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Crushed Aid: Fragmentation in Sectoral Aid

Emmanuel Frot and Javier Santiso

Stockholm Institute of Transition Economics
Stockholm School of Economics
Sveavägen 65, P.O. Box 6501
SE – 113 83 Stockholm
Sweden
http://www.hhs.se/SITE/

Crushed Aid: Fragmentation in Sectoral Aid[§]

Emmanuel Frot[*] and Javier Santiso[#]

Abstract

This paper measures and compares fragmentation in aid sectors. Past studies focused on aggregate country data but a sector analysis provides a better picture of fragmentation. We start by counting the number of aid projects in the developing world and find that, in 2007, more than 90 000 projects were running simultaneously. Project proliferation is on a steep upward trend and will certainly be reinforced by the emergence of new donors. Developing countries with the largest numbers of aid projects have more than 2 000 in a single year. In parallel to this boom of aid projects, there has been a major shift towards social sectors and, as a consequence, these are the most fragmented. We quantify fragmentation in each aid sector for donors and recipients and identify which exhibit the highest fragmentation. While fragmentation is usually seen as an issue when it is excessive, we also show that some countries suffer from too little fragmentation. An original contribution of this paper is to develop a monopoly index that identifies countries where a donor enjoys monopoly power. Finally, we characterise countries with high fragmentation levels. Countries that are poor, democratic and have a large population get more fragmented aid. However, this is only because poor and democratic countries attract more donors. Once we control for the number of donors in a country-sector, democratic countries do not appear different from non-democratic ones in any sector and poor countries actually have a slightly less fragmented aid allocation.

Keywords: aid; fragmentation

JEL Classification: F35

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[*] Stockholm Institute of Transition Economics, Stockholm School of Economics, P.O. Box 6501, Sveavägen 65, SE – 11383 Stockholm, Sweden, email: emmanuel.frot@hhs.se. Emmanuel Frot acknowledges the generous financial support of the Jan Wallanders och Tom Hedelius Stiftelse.

[#] OECD Development Centre, 2 rue André Pascal, 75775 Paris Cedex 16, France, email: javier.santiso@oecd.org.

I. INTRODUCTION

The world of official development assistance is rapidly evolving. It has been on an expansion path now for half a century, with today a plethora of actors working in the same countries and in the same sectors. In the remote past, developed countries used to grant money to a few carefully picked countries, often current or former colonies, or strategic political and economic partners. In this perspective, aid was a tiny club affair, reserved to a small number of partnerships, and global quantities were quite limited and concentrated. But in the last four decades, aid partnerships boomed, new bilateral and multilateral donors have emerged and this trend is still ongoing today with emerging countries that evolve from being aid recipients to aid donors (Brazil, China, Russia, Saudi Arabia or Venezuela) (see Woods, 2008).

The issue is even more complicated when we go within each specific country because many old and new donors have more than one agency giving aid. Brainard (2007) estimated that the United States for example, the largest bilateral donor and dominant player, had more than 50 bureaucracies by the mid 2000s involved in aid giving. The major aid unit in the US is the aid agency USAID but according to Oxfam only 45% of total US foreign aid is overseen by this agency[1]. All in all, US foreign assistance programs are fragmented across 12 departments, 25 different agencies and nearly 60 government offices[2].

As underlined by Kharas (2007a and 2007b) not only are new sovereign donors emerging but traditional donors are also splintering into many specialised agencies while the number of private nonprofits is exploding. This new reality of aid amplifies the pressing need and search for more aid efficiency[3]. With the multiplication of actors on the aid stage, disbursements have started to become more fragmented: aid is received in many small pieces from many donors. Frot and Santiso (2008), in a large comparative analysis of aid fragmentation, showed that if in 1960 the average OECD donor disbursed aid each year to an average of 20 countries, in 2006 it did so to more than 100. Frot (2009) analysed the process of fragmentation and underlined that donors gave aid to rising numbers of countries but did not increase their aid budget at the same rate. Donors established new partnerships but allocated them small aid quantities, thereby adding to fragmentation. This simple observation is at the core of aid fragmentation, a now prominent issue in the aid community.

Donors themselves, both bilateral and multilateral, mobilise principles and actions in order to reduce fragmentation and increase coordination. The Paris Declaration, signed in 2005 by most developed and developing countries, explicitly makes coordination one of its goals. The Accra Agenda for Action, designed in 2008, reaffirmed the goal of a "more effective division of labour" and enacted a set of international good practice principles on in-country division of

1 See http://siteresources.worldbank.org/IDA/Resources/Aidarchitecture-4.pdf.

2 See Duncan Green's blog, the Head of Research of Oxfam in the UK: http://www.oxfamblogs.org/fp2p/?p=266

3 Of course aid efficiency is a multi-dimensional problem, of which fragmentation is only one dimension. Propositions towards more efficiency are numerous. Birdsall (2005), Borensztein *et al*. (2008), Kharas (2007b), among others, present many issues about aid allocation that have a direct effect on aid efficiency.

labour. The Development Assistance Committee (DAC) of the OECD is actively measuring progress in the implementation of these goals.

New research has fuelled this awareness by quantifying how fragmentation has adversely affected aid effectiveness. Acharya *et al.* (2006) measured fragmentation and provided an account of its consequences. Knack and Rahman (2007) found that fragmentation decreases the bureaucratic quality of aid recipients. Djankov *et al*. (2009) studied the consequences of fragmentation and found that it makes aid inefficient and worsens corruption. Easterly and Pfutze (2008) calculated that the probability that two randomly selected dollars in the international aid effort will be from the same donor to the same country for the same sector is 1 out of nearly 2660. OECD DAC (2008) proposes new fragmentation measures at the donors' and recipients' levels and argues that fragmentation at the sector level is more accurate and underlines better the potentialities for labour division among donors. It motivates our approach, that is complementary to OECD DAC (2008).

This paper undertakes the task of looking at sector aid data and measuring fragmentation in each sector, for each donor of the Development Assistance Committee (DAC) and for each recipient. Past studies looked only at aggregate data, or contained a much more limited number of sectors and years. A measure of fragmentation at the sector level indeed brings new benefits compared to existing measures. From a policy recommendation point of view, a single aggregate measure per country says little about potentialities for coordination among donors within the country. As we show in this paper, sectors are very unequal in terms of fragmentation, and aggregate fragmentation hides disparities. But we also find that aggregate fragmentation distorts the true picture by biasing upwards fragmentation levels for donors. A donor may give little aid to a recipient compared to other donors and so apparently contribute to fragmentation, but still be a major actor in a sector of the same recipient. Aggregate measures therefore oversimplify the issue of fragmentation by disregarding the different functions of aid, and as such miss important features.

By doing a project count and by measuring aid fragmentation for donors and recipients, our analysis reveals that there has been a dramatic allocation shift from the economic and production sectors to the social sectors over many years. This trend, coupled with the fact that small-scale social sector projects are more prone to proliferation than heavy infrastructure investments, implies that social sectors are the most fragmented today. Coordination among donors is acutely needed in these sectors, in particular in the Education and Government & Civil Society sectors.

The emphasis so far in the literature has been on the risks of too much fragmentation, but too little is also an issue. This paper explicitly considers this unexplored aspect of fragmentation. If a donor enjoys a monopoly in aid disbursements in a country, it is doubtful that aid will be disbursed in the most efficient fashion. Ideally one would like to have some competition, to not have developing countries depending on a single country for aid, but not so much competition that the costs of administering all the partnerships become unmanageable. To find the optimal number of donors for a country is a difficult task and this paper does not deal with it. However, we create a monopoly index to identify countries whose aid allocation is dominated by the same donor in each sector. We recognise that a donor enjoys monopoly power if it is dominant in many sectors, and not only at the aggregate level. The index therefore makes full use of the sector

data. By designing this new index, we aim to provide as complete a picture of fragmentation as possible, from too much to too low fragmentation, to inform donors and help derive policy recommendations.

Finally, we examine the characteristics of the recipients whose aid is the most fragmented. We uncover the relationship between fragmentation and three variables: GDP per capita, population and democracy. The motivation for this simple descriptive analysis is that we expect donors to cluster in poor, large and democratic countries, and so fragmentation to be correlated with these variables. We find that countries that are poorer, more democratic and with a larger population indeed get a more fragmented aid. However, the effects of these variables are quite limited and it is mostly due to the number of donors present. Once we control for the number of donors, we find that the level of democracy is not correlated with fragmentation. More democratic countries attract more donors and that is why they have higher fragmentation levels.

We are not the first to measure aid fragmentation, neither at the aggregate nor at the sector level. Acharya *et al.* (2006) were among the first to do so with aggregate figures. They documented the extent of fragmentation referring to some anecdotal cases, for instance by underlining that a fairly representative aid recipient country like Vietnam had 25 official bilateral aid donors operating in the early 2000s, 19 multilateral aid donors and more than 350 international NGOs operating all together 8 000 aid projects. They also presented measures for donors and recipients for the period 1999-2001. Frot and Santiso (2008) considerably extended the perspective by expanding the set of donors and using data from 1960 to 2006. By doing so they were able to follow the evolution of fragmentation and to show how it became more severe with time. Frot (2009) used the same data to show that a relatively limited reallocation of aid across recipients and donors would considerably decrease fragmentation levels. OECD DAC (2008) presented its own fragmentation indexes for 2005 and was the first to initiate a sector analysis, looking at the health and economic infrastructure sectors. The most recent 2009 report from the OECD DAC (2009) uses the same figures and suggests aid disbursement has become even more fragmented, reducing its effectiveness. Our work uses the whole range of available data in all the sectors and for all the possible years. It complements past works by expanding their range and offers a more complete picture of aid fragmentation. Its contribution is also to underline that too little fragmentation is also an issue and to offer a way to identify countries and sectors subject to donor monopoly power.

II. THE NUMBERS: SHIFTING TOWARDS SOCIAL PROJECTS

1. Data

Our definition of aid is Country Programmable Aid (CPA) that includes flows that are defined as ODA (Official Development Assistance), but that are not classified as humanitarian aid, food aid, donor administrative costs, debt relief, budget support to NGOs, aid to refugees in donor countries and unallocated flows. Each time we refer to aid in the text, we mean CPA and not ODA. CPA is meant to better capture programmable development projects not motivated by emergency situations. It also excludes activities not located in the developing country (donor administrative costs, aid to refugees in the donor country) and debt relief that does not imply an actual cash transfer. Many authors, for instance Kharas (2007b), consider that CPA is a better measure of development efforts than ODA. It is also the quantity that DAC OECD uses in its studies of fragmentation (OECD DAC 2008).

We exploit the Credit Reporting System (CRS) Aid Activities database of the OECD. It reports a sectoral breakdown of aid data for the 22 member countries of the OECD's Development Assistance Committee (DAC), the European Commission and other international organisations. Countries that are non-DAC but OECD members report their aggregate, but not their sector aid disbursements, and so are not included in the analysis. "New" donors, such as Brazil, China, India, Russia, Saudi Arabia or Venezuela are becoming increasingly important and any study on fragmentation would greatly benefit from their inclusion. However, aid data for these countries is scarce and virtually non-existent at the sector level. It is a drawback not to be able to document how these donors contribute to fragmentation, but we must make do with this limitation. If anything, we believe that adding more donors to the analysis would make fragmentation even worse than it is described here. Readers should therefore take numbers presented in this paper as a lower bound on how severe fragmentation is.

