1 + v_p}. \tag{4}$$

The donor country anticipates this rule *z(t)*and optimises (2) subject to its budget constraint:

$$\bar{Y}_r - t = x_r.$$

It finds that the optimal transfer is:

$$t = \gamma\bar{Y}_r - (1-\gamma)\bar{Y}_p \tag{5}$$

where:

$$\gamma = \frac{(v_r + \alpha(1+v_p))}{1 + v_r + \alpha(1+v_p)} \text{ and } 0 < \gamma < 1$$

This result is quite intuitive. The donor country is prepared to transfer more resources to the poor country if its own income $\bar{Y}_r$ is high, if it "cares much" (high α), and if the public good yields a high utility relative to the private good (v_r and v_p). Conversely, if the poor country's income rises, the donor country's willingness to transfer resources diminishes.

We can now substitute 5 into 4 to find the equilibrium supply of the public good when transfers are free:

$$z^{FT} = \frac{v_p(v_r + \alpha(1+v_p))}{(1+v_p)(1+v_r + \alpha(1+v_p))}(\bar{Y}_p + \bar{Y}_r) \tag{6}$$

Using comparative static analysis for the case of free transfers, it is possible to see that the supply of the public good depends positively on both countries' income, on the importance the countries attribute to the public good relative to the consumption of private goods, and on the level of altruism in the rich country with respect to the welfare of the recipient country.

IV.2. Earmarked Transfers

Donors will be inclined to provide funding for global public goods only for earmarked use. From the donor perspective, the model thus groups ODA allocation into funds *z* that may exclusively be spent on the public good and OA (contributions to the poor country's private good). This implies that the recipient country cannot freely allocate the transfer at home. (Since both goods yield positive utility to the poor country, there are no participation concerns to consider.) However, in case the donor country offers too little funds for the public good supply, the recipient country may wish to contribute to the

public good out of its own budget, which adds a side condition to the budget constraint in the donors' optimisation problem:

$\max_{z,TA} U_r$ *subject to*

$$\bar{Y}_r - OA - z = x_r, \qquad \bar{Y}_p + OA = x_p \qquad \text{and} \qquad z \geq z^{FT} \tag{7}$$

From the previous section, we already know how much the recipient country would voluntarily contribute to the public good (z^{FT}), given the transfer *t*. If it can be shown that the donor country voluntarily transfers no less than *t* and funds no less than z^{FT} in transfers earmarked for international public goods, the last constraint does not apply.

Combining the two first order conditions for optimality[7] yields that, in equilibrium, the rich country's marginal utility of spending an extra transfer-dollar on the public good equals its marginal utility of spending it on the private good:

$$\frac{v_r}{z} + \alpha \frac{v_p}{z} = \frac{1}{x_p}.$$

Clearly, for any $\alpha < 1$, the public good supply is inefficiently low since the Lindahl condition is violated — a standard public finance result. The Lindahl equilibrium requires that the *sum* of the marginal utilities from the public good equal the marginal utility from the private good.

The same first order conditions, when substituted into each other, yield the equilibrium values for earmarked ODA transfers:

$$z^{ET} = \frac{(v_r + \alpha v_p)}{1 + v_r + \alpha(1 + v_p)} (\bar{Y}_p + \bar{Y}_r) \tag{8}$$

$$OA = \frac{\alpha(\bar{Y}_p + \bar{Y}_r)}{1 + v_r + \alpha(1 + v_p)} - \bar{Y}_p \tag{9}$$

As before, the supply of the public good increases with the available income of both partner countries and with the degree of relative appreciation of the public good. However, an increase of altruism (α) only leads to more supply of the public good if $v_p > v_r$, i.e. if the poor country receives a higher relative utility than the donor country from the provision of the public good, even though a higher α will result in higher donor spending on ODA. The intuition is that, while a higher "care factor" α implies more willingness for transfers, the extra transfer goes where it benefits the recipient country most. With the relative utility derived from a public good lower in the poor than in the donor country ($v_p < v_r$), increased altruism (α) makes the donor pay less attention to its

7. Differentiate the donor country's utility (eq. 1) with respect to the choice variables *z* and *OA* to derive the two first order conditions for optimality. Then substitute into one another.

own direct interest (v_r) and more to the recipient country's utility (which, under the condition $v_p < v_r$ is dominated by the consumption of its private goods).