The CRS database includes all aid recipients, but we do not consider multi/regional recipients (say Africa, or Asia unspecified). An aid project is defined as an entry in the CRS database, as identified by its CRS identification number and with a strictly positive flow (some observations are zeros)[4]. By imposing these conditions, we aim to capture flows that correspond to projects in the field, and not in the donor country; that represent money available to the developing country, and not debt relief that does not represent an actual flow; that are allocated to a given country, and not to a whole region; and that are part of a programmable policy within a policy agenda, and not disbursed because of an emergency.

There is massive under-reporting in the data, such that any trend must be interpreted with extreme caution. Disbursement data is virtually absent before 1990 and commitment data, though available since 1973, is also incomplete in the early years. It is unclear if trends are driven by better reporting or indeed reflect changes in aid allocation. To avoid this issue, we focus primarily on the last year of available data (2007) and refrain from exploiting time variation.

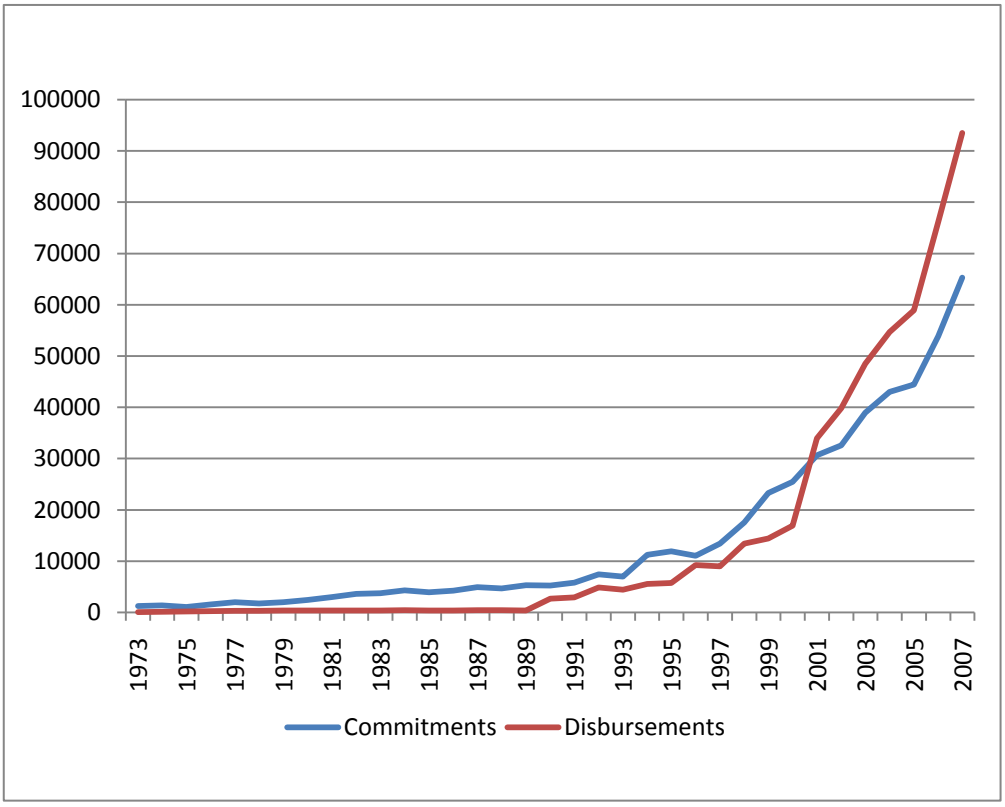
4 See Appendix for more details about the method we used to count the number of projects.

2. Counting projects

We start by simply counting the number of aid projects in the world. We find that there were 93 517 projects in 2007, based on disbursement data. Because there is under-reporting, this is a lower bound. If instead of using CPA we simply refer to ODA projects, we find 132 326 aid projects in 2007. It is not surprising that there are more disbursements than commitments as a commitment is then usually disbursed over many years. The increase in the number of aid projects may be entirely driven by better reporting from aid agencies. On the other hand, the trend is so remarkable that it seems difficult to completely explain it by improved data collection.

The number of aid projects is arguably a crude indicator of the extent to which aid allocation is fragmented. An important limitation of counting aid projects is that it does not take into account when different projects are inter-related and are therefore part of a bigger, coordinated project. The CRS data does not reflect these subtleties. It is a limitation, but we still believe aid project numbers give at least a rough idea of the administrative burden of aid. This issue is much less salient for the fragmentation index we develop later on, as it relies on aggregate aid disbursements in sectors, and not on the number of projects.

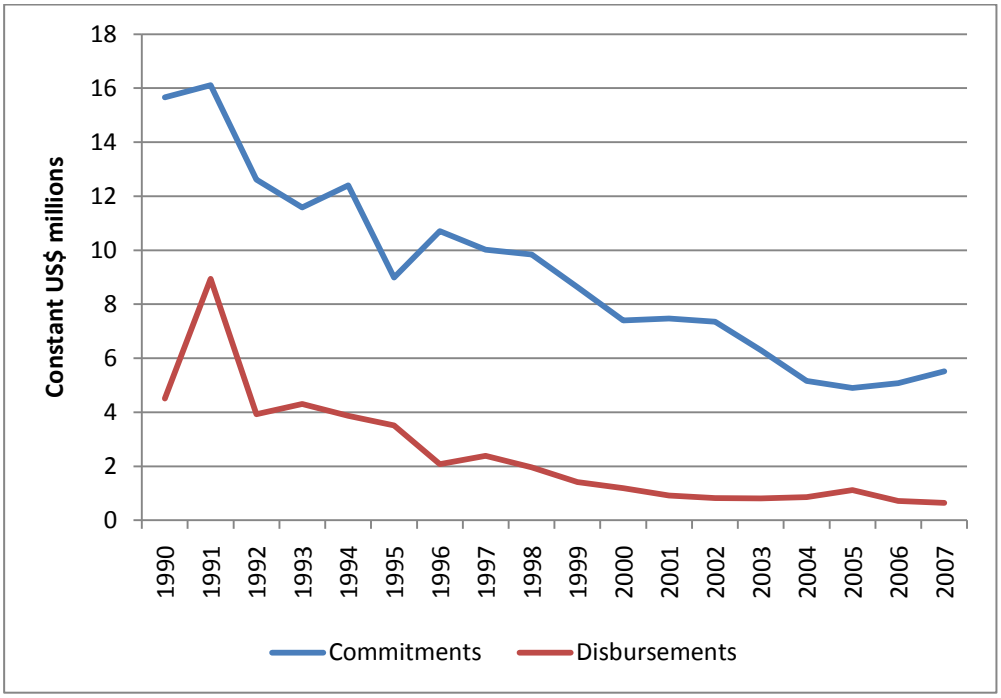
Figure 1. Number of aid projects, 1973-2007



Source: Authors, 2009, based on OECD DAC databases, 2009.

This large increase in aid projects has been accompanied by a corresponding fall in the average project size, as shown on Figure 2. The expansion of partnerships has not been met by a similar expansion in aid budgets, resulting in more, but smaller, projects[5].

Figure 2: Average project size, 1990-2007



Source: Authors, 2009, based on OECD DAC databases, 2009.

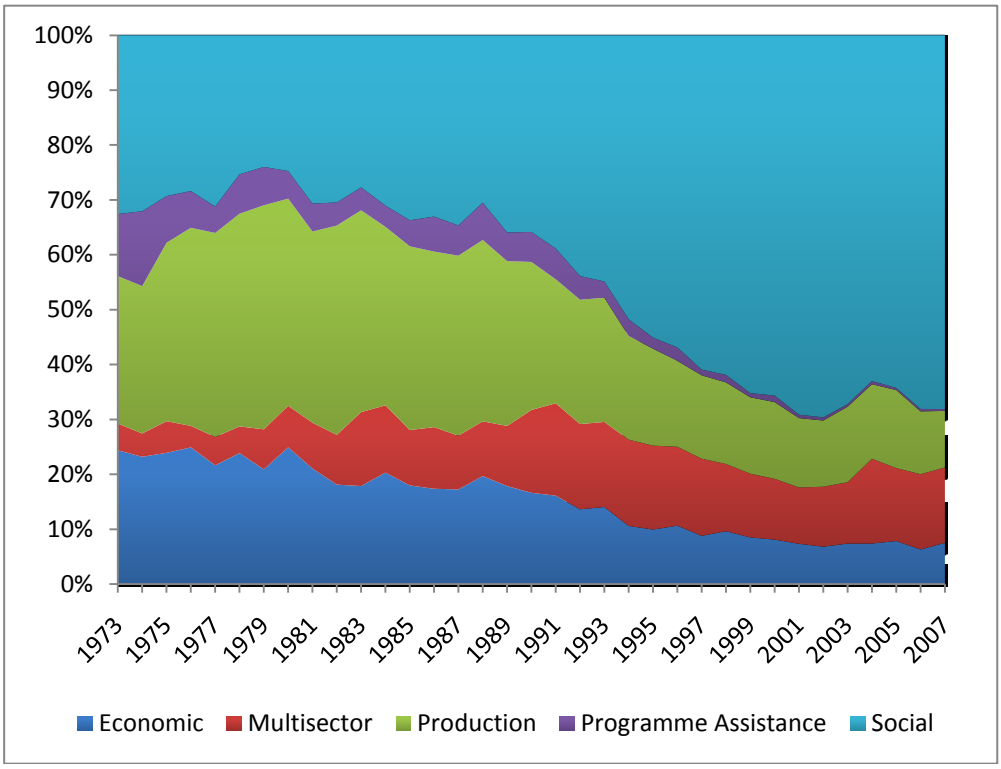
3. Shifting towards social sectors

These figures so far show a sharp increase in the number of projects, but we do not know if that increase has been equally distributed across sectors. To answer this question, we now plot the number of projects in each sector as a percentage of the total number of projects.

Aid sector definition follows that of DAC. Under-reporting is less of an issue here because we are looking at the proportion of projects that goes to a sector. As long as under-reporting is identical across sectors, proportions will be correct. Because pre-1990 data for disbursements is hardly existent we rely on commitment data to have a more consistent long-term view.

Figure 3: Project sector repartition, 1973-2007, commitment data

[5] The Appendix reports the number of projects and average project size for each donor in 2007.

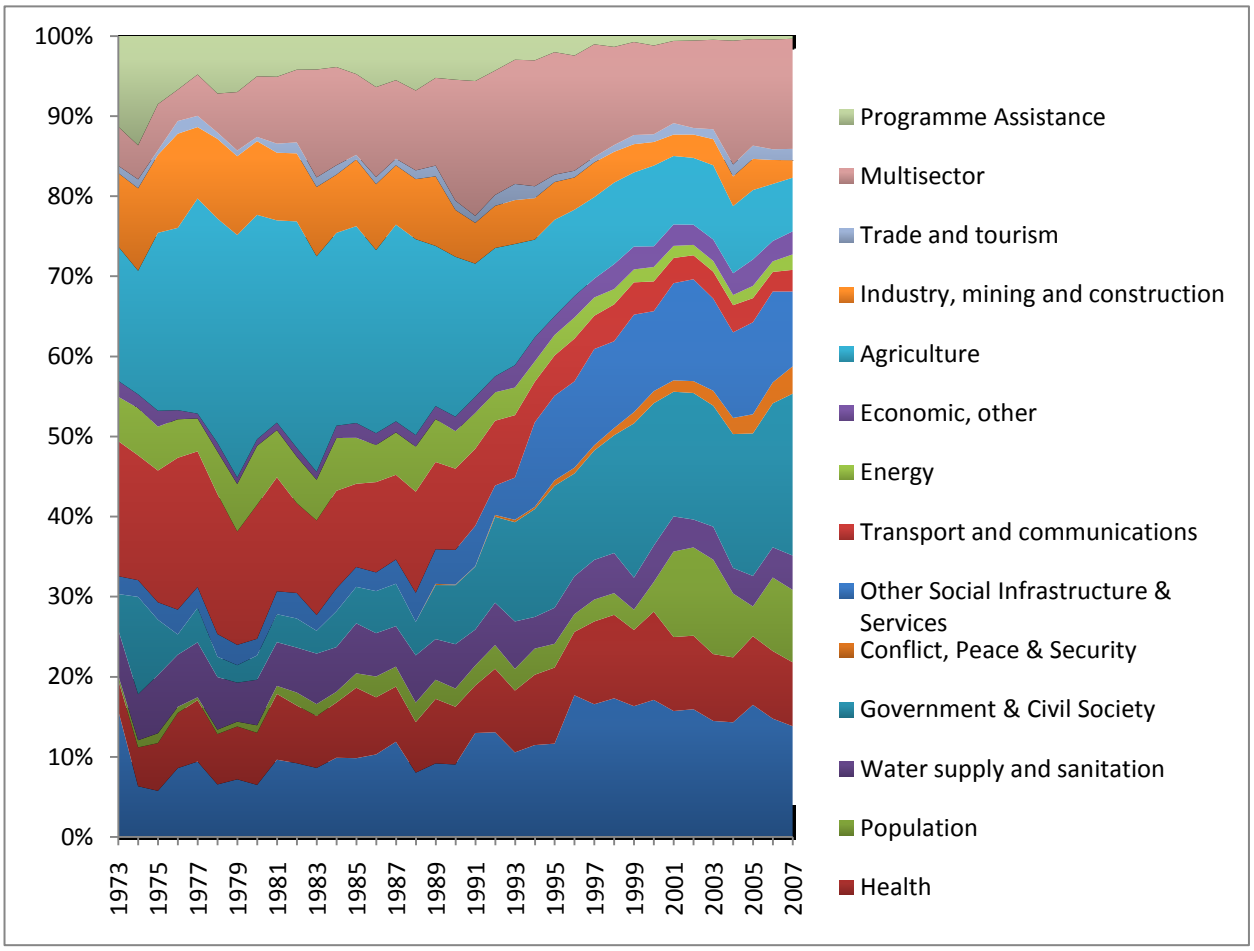


Source: Authors calculations, 2009, based on OECD DAC data, 2009.

The historical trend in the aid sector allocations is also instructive. We observe a major shift in priorities from Production (agriculture, forestry, fishing, industry, mining, construction, trade, and tourism) and Economic (transport, communication, energy and banking) sectors to Social (health, education, population, water supply, government and conflict prevention) sectors. Social sectors now represent more than 60% of the total number of projects, up from 30% in the 1970's (disbursement data would show a very similar picture).

A finer breakdown confirms these results. Instead of using broad sectors, sub-categories are not aggregated. Social sectors are the seven bottom ones on the picture. The Government & civil society and Population sectors have gained the most projects over time. Agriculture and Energy sectors have gained much less.

Figure 4. Project subsector repartition, 1973-2007, commitment data



Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Social sectors have benefited the most from the expansion in project numbers. Looking at quantities committed or disbursed, instead of number of projects, would yield the same conclusion. The shift in priorities from donor countries towards these sectors also implies that we should expect them to be most fragmented.

4. Making sense of the shift from production to social sectors

We observe a change in donor countries' priorities. They used to invest in infrastructure, heavy investment, before moving towards social issues. This trend has been observed elsewhere (see Easterly 2009). In the early days of aid, the emphasis was on increasing the quantity of physical infrastructure. The theoretical rationale behind giving aid to raise the stock of capital was provided by the two-gap model. This model stated that developing countries lacked investment, and so that aid had to finance large projects (dam, power station, highways, steel mills, etc.). However, by the 1990s, donors realised that low maintenance on these large scale projects made them ineffective. The two-gap model also somehow came out of fashion, as empirical studies failed to confirm its predictions (Easterly 1999). Aid agencies are also prone to

recurring fads and fashions that are reflected by shifts in sector allocations[6]. Large-scale infrastructure and, to a lesser extent agriculture, used to be a primary goal of aid but, in the 1980s, donors favoured an agenda of structural adjustments and macroeconomic reforms. The relative disappointment associated to this agenda led to a focus on institutional reform, corruption and democracy, as shown by the quick expansion of the Government and Civil Society sector. The shift in priorities tends to follow the findings in the academic literature.

The literature on growth accounting, summarised by Caselli (2005), also established that cross-country variations in incomes cannot be explained by differences in factors of productions (either physical or human capital). Easterly and Levine (2001) also argue that factor accumulation fails to explain growth. On the other hand, institutions have now become a prime candidate to explain why some countries are richer than others. The importance of institution quality, property rights, and the rule of law was emphasised by North (1991). Acemoglu *et al.* (2001) also initiated a vast literature on the long-term consequences of institutions.

Similarly, the shift from large-scale projects to social issues may be related to the trend in development economics from macro to micro levels of analysis. Field experiments are now implemented at the local level all over the world and have shown how some small interventions could make a large difference for poverty. This is not to say that aid agencies have adopted the same methodological apparatus as researchers to implement and evaluate their interventions (see Easterly (2009) for an overview of aid agencies' policies in light of the academic literature), but there is a parallel between both.

Agriculture has been a victim of the comparative attractiveness of social sectors for aid agencies. OECD (2008) argues that transaction costs are lower in social sectors and that funds in these sectors are easily channelled through large public sector entities. Moreover, social sector aid leads to the delivery of well identified basic services that have a direct impact on development targets such as the Millennium Development Goals. Easterly (2009) notes that, despite some clear successes in this sector, like the Green Revolution in India, and the recognition that it is important for development, African agricultural aid is widely seen as a failure. He also remarks that, as a share of total aid, aid to agriculture has sharply fallen, and that the World Bank and USAID have been severely criticised for neglecting the sector. Since in the poorest countries virtually everyone works in the agricultural sector, this lack of consideration must have been quite damaging. Caselli (2005) shows that, looking at sectoral data, one of the main reasons why poor countries are poor is their much lower labour productivity in the agricultural sector[7]. He quantifies this effect by computing cross-country income differences, had all countries had the same agricultural labour productivity as the USA. He finds the stunning result that, under this assumption, world income inequality would virtually disappear. Improvements in agricultural productivity would therefore bring sizable benefits. The small number of projects and low stakes in the sector seem to imply that aid donors failed to recognise this potential, or at least had other reasons not to exploit it.

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6 Frot and Santiso (2009) find evidence that donors herd. This behaviour typically generates fads and fashions.

7 The other two reasons are that they are also less productive in the non-agricultural sectors, and that much of their labour force is in the agricultural sector, where labour productivity is lower.

The Economist (2009) reported that foreign aid to farming fell dramatically between 1980 and 2004, but also that public spending was halved in the sector during the same period. The neglect of traditional donors and developing countries' governments has led new donors like China or oil exporters from the Persian Gulf to invest in the sector. An official at Sudan's agriculture ministry said investment in farming in his country by Arab states would rise almost tenfold from USD 700 million in 2007 to a forecast USD 7.5 billion in 2010, representing half of all investment in the country when it was a mere 3% in 2007. These new investors bring with them seeds, marketing techniques, jobs, schools, clinics and roads. We do not enter here into the debate of whether these investments will succeed where other Western initiatives failed, or whether aid from "new donors" carries costs that reduce its value, but it seems that the neglect of agriculture by traditional donors has opened up the way for emerging donors in this sector.

III. FRAGMENTATION ON THE DONORS' SIDE

In this section we measure donor fragmentation in each sector and assess how much a fragmentation measure based on sectors differs from one based on countries. We make use of the OECD DAC definition of fragmentation and extend it to sectors. In each recipient-sector-year, donors' shares are computed and compared to donors' shares in the sector at the global level. If the former is smaller than the latter then the partnership is said to be insignificant. Assume for instance that Austria provides 2% of total health aid to Vietnam. If Austria provides 5% of global health aid then its partnership with Vietnam is considered as fragmented or, in other words, insignificant.

This first measure suffers from a negative bias towards large donors. Small donors' global shares are often so low that they correspond to quite small amounts of money for a recipient. It is therefore more often the case that a small donor's partnership is more significant than that of a large donor. Large donors' portfolios are likely to appear more fragmented because of this bias. For this reason OECD DAC also takes into account, as a complementary measure, if the donor is among the group of donors that together disburse 90%of total aid to the recipient.

We later present both measures for each donor but in Table 1 we use only the first one to average across donors. Results with the second measure would be very similar. Both definitions actually lead to an almost perfect correlation between the two measures, as shown in the Appendix.

Table 1. Average fraction of significant partnerships and average aid fraction they receive, 2007, disbursement data

	Fraction of significant partnerships	Fraction of aid that goes to significant recipients
Social sectors		
Education	45	89
Health	51	88
Population	61	86
Water supply and sanitation	62	94
Government & Civil Society	47	86
Conflict, Peace & Security	61	88
Other Social Infrastructure & Services	53	90
Economic sectors		
Transport and	61	96
Energy	73	95
Economic, other	72	95
Production sectors		
Agriculture	57	90
Industry, mining and	68	96
Trade and tourism	79	97
Multisector	47	87
Programme Assistance	88	97

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Table 1 indicates which sectors are, on average, more fragmented. The first column reports the average fraction, across donors, of significant partnerships in the sector. The second column indicates the share of aid that these significant partnerships represent.

Social sectors are more fragmented, as we expected above. Often fewer than half of all partnerships are significant. This is particularly true for the Education sector. This occurs when donor countries have many small projects and indicate opportunities to reduce fragmentation. The economic and production sectors are less fragmented. The second column shows that even when most partnerships are not significant, they still represent a very small aid budget relative to the total allocated to the sector. The most fragmented sector is Education, but significant partnerships still receive 89% of aid. It underlines that non-significant partnerships are under-funded and involve very tiny amounts. This observation also holds at the recipient level and is a constant of aid allocation (see Frot 2009).

Table 2 presents both fragmentation measures for each donor in social sectors in 2007. Columns labelled "Global" use the definition of fragmentation based on global shares, those labelled "Top" use the definition based on whether the donor is in the group of largest donors.

Fragmentation numbers are sometimes quite extreme. For instance only 22% of all Austrian partnerships in the Education sector are significant. Only 19% of US partnerships in the water supply sector are significant. The two measures do not necessarily disagree and the bias against large donors is not always present. It plays a big role for the United States, by far the largest donor, but not necessarily for other large donors (Japan, United Kingdom, Germany, France). Some donors exhibit a highly fragmented portfolio according to both measures: Italy scores badly along both. Table 2 contains summary measures across all recipients and can only identify donors whose allocations are fragmented on average in a sector. It is only a first step in providing a detailed picture of fragmentation. Policy recommendations need to be based on the fragmentation analysis in each recipient. The matrix of donor-recipient-fragmentation is too large to be presented here, but is available on request from the authors.

A more stringent definition of fragmentation would classify partnerships as being equivalent only when the donor's share is above its global share and it is among the group of top donors. It happens that this measure is always equal to the minimum of the two presented in Table 2, so it can be read easily from this table[8].

[8] Alternatively, one could use a looser definition that considers a partnership to be significant if either the share is above the global one or the donor is in the top group of donors. Similarly, this corresponds in practice to the maximum of these two measures and so can also be read in Table 2.