Note that the sum of z^{ET} and *OA* equals exactly the free transfer *t*. This means that binding the transfers to a certain use in the recipient country does not affect the donor's willingness to transfer resources in the model. This may seem counterintuitive as a donor perfectly in control of the use of funds should be willing to provide more aid. Technically speaking, the effect is due to the choice of the utility function (Cobb-Douglas property).

Yet there remains an important difference between the two ways of providing ODA to poor countries. Since one of the two goods is public, the donor country benefits from it in a "double" way: it does not only draw direct utility from it (due to higher consumption of the global public good), it also benefits from increased welfare in the recipient country (via altruism). This is why the earmarked transfers naturally lead to a higher supply of the public good. To see this, simply compare the equilibrium public good supply in the two regimes, equations (6) and (8):

$$z^{ET} - z^{FT} = \frac{v_r(\bar{Y}_p + \bar{Y}_r)}{(1+v_r)(1+v_r+\alpha(1+v_p))} > 0.$$

This result implies a clear crowding-out effect. When total transfers remain constant but more is spent on the public good, then this is detrimental to conventional development assistance. On the other hand, the under-provision of the public good is mitigated, which increases efficiency. The less "ownership" the recipient countries have on the use of the funds, the better the world's provision with international public goods. Summing up, we expect the provision of earmarked transfer to be a function of the model parameters as follows:

$$z^{ET} = F(\underbrace{v_r, v_p, \bar{Y}_p, \bar{Y}_r}_{+}). \tag{10}$$

The impact of α is ambiguous, depending on the importance of v_p relative to v_r when transfers are earmarked. More specifically, if $v_r > v_p$, then z^{ET} increases with α. This is so simply because of a size effect: as α becomes relatively large, the donor gives more aid, part of which will be earmarked if the recipient cares little about the public good i.e., if v_p is small.

Before doing the econometric section and to bring the model closer to the real world, it would be interesting to identify some variables related to two key parameters of the model, namely the relative preference of donors for public goods, v_r, and their degree of altruism, α. The model states that the higher the value of v_r and α, the higher will be the share of global public goods in total aid and the ratio of total aid to national income, respectively. Consequently, the paper compares a number of variables that are thought to be related to the parameters with the GPG/ODA and ODA/GDP ratios. The variables selected correspond to: *i)* indicators of the economic openness of rich countries, measured by the ratio of direct investment abroad and exports plus imports to GDP; *ii)* the size of the government (measured by share of the government consumption in GDP); *iii)* the shares of public spending in education and health in GDP; and *iv)* the

share of military spending on GDP. The rationale for linking the openness indicators with the parameters is that the openness degree may in part reflect the extent to which donors care about the rest of the world (i.e. their altruism). Likewise, the size of government may be related to both, the level of altruism and the preference for public goods. This may be so because countries with higher level of altruism arguably spend more on poor people (through, for instance, health and educational programs). Also, if health and education are thought to have positive externalities, there would be a higher involvement of the public sector in the provision of these goods. Similarly, governments caring about the global public good "global peace" need to be prepared to carry out respective actions through relatively higher military spending.

Table 1 presents the rank correlations of these indicators with the GPG/ODA and ODA/GDP ratios. The figures are based on the average over the period 1997-2001 for each of the 19 donor countries in the sample (see below). The two indicators for openness are significantly correlated with the ODA/GDP ratio, which gives support to the hypothesis that economic openness is associated with altruism. Total government consumption is also related to the ODA/GDP ratio, which could also be interpreted as the fact that larger governments are associated with stronger altruism. Of the other indicators selected, only public spending in education is significantly correlated with the share of ODA in GDP. By contrast, the combined spending in health, education and defence is correlated with the share of GPG in total ODA. This supports the hypothesis that the total public spending in education, health and defence are associated to the relative preference of donors for public goods.