Table 2. Fragmentation in social sectors 2007
(% projects that are significant relative to all partnerships)

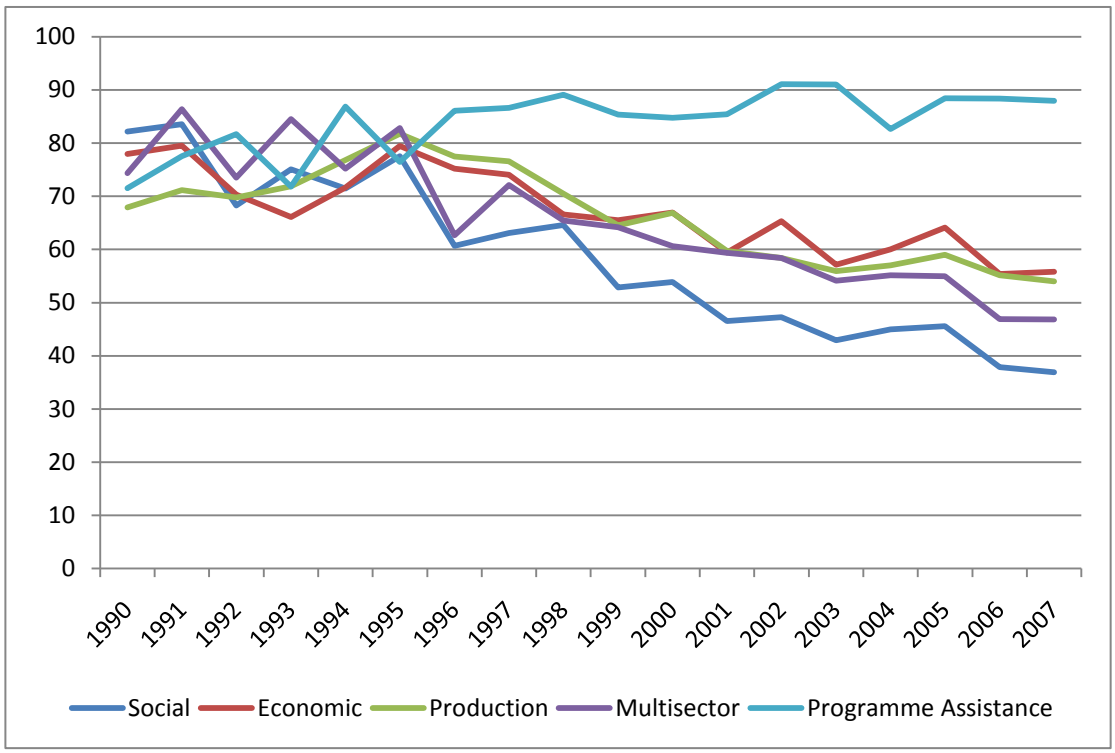
	Education		Health		Population		Water supply and sanitation		Government & Civil Society		Conflict, Peace & Security		Other Social Infrastructure & Services	
	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top
Australia	43	36	46	41	62	62	46	15	62	69	63	69	62	33
Austria	22	15	43	2	65	6	52	41	41	11	68	14	49	8
Belgium	43	25	50	48	41	15	62	38	47	21	74	32	42	19
Canada	34	31	43	45	58	23	51	26	43	46	79	45	33	23
Denmark	68	55	41	35	80	15	68	63	63	44	73	53	76	36
EC	43	56	43	64	54	50	59	71	48	88	59	76	25	71
Finland	49	19	50	11	57	4	60	27	32	10	67	19	80	11
France	31	66	68	53	100	29	60	63	42	26	61	47	46	67
Germany	35	66	28	28	45	45	57	77	46	60	56	59	44	59
Global Fund			64	91	62	97								
Greece	35	11	69	3	100	0	63	11	69	15	46	46	60	16
Ireland	33	16	30	21	36	25	75	21	39	22	73	27	46	29
Italy	44	7	35	30	55	10	36	13	34	15	53	33	45	23
Japan	33	58	44	59	65	24	43	70	33	35	82	73	51	53
Luxembourg	61	18	56	29	72	44	76	35	47	13	64	27	63	13
Netherlands	64	75	70	65	61	26	73	81	51	51	65	65	57	27
New Zealand	48	20	88	31	63	25	100	75	80	28	86	57	93	27
Norway	57	43	48	38	53	26	64	27	44	44	65	81	54	36
Portugal	20	17	83	67	100	50	100	20	57	36	41	50	29	19
Spain	47	46	53	49	61	43	63	59	49	51	65	65	62	68
Sweden	53	34	21	19	31	13	64	40	39	51	49	41	42	35
Switzerland	40	8	67	47	69	0	45	29	53	24	39	42	55	10
UNAIDS					65	38								
UNDP	85	0	69	19	66	15	78	11	64	60	68	26	76	15
UNFPA					77	82								
UNICEF	49	17	46	55	59	28	58	22	50	9	46	14	63	47
United Kingdom	59	59	44	62	35	65	65	65	27	52	44	58	54	50
United States	38	52	39	74	24	76	19	28	24	75	36	71	31	64
Average	45	34	51	42	61	33	62	41	47	38	61	48	53	34

Note: Shaded cells indicate the five most fragmented donors in each sector, according to each measure.

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Evolution over time of fragmentation shows fragmentation has also deteriorated most in the Social sectors. To show this, we define broad sector categories and compute the number of significant partnerships in each broad category. We then average this number across donors. Since 2000, donor countries have had, on average, fewer than 50% of significant partners in the Social sector. As already hinted above, higher fragmentation in the social sectors is to be expected. Donors incur higher fixed costs when entering into large infrastructure projects that are found in the economic and production sectors. Dispersion is therefore costly in these sectors. On the contrary, social sectors are ideal for local projects with lower fixed costs. The political economy of aid, that require aid agencies to show tangible results, puts greater emphasis on short-term projects with well-identified outputs that fit better the conditions of social sectors. Though these results were expected, they show how organisational incentives have shaped aid allocation, with detrimental consequences on its efficiency.

Figure 5. Average donor fragmentation per sector, 1990-2007, disbursement data



Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Finally, we provide aggregate fragmentation measures for donors. We also quantify to what extent a global fragmentation index based on sector differs from one based on countries.

Using the same fine sector decomposition as above, we compute the fraction of significant partnerships in each broad sector. In other words, for each donor we count the number of its significant partnerships in all subsectors of the social sector (education, health, etc) and we divide this number by the total number of partnerships in the social sector that involves this donor. This quantity is our donor social sector fragmentation index. This is repeated for each

sector. We also define a global donor fragmentation index as the fraction of significant partnerships across all sectors.

The indexes are presented for year 2007 in Table 3. They indicate which donors have the most fragmented portfolios in each sector. The global donor index is not based on the sector figures, but on a finer decomposition of subsectors (the social sector is decomposed into education, health, population, etc.).

Sector indexes confirm the higher fragmentation of the social sectors, according to both measures, and which donors are the most fragmented. The United States often have the most fragmented allocation. A possible explanation is that this donor usually disburses a very large share of its aid to a handful of countries. Its other recipients therefore appear as insignificant, even though the United States are still an important donor for them.

An alternative global index is to consider recipient countries instead of recipient-sectors. This decomposition was the first used by OECD (2008) and Frot (2009). Using the same CRS data, the last column of the table presents a fragmentation index that is the proportion of significant recipients for each donor. The global index based on sectors is almost always much higher than when it is based on countries. It shows donors tend to specialise. Their aid share in the recipient may be low, and so the recipient is counted as insignificant, but their aid share in a sector in the same recipient may be very high, and the recipient-sector is counted as significant. Fragmentation is over-estimated by looking at aggregate country data. It shows that taking into account the sectoral nature of aid matters significantly in measuring fragmentation. This is true for the first definition of fragmentation, based on global shares, but less for the second definition. The "top" fragmentation measures for country-sectors and countries are quite close, except for the largest donors, whose fragmentation appears to be much lower with the country index.One could also argue that the country-sector index underestimates fragmentation because it does not take into account that sectors are in a same country. The country-sector index is neutral with respect to recipients whereas a portfolio where significant sectors are grouped in a few recipients could be considered to be less fragmented than when they are dispersed over many recipients[9].

9 It is possible to modify the index to take into account the fact that sectors are in the same or different countries. However this degree of substitutability between country-sectors must be arbitrarily imposed and here we limit ourselves to the simple case where country-sectors contribute equally to the fragmentation index regardless of their being in the same or different countries.

Table 3. Donor fragmentation index, 2007

	Social		Economic		Production		Multisector		Programme Assistance		Global (country-sectors		Global (countries)	
	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top	Global	Top
Australia	53	47	61	44	38	49	56	40	75	50	52	24	26	27
Austria	41	13	80	29	59	8	69	23			50	9	27	11
Belgium	49	27	59	28	49	29	60	40	50	0	52	17	29	17
Canada	46	36	50	31	59	17	41	32	75	50	47	19	29	28
Denmark	67	43	64	56	67	48	73	70	80	60	68	25	41	36
EC	45	70	68	74	46	76	54	82	82	97	51	37	50	87
Finland	51	13	77	20	42	20	64	29	100	0	54	9	27	5
France	47	55	73	66	36	54	55	68	92	83	49	36	34	53
Germany	43	58	45	60	43	71	54	54	89	56	46	32	39	74
Global Fund	63	94									63	94	53	62
Greece	51	13	92	15	55	9	94	35			57	8	26	4
Ireland	41	21	85	11	36	17	72	38	100	50	48	15	29	14
Italy	41	18	67	42	51	22	55	34	60	40	47	11	28	20
Japan	44	53	47	57	19	39	48	66	75	100	44	25	23	71
Luxembourg	60	23	92	29	65	19	71	32			65	16	39	13
Netherlands	61	55	62	40	45	60	67	52	81	100	61	27	35	41
New Zealand	68	28	87	70	59	19	82	42	100	100	71	17	32	15
Norway	54	44	64	41	43	50	55	38	100	100	55	26	31	33
Portugal	39	30	88	56	70	70	100	38	100	0	52	22	22	16
Spain	55	53	59	40	54	62	62	54	100	90	57	31	38	45
Sweden	39	33	47	29	33	28	71	58	100	100	42	21	39	38
Switzerland	50	22	79	38	36	21	66	43	100	33	53	12	32	18
UNAIDS	65	38									65	38	54	2
UNDP	68	35	77	37	56	47	77	42			67	19	60	20
UNFPA	77	82									77	82	62	5
UNICEF	53	29			45	26					52	25	48	28
United Kingdom	42	57	67	52	27	33	57	62	100	100	46	35	25	43
United States	30	67	27	54	38	74	29	51	100	100	31	36	30	75

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

IV. FRAGMENTATION ON RECIPIENTS' SIDE

1. Counting projects

We first list in Table 4 the top 10 recipients with the largest number of projects, in total, and then in broad sectors in 2007, before computing a precise fragmentation index (the full list is in the Appendix). Countries with the largest number of projects have more than 2000 in a single year. Iraq alone has more than 4 000 aid projects running in a single year, doubling the amount of other countries. Large countries like India, Indonesia and China had more than 2 000 aid projects in 2007 but so did smaller countries like Uganda, Mozambique or Zambia.

All in all, 601 aid projects run simultaneously in the average recipient (the median is 434). Similarly, a single sector easily accommodates 400 aid projects. However the distribution is quite skewed with on average 44 projects in a recipient-sector. The median is 19 projects in a recipient-sector. It indicates that some sectors in some countries attract disproportionate quantities of projects, whereas others might actually suffer from too low donors' attention.