Table 1. **Correlation of Selected Variables with Aid**

	GPG/ODA	ODA/GDP
FDI outflows/GDP	0.296	0.628[a]
(X+M)/GDP	-0.007	0.570[a]
Government consumption/GDP	0.018	0.495[a]
Public Health expenditure/GDP	0.330	0.163
Public expenditure on education/GDP	0.254	0.509[a]
Military expenditure/GDP	0.318	0.054
(Health+Education public expenditure)/GDP	0.304	0.398
(Health+Education+Military expenditure)/GDP	0.460[a]	0.302

Notes:
Rank correlations for 19 donors (average over 1997-2001).
a) Correlation is significant at a 5 per cent level.

V. EMPIRICAL ANALYSIS

The objective of this section is to investigate whether aid in the form of global public goods is crowding out aid to the poorest countries and traditional aid. In order to isolate the impact of ODA related to international public goods it is first necessary to have a better empirical understanding about the determinants of aid. Equation (5) predicts that total aid depends positively on the donor's income and negatively on the recipient's income, in addition to specific parameters of each country. More specifically, total aid by donor i to recipient j in period t can be written as:

$$\text{Total Aid}_{ijt} = \pi_{ij} Y_{jt} + c_i + \tau_{it} + e_{ijt} \qquad (11)$$

where π_{ij} depends on a set of parameters specific to the donor and the recipient country, c_i is a specific effect related to the donor and τ_{it} is a time dummy. This is introduced in order to account for any time-varying effect (such as the donor's income or any other determinant of aid relevant for the donor but not considered in the model). Equation (11) represents the baseline for the regressions reported below. Since the parameter π_i may vary from donor to donor the estimates are carried out separately for each donor. This approach allows accounting for the specificities of the donors but not those of the recipients. Therefore an implicit assumption of the estimates presented below is that recipient countries have similar preferences for global public goods. Note that the model implicitly assumes that there is a single person in each recipient and donor country, which means that income is measured in per capita terms. Consequently, it is necessary to take into account the population of recipient countries. We expect to find that the higher the recipient country's income and the lower its population, the lower the level of aid allocated to that country by each donor. The data correspond to the annual committed *grants* (concessional loans are not included) donated by each of the 19 countries and the European Commission as reported in the *OECD Creditor Reporting System*. The sample covers the period 1997-2001 (the latest year available), hence roughly the period which has seen a risen awareness of the underprovision with international public goods. Further, the five-year period has been selected to reach a sufficient number of observations for the panel data analysis carried out below.

The results are presented in Table A3 of the annex. The table shows that the income of recipient countries explains aid commitments only modestly[8]. Although the average response of donors to recipient's income displays the expected sign, there is

8. Berthélemy and Tichit (2002) find that since the 1990s aid allocation is significantly determined by trade links (in particular for small donor countries) and tilted towards recipient countries with relatively good economic performance and political governance.

great heterogeneity in the coefficients — some of them display the wrong sign — and, most importantly, only few countries display significant coefficients. Therefore, the most important determinants of aid are hidden in the recipient country-specific effects, which in itself is not very informative. By contrast, when recipient country-specific dummies are replaced by regional dummies (Table A4), it emerges that these dummies are good explanatory variables of aid. More specifically, the table shows that, given the GDP and population levels of recipients, sub-Saharan countries are privileged by most of European donors (and the European Commission). On the other hand, the well-known fact that the United States gives higher amounts of aid to countries in the Middle East and North African regions is clearly observed in the table. On the other hand, Japan favours the East Asia and Pacific and the South Asia regions.

Another variable that is most likely to play a role in the determination of aid is the budget balance of donors. Although the budget balance is not directly linked to the model of the previous section — since that is a static model, whereas the concept of budget balance is inherently related to the time dimension — common sense would suggest that donors suffering from a tight budgetary situation would tend to be less charitable with recipients of aid. The significance of the budget balance variable is tested in two separate sets of regressions (one for total aid and the other for global public goods). However, a preliminary analysis shows that the effects of the budgetary balance cannot be observed in regressions where each recipient enters as an individual observation. Yet a tight budgetary situation may still have an impact on the overall aid program of the donor. This may be the case if, for instance, under fiscal strain a donor would cut aid more easily on one particular group of countries while keeping aid to other recipients untouched. Under such circumstances an analysis of the overall aid program would be more pertinent than considering the effects on each recipient. We do this by examining the impact of the budget balances on the average annual aid given by every donor. The results are presented in Table 1.

In the first two columns it is also included the donor's GDP to account for size effects. The budget balance enters with positive and significant coefficients in both total aid and GPG regressions. Taking the point estimates at face value, one percentage point increase in the budget balance of the "average" donor country would increase total aid to each recipient by a little less than $8 million and aid destined to global public goods by some $2 million.

Table 2. **Budget Balance and Aid (annual observations over 1997-2001 for 19 donors)**

	Dependent variable:			
	Total aid	GPG	Total aid/GDP	GPG/GDP
GDP (donor) *	0.0066 [a]	0.0014 [a]	-	-
Budget balance/GDP	76.8 [a]	21.3 [a]	8.6×10^{-5} [b]	1.2×10^{-5} [a]

Notes:
Fixed effects estimation; data are averaged over recipients.
All variables are significant at a 1 per cent level.
* Coefficients on GDP are multiplied by 1000.
a) Significant at 1 per cent level.
b) Significant at 7 per cent level.

These results have to be interpreted with caution since donors with very different characteristics are pooled together; in particular, the size of their economies varies considerably. When the aid variables are scaled by the GDP of donors the resulting estimates on budget balance are also significant (see the last two columns of Table 1). These results confirm that the budgetary situation of donors has an effect on their global aid programs but changes in the budget balance do not seem to have a uniform effect on recipients.

The discussion on the constraints imposed by tight budgets leads us to the problem of crowding-out. It has been argued that donor countries may be tempted to substitute spending on global public goods for traditional aid. This could be so because donors could benefit more, though indirectly, from the donation of aid destined to GPGs than from contributions in the form of traditional aid. The concern is that if global public goods are less beneficial to at least to some poor countries than traditional aid, earmarking aid to global public goods would reduce the utility that developing countries can derive from aid. Hence the importance of analysing the eventual crowding-out effect of GPGs on traditional aid. Notice that since there is no information available on earmarked aid it is assumed that all aid destined to global public goods is earmarked.

There is no straightforward way to test for crowding-out. As a matter of fact it is first necessary to define what we understand precisely by crowding-out. The paper will address two different situations that can be thought of as particular examples of crowding-out. The first, which can be called the extreme case, would occur if donors make increases in aid conditional on them being fully allocated into GPGs. Under such conditions, the ratio of traditional aid to total aid would fall as total aid increases. We call this case extreme because every additional dollar of aid would be used for the specific use earmarked by the donor.

Table 3 reports the results of regressing the ratio traditional/total aid on total aid. Since the focus is exclusively on the presence of crowding-out, regional variables are replaced by fixed-effect dummies. Notice that these estimates are biased downwards spuriously since the only explanatory variable, total aid, appears in the denominator of the dependent variable. Thus, by running such regressions the likelihood of finding a crowding-out effect is artificially increased. However, Table 3 shows that the extreme version of crowding-out is not supported by the data. Most of donor countries display a positive coefficient on total aid, and the few negative coefficients in the table are not significant. While the hypothesis of extreme crowding-out is strongly rejected, the *average offset coefficient* between GPG-related ODA and traditional aid is also significantly higher than zero, namely 43 per cent.