Table 4. Top ten countries for number of aid projects, 2007, disbursement data

Recipient	Number of aid projects
Iraq	4162
Mozambique	2409
India	2122
Uganda	2110
China	2106
Zambia	2105
Indonesia	2039
Ethiopia	1840
Viet Nam	1763
Tanzania	1601
World average	601
World median	434

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Table 5. Top ten country-sectors for number of aid projects (Iraq excluded), 2007, disbursement data

Recipient	Sector	Number of aid projects
Mozambique	Multisector	949
Uganda	Government & Civil Society	555
Serbia	Government & Civil Society	492
Uganda	Education	467
Zambia	Water supply and sanitation	429
Indonesia	Government & Civil Society	427
China	Multisector	425
India	Government & Civil Society	418
Bosnia-Herzegovina	Government & Civil Society	411
Zambia	Government & Civil Society	386
World average		44
World median		19

Note: The world average includes Iraq.

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

In some countries lots of aid projects sometimes coexist. On the other hand, many countries have much fewer. Fragmentation is not only about too many projects in a country, but also about disparities across countries, with some attracting a large share of projects.

2. Fragmentation

OECD DAC measures fragmentation in recipients as the number of donors that account for less than 10% of total aid. We use this definition here and report the most fragmented recipient-sectors in 2007. The maximum number of donor countries is 28. For each recipient-sector, we also report the number of donors that were operating. It is usually the case in the most fragmented sectors that a very high proportion of donors represent less than 10% of disbursed aid. The most fragmented sectors all are social sectors.

Table 6. Number of donors disbursing less than 10% of aid, 2007 disbursement data

Recipient	Sector	Number of donors representing less than 10% of aid	Number of donors
China	Education	20	23
Ethiopia	Other Social Infrastructure & Services	19	22
Palestinian Adm. Areas	Other Social Infrastructure & Services	19	20
South Africa	Population	18	23
India	Education	18	23
Colombia	Other Social Infrastructure & Services	17	19
Kenya	Population	17	19
Afghanistan	Other Social Infrastructure & Services	17	21
Uganda	Population	16	20
Indonesia	Education	16	21

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Table 5 and Table 6 look at the most fragmented country-sectors. In order to find which sectors are most fragmented from a recipient point of view, we compute in Table 7 the averages, across recipients in 2007, of number of donors and number or proportion of donors that collectively represent less than 10% of aid. The education sector is the most fragmented with on average 10 donors and 56% of them disbursing collectively less than 10% of aid. Social sectors are the most fragmented. They have the largest number of donors and the largest proportion of donors disbursing small quantities.

Table 7. Recipient fragmentation, 2007

Sector	Number of donors	Number of donors that collectively represent less than 10% of aid	Proportion of donors that collectively represent less than 10% of aid
Social sectors			
Education	12	7	60
Health	10	5	46
Population	9	5	47
Water supply and sanitation	6	3	40
Government & Civil Society	12	7	50
Conflict, Peace & Security	7	4	43
Other Social Infrastructure & Services	10	6	50
Economic sectors			
Transport and communications	5	3	45
Energy	4	2	35
Economic, other	6	3	38
Production sectors			
Agriculture	7	4	41
Industry, mining and construction	5	2	35
Trade and tourism	4	2	32
Multisector	12	7	54
Programme assistance	3	1	11

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

3. Monopoly index

However, as already remarked by OECD DAC (2008), fragmentation is not always about too much fragmentation, but also about not enough. Too many donors in one sector create transaction costs that decrease aid efficiency, but not enough competition among donors is also an issue. A donor enjoying a monopoly in a sector may be more at ease to impose its contractors, to tie aid, etc. Competition between donors is usually weak in aid allocation, even when many are present, and a too low fragmentation (*i.e.* a monopoly) reinforces this effect.

Our concept of donor monopoly power aggregates up sectors within a country. A donor is said to be in a monopoly position when it represents a large share of aid disbursed in each sector it is present, and when it is present in many sectors. We define a monopoly index that takes these two dimensions into account. Donor i disburses a_{ijs} to country j in sector s. Let S_{ij} be the number of sectors in country j where donor i is active, and S_j the number of sectors in country j that receive aid from any donor. The index M_{ij} is the product of the average sector share of donor i in country j by the fraction of sectors where donor i is active. Formally,

$$M_{ij} = \frac{S_{ij}}{S_j} \frac{1}{S_{ij}} \sum_s \frac{a_{ijs}}{\sum_i a_{ijs}}$$

It is equivalent to the average donor share, when all the sectors are taken into account (with sectors where the donor is not present with a zero disbursement), but we think the interpretation above captures well the intuition behind the index. M_{ij} is large when the donor is present in many sectors and dominates many of them. Its maximum is 1, and it is reached when only one donor is present in a country.

M_{ij} weighs equally each sector. However, sectors receive different aid quantities and monopoly power is reinforced when a donor is dominant in the most important sectors. To capture this dimension, we define a weighted index W_{ij}. It is defined similarly to M_{ij} but each term of the sum is weighted by the aid share of the sector,

$$W_{ij} = \frac{S_{ij}}{S_j} \sum_s \frac{\sum_i a_{ijs}}{\sum_i \sum_t a_{ijt}} \frac{a_{ijs}}{\sum_i a_{ijs}}$$

W_{ij} is large when the donor is present in many sectors, and is dominant in dominant sectors. Its maximum value is also 1. The unweighted and weighted indexes are highly correlated (correlation is 0.95) although in some cases they diverge. That occurs for instance when a donor disburses aid in many sectors, but only small quantities in the well-endowed sectors, or when a donor targets a few sectors with very large disbursements, but spends nothing in other sectors where other donors disburse moderate amounts of cash. Though no index is strictly better than the other, the weighted index has the advantage of being influenced by aid quantities, and not only shares in sectors.

These two indexes are useful to identify developing countries that are heavily dependent on a donor. Note that our approach is more complex than a single look at donors' aid shares for each country because it takes into account that aid is spent in different sectors. Monopoly power is stronger when a donor is present in many sectors. It is also revealed when a donor takes a comprehensive approach to the partnership by being the dominant player in most sectors. This characteristic is not captured by an index based on disbursements at the country level.

In Table 8 we present countries that constitute the top 5% of the distribution of each index in 2007. For each recipient, we also indicate the donor that dominates. Countries with the strongest donor monopoly are first island states, usually former colonies sometimes still officially linked to the former colonial power.

The unweighted index also reveals the predominance of Japan in the Pacific area. Apart from these small island states, the unweighted index also identifies Iraq, Malaysia, Equatorial Guinea, Turkmenistan, Gabon and Iran as aid recipients with one dominant donor. The weighted index confirms these cases and reveals new ones: Kazakhstan, Colombia, Egypt, Jordan, Croatia, Afghanistan, Indonesia, Turkey, China and Liberia.

Donors with monopoly power are those with the largest aid budgets, apart from New Zealand, and, to a lesser extent, Australia and Spain. However Germany, whose aid budget is similar to the French budget, is not in the list.

For all the countries listed, the concern is more about too few donors than too many. There is no general rule to indicate the optimal number of donors given the recipient's characteristics, but too little competition is not beneficial either. The point here is not to precisely identify the right balance between monopoly power and fragmentation, but more to emphasise that some countries have too few donors.

Table 8. Monopoly index, top 5% highest values, 2007

Recipient	Donor	M_{ij}	Recipient	Donor	W_{ij}
Anguilla	United Kingdom	1	Anguilla	United Kingdom	1
Mayotte	France	0.98	Wallis & Futuna	France	1
St. Helena	United Kingdom	0.96	Mayotte	France	1
Wallis & Futuna	France	0.92	St. Helena	United Kingdom	0.92
Montserrat	United Kingdom	0.84	Montserrat	United Kingdom	0.89
Iraq	United States	0.81	Niue	New Zealand	0.84
Tokelau	New Zealand	0.81	Iraq	United States	0.84
Niue	New Zealand	0.78	Tokelau	New Zealand	0.84
Turks and Caicos Islands	United Kingdom	0.75	Malaysia	Japan	0.79
Palau	Japan	0.75	Papua New Guinea	Australia	0.70
Suriname	Netherlands	0.62	Suriname	Netherlands	0.69
Malaysia	Japan	0.61	Dominica	EC	0.62
Dominica	EC	0.59	Kazakhstan	United States	0.59
Papua New Guinea	Australia	0.56	Nauru	Australia	0.56
Cook Islands	New Zealand	0.56	Philippines	Japan	0.54
Nauru	Australia	0.56	Equatorial Guinea	Spain	0.54
Saudi Arabia	Japan	0.55	Cook Islands	New Zealand	0.52
Mauritius	France	0.52	Colombia	United States	0.51
Marshall Islands	Japan	0.51	Gabon	France	0.51
Tuvalu	Japan	0.50	Egypt	United States	0.50
Micronesia, Fed. States	Japan	0.50	Jordan	United States	0.50
Equatorial Guinea	Spain	0.48	Croatia	EC	0.50
Oman	Japan	0.48	Solomon Islands	Australia	0.49
Comoros	France	0.47	Afghanistan	United States	0.47
Myanmar	Japan	0.47	Antigua and Barbuda	EC	0.47
Samoa	Japan	0.46	Indonesia	Japan	0.46
Turkmenistan	United States	0.45	Turkey	EC	0.43
Gabon	France	0.45	Mauritius	France	0.43
St.Vincent & Grenadines	Japan	0.43	Turkmenistan	United States	0.42
Iran	Japan	0.42	China	Japan	0.40
Kiribati	Japan	0.42	Liberia	United States	0.40

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

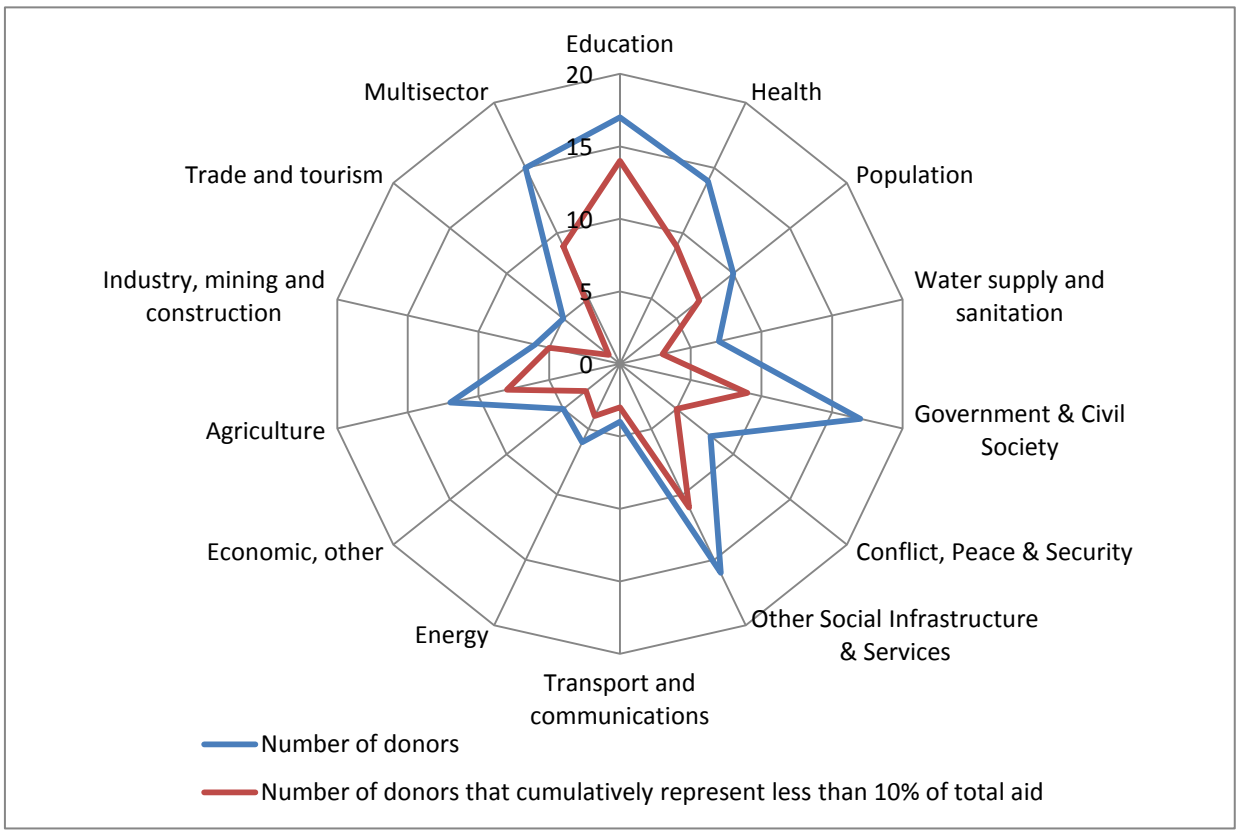
4. How to summarise recipient fragmentation: a graphical tool

The sector decomposition allows further comparisons between recipients and across sectors within recipients. Tanzania is known to have a highly fragmented aid allocation. According to the World Bank aid to Tanzania is disbursed through more than 700 projects managed by 56 parallel implementation units[10]. Tanzania received 541 donor missions during 2005 of which only 17% involved more than one donor.