Table 3. **Crowding-out Effect of GPGs (I)**

Dependent variable is Traditional Aid/Total Aid

	Coefficient on total aid (×1000)		Coefficient on total aid (×1000)
Average	*0.434*		
Australia	0.191	Italy	0.935
Austria	0.801	Japan	0.323
Belgium	2.681 [b]	Netherlands	0.240
Canada	-1.316	Norway	3.846 [a]
Denmark	0.067	Portugal	0.180
EC	0.472 [b]	Spain	0.387
Finland	-1.294	Sweden	1.396
France	0.656 [b]	Switzerland	-1.251
Germany	0.092	UK	0.439 [b]
Ireland	-0.242	USA	0.069

Notes:
Fixed effects estimation.
a) Significant at 1 per cent level.
b) Significant at 7 per cent level.

There may be a second and more subtle form of crowding-out. The model of the previous section shows that the ratio of traditional aid to total aid is independent of the amount of aid, but it falls when the donor has the possibility of earmarking. The model then suggests that crowding-out occurs when countries earmark, but as opposed to the extreme case, increases in aid need not to be fully destined to the specific purposes decided by the donor. We can thus study whether this less severe form of crowding-out exists in the real world by running a regression of the share of traditional aid in total aid on the aid destined to global public goods. If global public goods are actually displacing traditional aid then the share of traditional aid would fall as GPGs increase. Therefore the coefficient on the global public good variable should be negative. Table 4 summarises the main results. All the coefficients but one (Ireland) are significant and negative. This would suggest that a mild version of crowding-out may be operating. Some caution should be taken, however, for the interpretation of the estimates in Table 4. Aid is measured is millions of dollars. This means, taking again the example of Australia, that $1 million increase in aid destined to global public goods would reduce the traditional/total aid ratio by 1.48 percentage points, at the average aid level given by Australia in the sample. It is important to underline this last point because the estimates are sensitive to the level of aid given be each donor, as can be clearly observed in the table. Therefore, considering that the average amount donated by Australia to each country every year is $9.3 million, the estimates suggest that each additional dollar donated for global public goods means that traditional aid would increase by around 13.7 cents less than if no crowding-out took place[9]. Of course, this is a purely hypothetical exercise and does not take into account changes in policy: donors may very well decide that future donations in the form of global public goods should not dent others forms of aid, or on the contrary, that every additional dollar donated should be detonated for global public goods.

9. This figure is obtained by multiplying the estimated coefficient on the GPG variable by total aid.

Keeping these caveats in mind, it is possible to see that, as before, the results display considerable heterogeneity across donors. The estimated crowding-out effect is relatively low in the United States, whereas it is almost equal to 100 per cent in Austria. The weighted average of the different crowding-out effects is estimated at 24.8 per cent. These *results point to the existence of a soft version of crowding-out*. It is soft in the sense that the coefficients are globally much lower than one, meaning that donations in the form of GPGs do not appear to be financed only at the expense of traditional aid.

Table 4. **Crowding-out Effect of GPGs (II)**

Dependent variable is
Traditional aid/Total aid

	Coefficient on GPG (×1000)	Average total aid ($ million, per recipient and year)	Crowding-out effect of GPG
Average	*-54.2*	*13.5*	*0.248**
Australia	-14.8	9.3	0.137
Austria	-311.5	3.2	0.990
Belgium	-90.9	4.5	0.412
Canada	-34.7	7.4	0.255
Denmark	-23.9	16.2	0.386
EC	-7.6	22.7	0.173
Finland	-109.5	2.5	0.276
France	-28.0	11.1	0.310
Germany	-10.3	16.1	0.166
Ireland	-52.3	3.3	0.175
Italy	-88.6	4.1	0.366
Japan	-43.9	16.9	0.742
Netherlands	-19.7	19.0	0.376
Norway	-35.0	7.7	0.269
Portugal	-55.7	6.0	0.333
Spain	-50.7	5.5	0.280
Sweden	-52.1	9.5	0.494
Switzerland	-48.9	6.5	0.319
UK	-4.7	23.1	0.109
USA	-0.9	75.2	0.070

Notes:
All coefficients are significant
at a 1 per cent level except Ireland's.
* Weighted by total aid.