Frot and Santiso (2008) confirm, using a Hirshman-Herfindahl index, that Tanzania has one of the most fragmented aid portfolios when one looks at the total aid donor allocations. They also find that it has been the case for many years though the situation slightly improved after the Tanzanian government took some preventive actions. Sector data also confirm that Tanzania has, on average, a fragmented aid allocation.

To illustrate graphically this property, we construct a "radar" plot with the total number of donors active in the sector, and the number of donors that collectively represent less than 10% of total aid disbursed in the sector.

Figure 6. Fragmentation, Tanzania, 2007, disbursement data



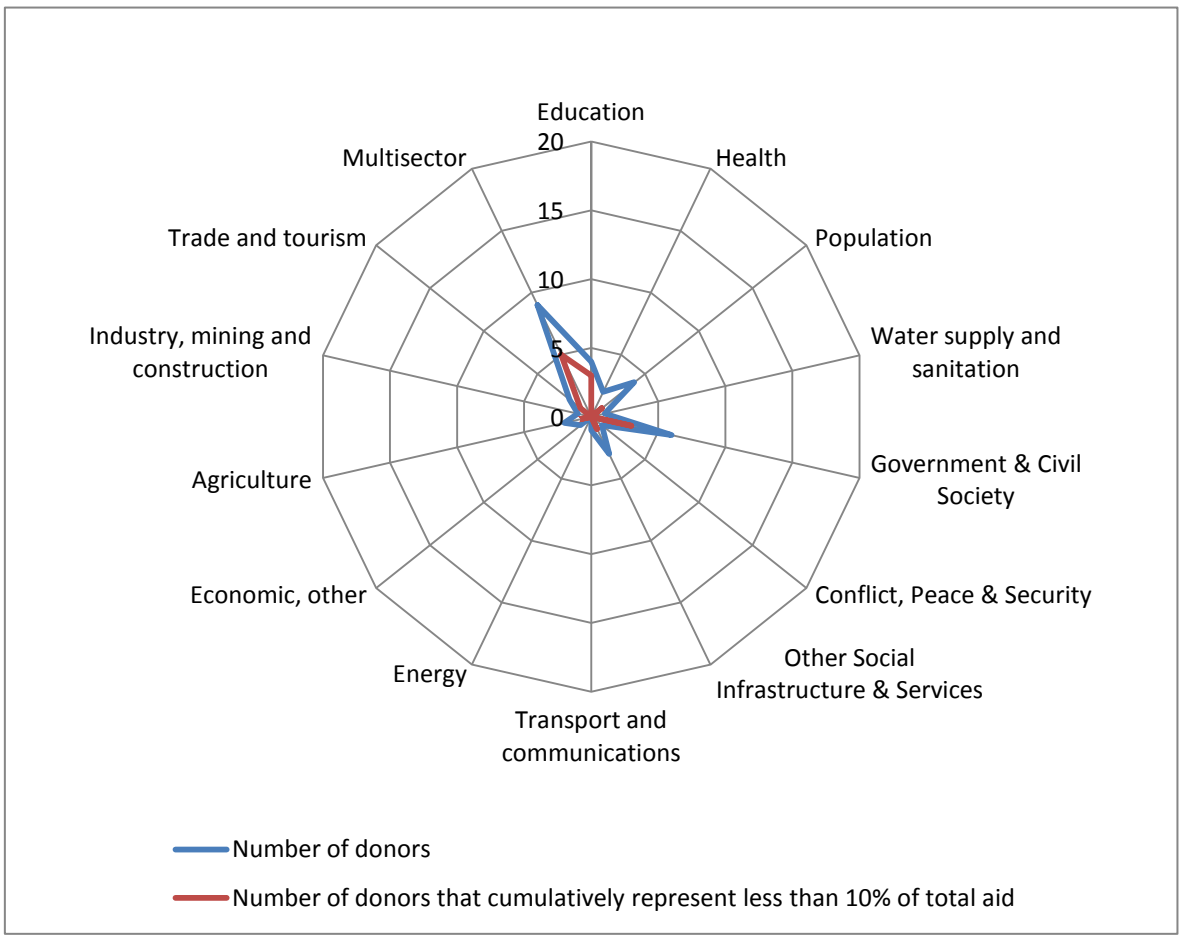
Source: Authors calculations, 2009, based on OECD DAC data, 2009.

10 See http://siteresources.worldbank.org/IDA/Resources/Aidarchitecture-4.pdf .

The graph indicates which sectors attract most aid donors. As already shown, social sectors concentrate the majority of donors. Production and infrastructure sectors receive little attention. The interior line gives the number of donors that represent less than 10% of total aid. Fragmentation is severe when there are lots of donors in a sector and many disburse small quantities. For instance the education sector is quite fragmented. On the other hand, 75% (3 out of 4) of the donors collectively disburse less than 10% of total aid in the transport and communications sector. This proportion is high, but given that there are only 4 donors, one cannot really say that aid to the sector is very fragmented.

Tanzania is, among others, an aid darling. For aid orphans, the radar plot is quite dissimilar. As an example, consider the case of Belize. The radius of the radar plot is the same as for Tanzania. Belize has very few donors in each sector. This is only revealed by a sector analysis: if we count total disbursements to Belize, we find 16 donor countries. Many sectors do not receive any attention at all.

Figure 7. Fragmentation, Belize, 2007, disbursement data

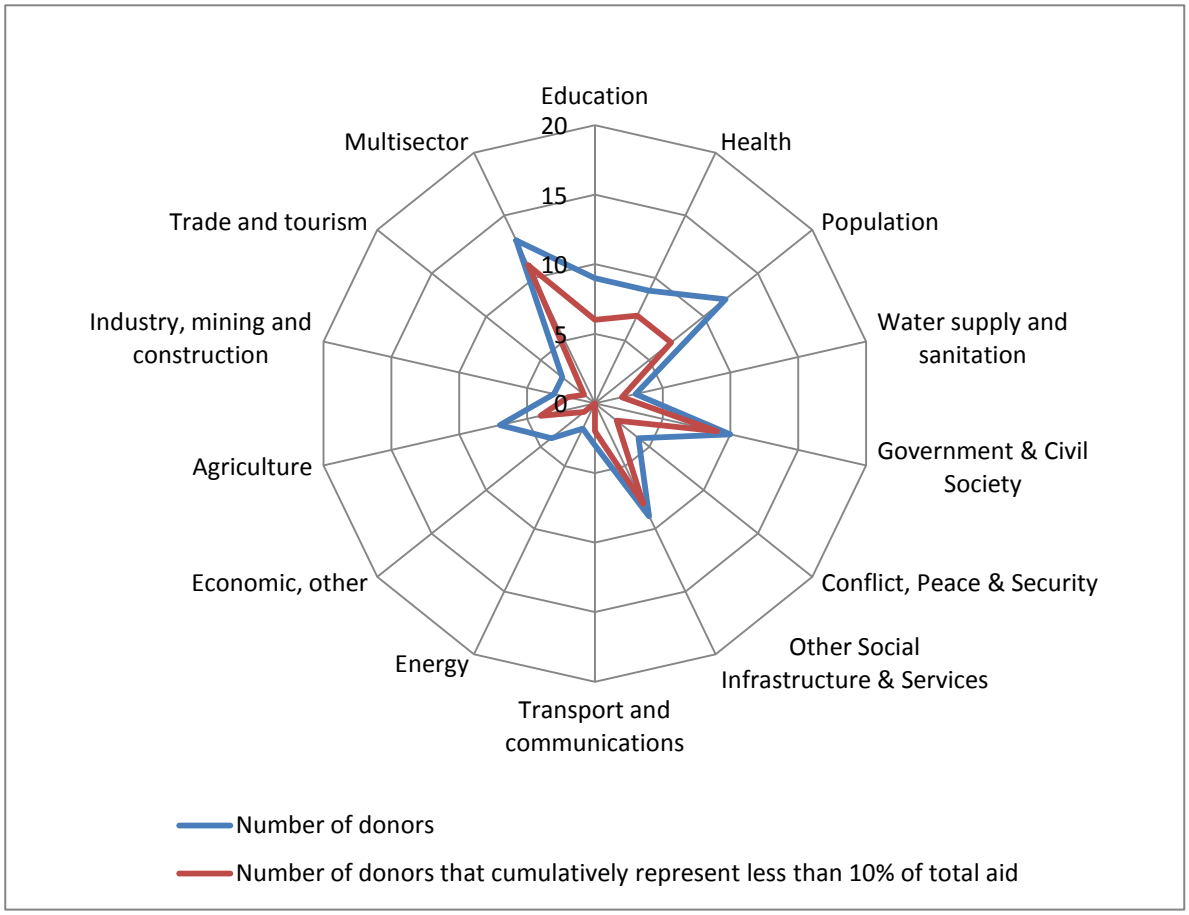


Source: Authors calculations, 2009, based on OECD DAC data, 2009.

We use Papua New Guinea as a final example. According to Table 8, Australia enjoys a monopoly in the country. The characteristic of Papua New Guinea is that the two lines are often

very close, especially in sectors with many donors. Australia is the dominant donor in most sectors and sometimes even represents more than 90% of total aid (for instance in the Government & Civil Society sector, Australian aid is USD 92 million and total aid to the sector is USD 99 million; the second biggest donor in the sector, New Zealand, disburses USD 3.3 million).