Finally, this study deals with another donor concern, namely that a surge in the provision of global public goods might depress the levels of aid destined to the poorest countries. However, the empirical analysis above has demonstrated that the link between a recipient country's GDP/capita and the per capita level of aid is week anyhow. Indeed, if aid is only weakly related to the income of recipient countries, the provision of global public goods can hardly be systematically reducing aid in the countries with lowest levels of income. Table 5 presents the results obtained in the regressions of total aid and aid spending on GPGs on income, pooling all donors together (all variables are measured in per capita terms). While GDP per capita in the recipient countries is negatively linked with ODA/capita, but positively with GPG-related ODA per capita, in neither regression the coefficient on income is significant. Naturally, it is still possible that a particular recipient has seen the aid it receives reduced because a donor has decided to give more

aid in the form of GPG to another –perhaps richer– country. Nevertheless, the paper cannot confirm a significant crowding-out of aid in poor countries caused by the provision of global public goods through ODA.

Table 5. **Crowding-out Effect of GPGs (III)**

	Dependent variable:	
	ODA per capita	GPG per capita
GDP per capita	-1.98×10^{-4}	1.69×10^{-5}
	(2.99×10^{-4})	(2.53×10^{-5})

Notes:
Fixed effects estimation; time dummies included.
Robust standard error in parenthesis (no variable significant).

VI. CONCLUSIONS

This paper has applied analysis and created empirical evidence with respect to a growing concern in the donor community in view of the approaching 2015 deadline to fund the Millennium Development Goals: how much of ODA to allocate to the provision of international public goods, and how much to set aside for traditional development projects. This policy concern requires first and foremost a proper definition of international public goods, both global and regional, and a correct attribution of CRS categories to international public goods. The paper has provided such a definition and attribution in view of the Millennium Development Goals, which in turn has enabled to provide evidence on major recent trends in ODA spending on international public goods. It has been shown that donors have spent around 30 per cent of ODA on international public goods during the last five years for which data were available — 1997-2001 — half on global public goods and half on regional public goods. The paper can confirm allocational trade-offs as it finds that the *average offset coefficient* between GPG-related ODA and traditional aid is significantly higher than zero, namely 25 per cent. By contrast, the paper finds — most importantly for donors who are concerned that increased ODA spending on GPGs might crowd out ODA to the poorest countries — that an increase in GPG spending is not likely to adversely affect the flow of aid transfers to the poorest countries.

Both the formal model and the empirical analysis presented in the preceding sections suggest that the free use of ODA by the poor recipient countries, thought to coincide with "ownership" of donor and reform projects, is a two-edged sword. On the one hand, more ownership is desirable because the recipient country feels committed to and has a true self-interest in the success of a given project. But at the same time, donors who draw "double" utility from investing in GPGs rather than traditional aid recognise that more "ownership" means that less will be spent on GPGs, so they are reluctant to give up control on project targeting, planning and execution. In order to overcome this dilemma, a new institutional set-up, with traditional assistance separated from GPG funding, might be helpful[10]. As some determinants of GPG spending — budget

10. An additional issue relevant to the organisational arrangement for delivering IPGs is that of economies of scope (see Sandler, 2001). If the cost of providing two or more IPGs in the same institution is lower than when supplying them through separate institutions, the provision should be concentrated in a regional or global unit.

balances, the scope of new direct foreign investment (Reisen, 2002) — are currently deteriorating in major DAC member countries, earmarking resources for international public goods may be the only practical way to avoid rising under-provision for these goods. In sum, the findings may militate in favour of separating traditional ODA from GPG-related spending, while at the same time such separation may encourage GPG funding where it is appropriate: at the international level[11].

11. Sagasti and Bezanson (2001) see the UN as the adequate institution to define a general framework for the delivery of GPGs because they "have political legitimacy and are representative of the diversity of national interests" (p. 64/65). However, since the authors regard the UN as rather inefficient and bureaucratic, they would like to see bilateral donors and the international financial institutions carry out funding and delivery of individual projects. But it should be clear that if there are *economies of scope*, then multilateral programs are more efficient than bilateral ones. Conversely, if subsidiarity is important, then local ownership should be stressed no matter whether the transfer is made bilaterally or multilaterally. Still more important, GPGs yield, by definition, low if any private returns, so transfers should be made as grants rather than loans. This implies that the financial institutions (in their traditional set-up) are not suited to fund GPGs.