Figure 8. Fragmentation, Papua New Guinea, 2007, disbursement data



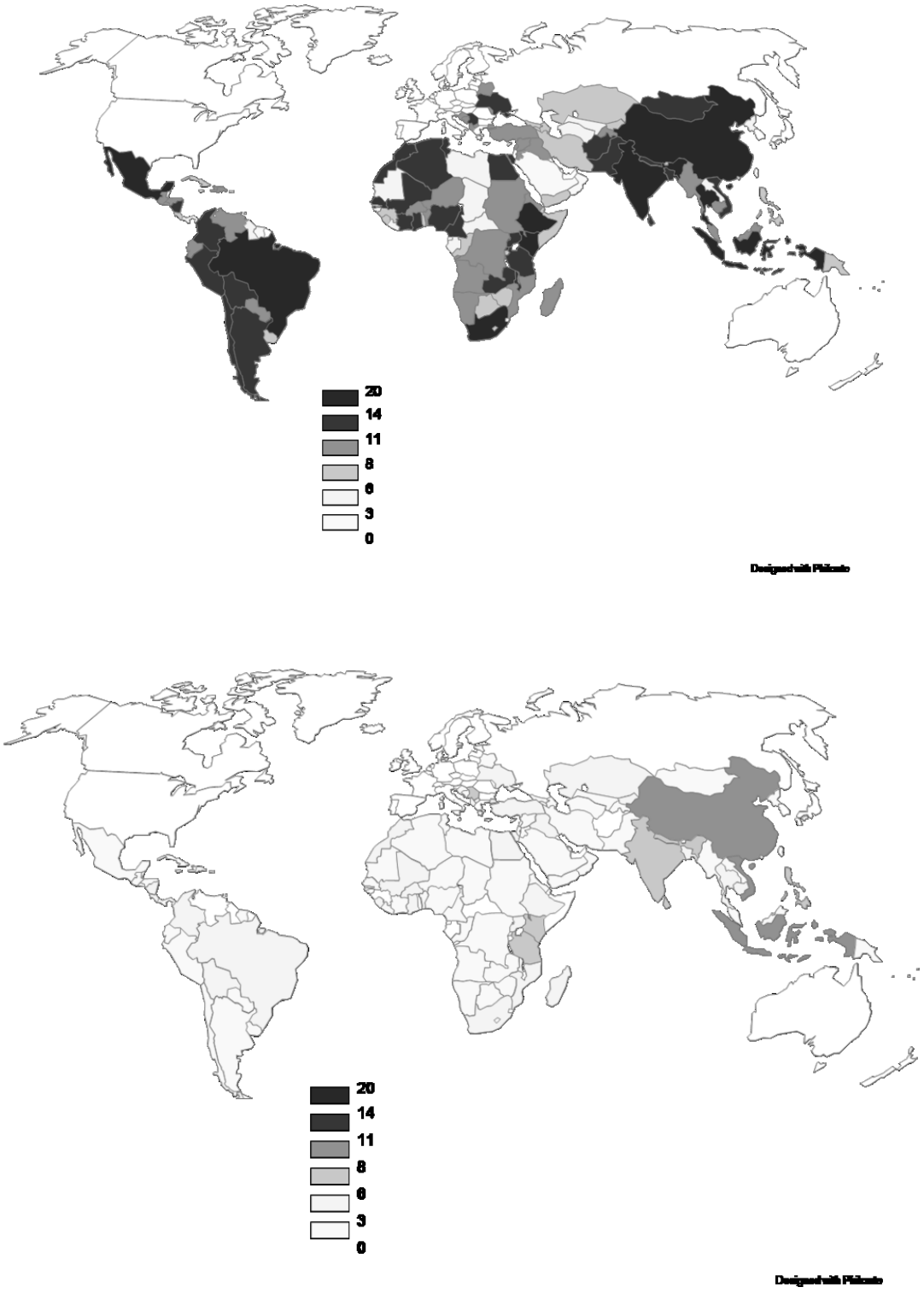
Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Radar plots offer a simple approach to visualise the multi-dimensionality of fragmentation within a recipient. They provide a quick and easy way to compare sectors in a country, sectors across countries, or countries defined by their whole set of sectors.

5. A world map of fragmentation

Finally, we present maps of fragmentation in the education and energy sectors, using the number of donors that collectively represent less than 10% of total aid as an indicator of fragmentation. The same colours are used on both maps. The darker the colour, the higher the fragmentation. Fragmentation in the education sector is severe in many countries, but never in the energy sector.

Figure 9. Recipient fragmentation in the education (top) and energy (bottom) sectors, 2007, disbursement data



Source: Authors calculations, 2009, based on OECD DAC data, 2009.

V. RECIPIENTS' CHARACTERISTICS

Even though the literature on fragmentation is rapidly expanding, relatively little is known about what, on average, is correlated with fragmentation. Is it, for instance, that poor countries suffer more from fragmentation? In this section we give a first answer to this type of question by examining which country characteristics are correlated with fragmentation. We specifically test the influence of three variables: GDP per capita, population and democracy.

Using OLS regressions including sector and year fixed effects, we check the influence of these variables on the recipient fragmentation measure (number of donors representing collectively less than 10% of total aid).

GDP per capita, in thousands of 2000 constant USD, and population data, in millions, come from the World Development Indicators. Democracy level is proxied by the polity2 variable of the Polity IV dataset. We must underline that in using these simple regressions, we do not claim to find any causality effect. We are simply measuring correlations to understand which countries have the most fragmented aid. The basic specification is the following:

$$f_{ist} = \alpha GDP_{it} + \beta POP_{it} + \gamma POLITY2_{it} + \delta_t + \mu_s + \epsilon_{ist}$$

where f_{ist} is fragmentation in sector s of country i in year t, GDP_{it} is country i income per capita in year t, POP_{it} is its population, $POLITY2_{it}$ is its democracy score, δ_t is a year fixed effect, μ_s is a sector fixed effect, and ε_{ist} is an error term.

We first use all available years and simply include the three variables. Column (1) shows the results. Rich countries receive less fragmented sector aid, while large and democratic countries receive more fragmented sector aid. In column (2) we interact the polity2 variable with sector dummies to evaluate the effect of democracy in each separate sector. The interaction term is positive and significant in most sectors. It reaches a maximum in the government and civil society sector, suggesting that donors tend to herd towards more democratic countries in this sector, where institutions may have a more direct effect than in other sectors. Programme assistance is actually less fragmented in more democratic countries, which may come as a surprise.

The fragmentation measure depends on the number of donors present in the country. Its lower bound is 0 if between 1 and 9 donors disburse aid to the sector, 1 if there are between 10 and 19, 2 between 20 and 29, and so on. Given this automatic relationship between fragmentation and number of donors, we include the latter in columns (3) and (4). We now find no effect of democracy on fragmentation, and a positive effect of GDP.

How shall we interpret these results? Columns (1) and (2) show that if we compare two countries, then the most democratic of the two has, on average, more fragmented aid. Columns (3) and (4) show that this is actually due to the fact that the most democratic country attracts more donors: if we compare two countries with the same number of donors, then regardless of their democracy scores, their fragmentation levels are identical.

The positive effect of GDP in columns (3) and (4) show that if we compare two countries with the same number of donors, then the richest one has a higher fragmentation measure. The interpretation here is that rich countries attract fewer donors, so that on average their aid is less

fragmented, but that, for a given number of donors, they actually are more fragmented than poorer countries.

Table 9. Country-sector fragmentation determinants

	All years				After 2003			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	-0.15***	-0.18***	0.025***	0.023***	-0.25***	-0.30***	0.037***	0.031**
	(0.032)	(0.034)	(0.0057)	(0.0057)	(0.049)	(0.055)	(0.012)	(0.012)
Population	0.0028***	0.0029***	0.00049***	0.00049***	0.0052***	0.0053***	0.0010***	0.0011***
	(0.00034)	(0.00033)	(0.000098)	(0.00010)	(0.00061)	(0.00063)	(0.00017)	(0.00018)
Democracy	0.033***		0.00095		0.074***		0.0010	
	(0.010)		(0.0026)		(0.019)		(0.0053)	
Number of donors			0.62***	0.62***			0.64***	0.63***
			(0.0090)	(0.010)			(0.0089)	(0.012)
Democracy interacted with:								
Education		0.068***		0.0054		0.091**		-0.0021
		(0.016)		(0.0081)		(0.036)		(0.021)
Health		0.047***		0.0049		0.060*		0.0067
		(0.016)		(0.0049)		(0.033)		(0.010)
Population		0.040*		0.0033		0.077**		0.015
		(0.021)		(0.0066)		(0.038)		(0.013)
Water supply and sanitation		0.010		0.00019		0.027		-0.015
		(0.014)		(0.0040)		(0.028)		(0.011)
Government & Civil Society		0.087***		0.0039		0.15***		0.018
		(0.017)		(0.0070)		(0.035)		(0.017)
Conflict, Peace & Security		0.024		0.0024		0.054		0.0053
		(0.025)		(0.0083)		(0.037)		(0.011)
Other Social Infrastructure & Services		0.085***		0.0042		0.15***		0.022
		(0.017)		(0.0071)		(0.034)		(0.015)
Transport and communications		0.016		0.0080**		0.054**		0.0051
		(0.012)		(0.0040)		(0.024)		(0.010)
Energy		-0.0059		-0.00058		0.046**		0.0012
		(0.013)		(0.0034)		(0.021)		(0.0096)
Economic, other		0.034**		-0.0017		0.074***		-0.0034
		(0.015)		(0.0043)		(0.025)		(0.0092)
Agriculture		0.052***		-0.00063		0.10***		-0.0035
		(0.013)		(0.0047)		(0.030)		(0.011)

Industry, mining and construction		0.020		-.000090		0.068***		-0.0082
		(0.013)		(0.0037)		(0.022)		(0.0080)
Trade and tourism		0.014		-0.0076		0.053**		-0.012
		(0.016)		(0.0049)		(0.022)		(0.0090)
Multisector		0.076***		-0.0031		0.12***		0.0100
		(0.015)		(0.0046)		(0.033)		(0.013)
Programme Assistance		-0.048***		-0.0067*		0.038		-0.0099
		(0.018)		(0.0039)		(0.048)		(0.014)
Observations	23772	23772	23772	23772	7692	7692	7692	7692
R^2	0.387	0.528	0.910	0.912	0.129	0.511	0.890	0.897

Notes: Standard errors clustered at the country level in parentheses. Sector and year fixed effects included in all the regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors calculations, 2009, based on OECD DAC data, 2009.

Early years often contain patchy data and their reliability is questionable. For this reason in columns (5) to (8) we repeat the same estimations but using only the last five years of the dataset, from 2003 to 2007.

Results are quite similar, with usually larger coefficients. Despite statistical significance for most variables, effects are relatively limited. GDP per capita is expressed in thousands of dollars, so even a large change in income hardly affects fragmentation (the standard deviation of GDP in the sample is 2.08, its mean is 1.6). The same is true for population, expressed in millions, and with a mean of 50 and a standard deviation of 167. The effect of democracy is also small: a one standard deviation change of 6.4 increases fragmentation by 0.2 (using column (1) estimates). The standard deviation of fragmentation in the sample is 2.8. For all these variables, large changes do not really have important consequences on fragmentation. Finally, one more additional donor increases fragmentation by 0.6, on average. So for three additional donors, two go to the group of "small" donors (that represents less than 10% of total aid).

The same result was found by Frot and Santiso (2008) using country data instead of sector data, and so it seems to be quite general. It implies that an increase in the number of donors quickly creates fragmentation. In this regard, the quick expansion in the number of aid donors and the expansion of their portfolios directly feeds into fragmentation.

VI. CONCLUSIONS

In documenting aid fragmentation at the sector level, this paper complements earlier studies that either stayed at the country level or were limited to a few sectors. The paper's first contribution is in the use of sector data for all DAC donors, sectors and years, with a view to providing as complete a picture as possible, given data limitation. Second, it emphasises that many sectors receive very little attention and that this creates "aid monopolies". An index has been created that identifies critical cases. It is a first contribution to quantifying this problem. Third, the paper provides an estimation of the country determinants of fragmentation.

It is found that sector decomposition proves useful in understanding where coordination efforts among donors are needed, with education and government sectors being conspicuous candidates. It is also argued that results can be quite different when one aggregates aid across all sectors or keeps them separated. The shift in aid priorities documented in this paper may well have been justified, but it may also have been excessive, particularly regarding agriculture. Neglected sectors today attract new donors that are happy to compensate for the lack of funds from more traditional Western donors. This is good news if these sectors were indeed cash-starved but it will also add to an already overcrowded aid environment. Unfortunately we can say nothing about this using current available data. If, first all OECD countries, and second "new" donors, were to provide accurate sector data, we would have a much more complete picture of fragmentation. A first policy recommendation would therefore be to invite these countries to do so, and to join the DAC donors in their effort to tackle fragmentation.

Fragmentation is a many-faceted issue. Some countries and sectors suffer from very fragmented aid allocations but, at the same time, some experience the opposite situation. And within countries, sectors are treated differentially. A country aid allocation may not appear overall as being particularly fragmented when in fact, some sectors are overwhelmed by projects and others are dominated by one or two donors. This complex pattern calls for a careful approach to fragmentation that takes into account the particularities of each case. The diagnosis of the problem might be the easiest part of the issue. Solving it or helping to solve it is a very different story. The discrepancies across sectors already suggest a more coordinated approach in the donor community to designing a better labour division, with donors focusing on their key partnerships and leaving those where they have little interest. This reform, already described by Frot (2009) at the country level, can be replicated with country-sectors. He showed that a reform that would leave aid budgets and receipts unchanged, but that would reshuffle around 20% of current disbursements, would dramatically reduce fragmentation. Aid fragmentation relies on an actually small number of underfunded partnerships and this paper has confirmed that it was also the case at the sector level. As a consequence, even limited action could have an important impact on fragmentation. The measures developed in this paper will help to design further policy recommendations in future research. By combining cross-country and in-country division of labour we can start drawing the contours of a more efficient aid allocation, keeping constant aid quantities and getting donors to focus on their most important partnerships.

However, such a reform keeps aid quantities constant for each recipient and reduces the number of donors in every country. This approach is usually the one advocated in fragmentation-reducing policy papers, such as OECD DAC (2009). Our results emphasised that

too little fragmentation, or rather too little competition, may also be an issue in many countries. There is a real tension between reducing fragmentation and avoiding the creation of aid monopolies. As Rogerson and Steensen (2009b) similarly argued, the pressure on donors to focus on fewer countries runs the risk of creating new aid orphans. But in addition to this issue, we stress here that the fall in competition may not be beneficial everywhere. The Paris Declaration and the Accra Agenda for Action strive to define a set of recommendations to make aid more efficient but could be complemented by a debate about the "right" level of fragmentation that would avoid monopolies and excessive superimposition of donors.

The OECD/DAC Working Party on Aid Effectiveness is following progress on a set of key tasks defined by the Accra Agenda for Action. It has a critical role in monitoring donors' commitments to improve aid efficiency. It recognises that dealing with division of labour and fragmentation also involves focusing on countries receiving insufficient aid. As shown in this paper, in addition to insufficient aid, too little competition is another aspect of the problem that should enter any discussion on fragmentation. Future work will shed more light on this topic.

APPENDIX

Definition of an aid project

The CRS database attributes an identification number to each aid activity (variable crsid in the dataset). This number alone almost perfectly identifies different aid activities. Though it is not usually the case, two different projects from two different donors may have the same identification number. On the other hand, two different projects from the same donor never have the same identification number[11]. Thanks to this, we are able to count the number of projects by first counting projects for each donor and then adding these numbers across donors. Finally, some projects are reported in the dataset but with a transfer of 0 dollars. These are not counted as active projects. If these should actually be counted, then our results underestimate the real number of projects.

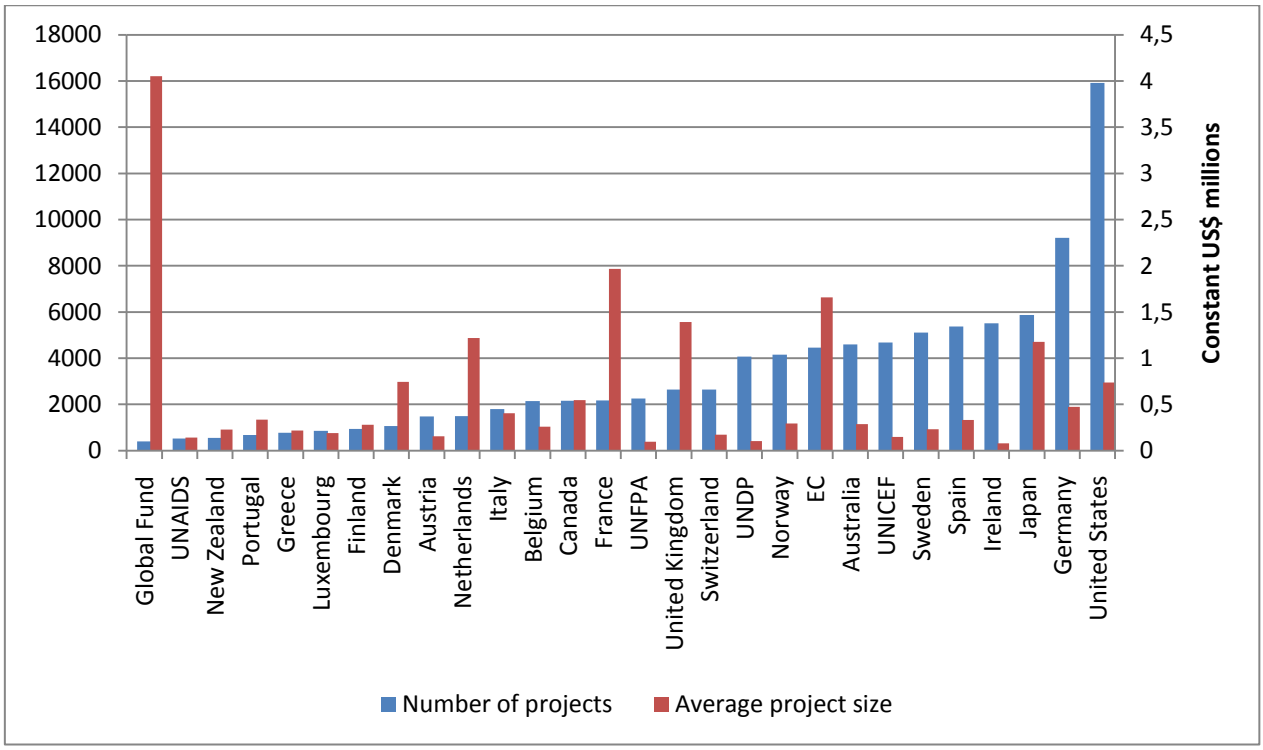
Complement to Table 1, with both measures of donor fragmentation

The "above global share" column replicates Table 1. The "top donors" column defines a partnership to be significant if the donor is in the group of donors that collectively disburse 90 %of the total aid to the recipient. Note that both measures are very highly correlated. Remember that a more stringent definition requiring both criteria to be satisfied in order for a partnership to be classified as significant would be almost equivalent to picking up the lowest fragmentation figure of the two proposed here.

11 This is almost always true. It sometimes happens that two activities from the same donor receive the same number. However these are usually closely related, by being in the same sector for instance. If anything, these cases lead us to underestimate the total number of projects.

	Fraction of significant partnerships		Fraction of aid that goes to significant recipients	
	Above global share	Top donors	Above global share	Top donors
Social sectors				
Education	45	34	89	76
Health	51	42	88	78
Population	61	33	86	59
Water supply and sanitation	62	41	94	75
Government & Civil Society	47	38	86	77
Conflict, Peace & Security	61	48	88	75
Other Social Infrastructure & Services	53	34	90	73
Economic sectors				
Transport and communications	61	35	96	76
Energy	73	46	95	77
Economic, other	72	48	95	71
Production sectors				
Agriculture	57	43	90	76
Industry, mining and	68	46	96	77
Trade and tourism	79	48	97	73
Multisector	47	39	87	78
Programme Assistance	88	65	97	72

Number of aid projects and average project size in 2007



Large donors run the largest number of projects but some, like France and the United Kingdom, despite disbursing large aid quantities, have fewer partnerships than many smaller donors.

Number of projects in each country, 2007, disbursement data

Country	Number of aid projects	Country	Number of aid projects
Afghanistan	1257	Malaysia	258
Albania	978	Maldives	104
Algeria	349	Mali	1006
Angola	665	Marshall Islands	44
Anguilla	9	Mauritania	364
Antigua and Barbuda	20	Mauritius	95
Argentina	654	Mayotte	28
Armenia	541	Mexico	735
Azerbaijan	375	Micronesia, Fed. States	64
Bangladesh	1117	Moldova	539
Barbados	35	Mongolia	488

Belarus	336	Montenegro	299
Belize	77	Montserrat	49
Benin	652	Morocco	995
Bhutan	255	Mozambique	2409
Bolivia	1468	Myanmar	395
Bosnia-Herzegovina	1192	Namibia	505
Botswana	237	Nauru	80
Brazil	1464	Nepal	1062
Burkina Faso	851	Nicaragua	1230
Burundi	501	Niger	595
Cambodia	1106	Nigeria	969
Cameroon	522	Niue	46
Cape Verde	327	Oman	42
Central African Rep.	208	Pakistan	955
Chad	339	Palau	44
Chile	443	Palestinian Adm. Areas	1187
China	2106	Panama	266
Colombia	1096	Papua New Guinea	949
Comoros	111	Paraguay	439
Congo, Dem. Rep.	1188	Peru	1483
Congo, Rep.	222	Philippines	1430
Cook Islands	58	Rwanda	816
Costa Rica	303	Samoa	212
Cote d'Ivoire	330	Sao Tome & Principe	194
Croatia	421	Saudi Arabia	58
Cuba	415	Senegal	928
Djibouti	133	Serbia	1396
Dominica	37	Seychelles	34
Dominican Republic	521	Sierra Leone	410
Ecuador	907	Solomon Islands	431
Egypt	952	Somalia	340
El Salvador	715	South Africa	1403
Equatorial Guinea	118	Sri Lanka	885
Eritrea	256	St. Helena	55
Ethiopia	1840	St. Kitts-Nevis	11
Fiji	296	St. Lucia	44
Gabon	156	St.Vincent & Grenadines	27
Gambia	222	States Ex-Yugoslavia	146
Georgia	613	Sudan	977
Ghana	882	Suriname	87
Grenada	19	Swaziland	173
Guatemala	1122	Syria	363

Guinea	382	Tajikistan	456
Guinea-Bissau	282	Tanzania	1601
Guyana	197	Thailand	600
Haiti	688	Timor-Leste	719
Honduras	737	Togo	328
India	2122	Tokelau	13
Indonesia	2039	Tonga	179
Iran	225	Trinidad and Tobago	77
Iraq	4162	Tunisia	444
Jamaica	271	Turkey	464
Jordan	500	Turkmenistan	167
Kazakhstan	512	Turks and Caicos Islands	9
Kenya	1537	Tuvalu	50
Kiribati	141	Uganda	2110
Korea, Dem. Rep.	129	Ukraine	1007
Kyrgyz Republic	562	Uruguay	287
Laos	708	Uzbekistan	437
Lebanon	511	Vanuatu	306
Lesotho	265	Venezuela	381
Liberia	480	Viet Nam	1763
Libya	60	Wallis & Futuna	21
Macedonia, FYR	613	Yemen	486
Madagascar	583	Zambia	2105
Malawi	848	Zimbabwe	756

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