ANNEX

Table A.1. **ODA and Global Public Goods in the CRS Database**

GPG	Commitment/ Expenditure	CRS Code	GPG	Commitment/ Expenditure	CRS Code
Knowledge	Educational research	11181	Sustainability	Population policy	13010
	Medical research	12182		Family planning	13030
	Statistical capacity building	16362		Power generation/ renewable	23030
	Scientific institutions	16381		Hydro plants	23065
	Agricultural research	31183		Geothermal energy	23066
	Livestock research	31184		Solar power	23067
	Forestry research	31282		Wind power	23068
	Fishery research	31382		Ocean	23069
	Technological research	32181		Biomass	23070
	Environmental research	41082		Forestry policy	31210
	Energy research	23082		Forestry dev.	31220
Human rights	Human rights	15063		Fuel wood/charcoal	31261
	Women in development	42010		Fishing policy	31310
Health	Infectious disease control	12250		Fishery dev.	31320
	STD control, incl. AIDS	13040		Environmental policy	41010
Fin. Stability/ Growth	Economic policy	15010		Biosphere protection	41020
	Financial policy	24010		Bio-diversity	41030
	Monetary institutions	24020		Site preservation	41040
	Trade policy	33110			
Crime Control	Narcotics Control	16361			
	Agricultural alternative	31165			
	Non-agricultural alternative	43050			

Source: OECD Creditor Reporting System.

Table A.2. **ODA and Regional Public Goods in the CRS Database**

RPG	Commitment/Expenditure	CRS-Code
Health	Health policy / management	12110
	Medical education / training	12181
	Medical services	12191
	Health education	12281
	Health personnel dev.	12282
	Personnel dev. reprod. health	13081
Water	Water policy / management	14010
	Water resources protection	14015
	Supply and sanitation	14020
	River development	14040
	Waste management	14050
	Education / training	14081
Peace	Post-conflict peace building	15061
	Demobilisation	15064
	Land mine clearance	15066
	Reconstruction relief	16340
Transport	Policy / management	21010
	Road transport	21020
	Rail transport	21030
	Water transport	21040
	Air transport	21050
	Storage	21061
	Education / training	21081
Communication	Policy / management	22010
	Telecommunications	22020
	Media	22030
Agriculture	Protection and pest control	31192
	Rural regional dev.	43040
Environment	Flood prevention / control	41050
	Environmental education	41081
Special support	Local aid to refugees	72030
	Support to local/regional NGOs	92930

Source: OECD Creditor Reporting System.

Table A3. **Response of Aid to GDP and Population of Recipient Countries**

	Dependent variable is total aid		Dependent variable is total aid per capita
	Coefficient on GDP (×1000)	Coefficient on population (×1000)	Coefficient on GDP per capita (×1000)
Average	*-0.039*	*177.8*	*-0.166*
Australia	0.043[b]	134.9	-0.972
Austria	0.005	-58.8[b]	-0.053
Belgium	-0.001	33.8[b]	0.246[a]
Canada	0.000	-178.8[a]	-0.006
Denmark	0.026	-3.6	-1.450[b]
EC	0.012	180.8	-2.054
Finland	-0.002	23.6[a]	-0.205[b]
France	0.046[b]	-115.5	0.220
Germany	0.020	165.7	-0.028
Ireland	-0.001[a]	-25.4[a]	-0.085[a]
Italy	0.006	137.6	0.004
Japan	-0.073	40.3	3.053
Netherlands	-0.028	387.5	-6.168[b]
Norway	-0.006[b]	163.2	0.004
Portugal	0.043	26.1	7.282[b]
Spain	-0.007	-8.3	-0.556[b]
Sweden	-0.043	-11.6	-0.016
Switzerland	0.012	-37.0	0.188
UK	-0.055	136.9	-2.464
USA	-0.773	2564.9[a]	-0.256

Notes:
Fixed-effects estimator; times dummies included.
a) Significant at 1 per cent level.
b) Significant at 7 per cent level.

Table A4. **Response of Total Aid to GDP, Population and Region of Recipient Countries**

	GDP (×1000)	Pop. (×1000)	EAP	EUR	LAC	MEA	NAF	SAS	SSA	CAS
Average	*-0.004*	*27.6*	*-5.5*	*-0.7*	*-4.2*	*7.3*	*7.1*	*2.9*	*0.4*	*-7.1*
Australia	-0.021[a]	32.4[a]	19.1[a]	-4	-2.9[b]	-3.8	1.7[b]	-2.2	-3.8	-4
Austria	-0.007	4.6	-1.6[b]	3.7[b]	1.8	-0.4	-1.9[b]	-2.1[b]	0.7	-0.3[a]
Belgium	-0.0060[b]	5.7[a]	1.1[b]	-1.2	0[a]	0	1.6[a]	-2.2	2.3[a]	-1.6[b]
Canada	0.005	22.2[b]	-0.6[a]	4.8[a]	-1.2[b]	-2.3[a]	-2.5[a]	5[a]	0.7[a]	-3.9
Denmark	0.007	-8	0.4[b]	-2.4	-3.9[b]	-8.3	7.7	11.4	6.3[b]	-11.2
EC	-0.028[a]	22.4[a]	-6.9[a]	2	-2.5	-3.7	-5	-7.4[a]	25.1[b]	-1.6
Finland	-0.002	4[a]	0.4[a]	0.3	0	-0.1	0.3	-1.1	0.9[a]	-0.7[a]
France	0.017[b]	-4.4	-8.1[a]	-3.7[b]	-8.6	-7.7[b]	36.9[a]	-8.9	9.8[a]	-9.6
Germany	0.023	52.8[a]	-8	1.6	-6.7[b]	1.1[b]	15.8	1.5	-1	-4.3[a]
Ireland	-0.003	2.9	-0.8	-0.1[b]	-0.3	0	-0.7	-1.1	3.4	-0.4
Italy	0.000	4.9	-1.9	2.7	-0.6[b]	0.4[a]	1.5[a]	-2.7	2.8[b]	-2.1[b]
Japan	-0.022[b]	24.1[a]	8.2[a]	-12.6	-7.6	2.5[b]	-2.1	26.3[a]	-2.3[a]	-12.4[a]
Netherlands	-0.036[b]	57.9[b]	0.5	4.9[b]	0.2[b]	0.3[b]	-3.5	2.5	2.9[a]	-7.6
Norway	-0.004	11[b]	-2.1[a]	6.1[b]	-1.7[b]	1.5[b]	-4.7[b]	2.7[b]	2.1[a]	-4
Portugal	-0.001	-0.6	-0.7	-0.9	-0.9	-0.9	-1.4	-0.5	8.5[a]	-3.1
Spain	-0.007[a]	7.6[a]	-1.8[a]	-0.9[a]	6.2[a]	-0.8[a]	4.9[a]	-3.7[b]	-1[b]	-2.9
Sweden	0.003	-2.8	3[a]	-0.1[a]	0.6[a]	-1.6[a]	-5.1	4.2[a]	4[a]	-5
Switzerland	-0.014[b]	20.7[a]	-3[a]	3	-0.3	-2.5[b]	-1.3	5[b]	-0.1	-0.8[a]
UK	-0.127[b]	284.1[a]	-25.9[a]	-5.4[a]	-1.5[a]	-8.4	-17.5	58.7[a]	13.5[b]	-13.5
USA	0.134[a]	9.9	-82.1[b]	-12[b]	-54.2	180.5[a]	116.6[b]	-28	-67[b]	-53.8[a]

Notes:
a) Significant at 1 per cent level.
b) Significant at 7 per cent level.
EAP= East Asia and Pacific; EUR = Europe; LAC = Latin America and Caribbean; MEA= Middle East; NAF = North Africa; SAS = South Asia; SSA = Sub-Saharan Africa; CAS = Central Asia.

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