What Determines the Size of Aid Projects?

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Abstract:

Over the last few years, considerable attention has focused on aid fragmentation, the proliferation of donors and projects in developing countries. Aid fragmentation has continued to increase despite international efforts to foster donor coordination. One possible implication of fragmentation is smaller aid projects, potentially with the result of more administrative work for overtaxed recipient governments per dollar of aid received. In principle, project size can be a function of donor characteristics, recipient characteristics, donor-recipient relations, and the type of projects funded.

This paper makes use of PLAID data on bilateral aid commitments, sector, and funding agency to explore the determinants of project size and to better understand the forces driving aid fragmentation. To the extent that project size is driven by the sectoral composition or purpose of aid, the associated administrative costs may be justified. Variations due to other factors, e.g., a donor's administrative structure or bureaucratic interests, provide a stronger case for reforms.

I.   Introduction

In the past five years, considerable attention has focused on aid fragmentation. With the Millennium Development Goals (MDGs) calling for substantial increases in aid flows, scholars and practitioners have pondered what impact such increases would have. How might increased aid volumes be structured to avoid exceeding the absorption capacity of recipient country governments, to maintain or enhance the development impact of aid? The more fragmented is the delivery of aid – between many donor agencies each with their own country missions, idiosyncratic reporting standards, and schedules – the greater the administrative demands on recipient governments in developing countries. Inevitably, this diversion of resources reduces the value of aid.

The existing work on aid fragmentation focuses on three primary dimensions: donor, recipient, and sector. Donor aid fragmentation refers to the division of a given donor's aid budget across many different recipients. Recipient aid fragmentation measures the degree to which a given country's aid receipts are fragmented across many different donors. Sectoral fragmentation can be examined at the donor level or at the country level.

Each dimension provides a different vantage point from which to assess problems associated with fragmentation. Donor fragmentation (across recipients or sectors) is the proximate source of these problems. Recipient fragmentation (across donors or sectors) is the symptom and provides a measure of the extent of the problem. Recipients that have to deal with many donors face high administrative costs adapting to the different standards and timetables of their various donors. Fragmentation that extends to the sectoral level suggests additional problems with donor coordination. Thus, the costs of fragmentation are likely tied to the extent and depth of fragmentation.

Administrative inefficiencies are greater still if fragmentation extends to the project level.

Do the same forces that drive donors to spread their aid across many recipients and sectors also result in smaller projects? Greater donor fragmentation is likely to lead to smaller individual donor budgets within each recipient country and this may naturally lead to smaller individual projects. But do the factors driving donor fragmentation extend beyond this so that, even controlling for the donor budget within the country, projects are smaller when the donor's fragmentation is higher?

There are many possible reasons donors fragment their aid. Those discussed in the literature include geopolitics, domestic politics, and herding (Acharya *et al*., 2006; Frot and Santiso, 2009a,b). Another as yet unexplored reason is the pursuit of bureaucratic and personal interests, consistent with a public choice approach. Donor agencies and their staff may benefit – in terms of budget, status or professional perks – from having a more global portfolio of projects. These factors will also be linked with reduced project size and its associated inefficiencies. Such bureaucratic competition is best measured with a new "agency fragmentation" variable, the fragmentation of a donor's aid across its various implementing agencies.

This paper explores links between aid fragmentation and project size using PLAID 1.9.1 data on 22 bilateral aid donors from 1973 to 2008. The unit of analysis is the individual project, a disaggregated design that allows one to control for a wide variety of factors including donor, recipient and sectoral fixed effects. Estimations include measures of the donor's overall country budget (excluding the project in question) and fragmentation. This approach can explore whether the forces driving fragmentation extend to the project level and sheds some light on the underlying factors driving aid fragmentation.

The analysis demonstrates that project size is negatively related to bilateral donor fragmentation but not to recipient fragmentation, *ceteris paribus*. Controlling for the donor's other

spending in the country, higher donor fragmentation is linked to smaller projects. Specifically, a donor's projects are smaller when the donor's administrative structure is more fragmented, i.e., when the donor's overall aid budget is more fragmented across its various funding agencies. There is evidence of a "tourist destination effect," supporting a public choice interpretation of donor agency behavior.

These effects of donor fragmentation on project size indicate that the costs of proliferation extend to the project level and that they are donor-driven. This underscores the magnitude of the problem and role fragmentation plays in reducing aid effectiveness. Using the available data to determine the optimal project size for promoting development is not straightforward but that optimal size is clearly not a function of donor political or bureaucratic interests.

Section II reviews the existing work on aid fragmentation and project size. Section III introduces the notation used to structure this analysis and describes the data. Section IV presents estimation results. Section V concludes.

II.   Literature Review

The literature on aid fragmentation examines three distinct issues: measurement, impact, and causes. There are a number of different dimensions along which to measure fragmentation. Measurements of donor fragmentation reflect how widely the donor spreads its aid budget. Acharya *et al*. (2006) draw on the income inequality literature for the Theil Index while others (e.g., Easterly and Pfutze, 2008) use a market concentration measure from the industrial organization literature, the Herfindahl-Hirschmann Index (HHI). These are constructed using data on aid flows from a single donor to all of its recipients. To a large extent, this dimension of fragmentation is viewed as a

measure of the *source* of the fragmentation problem. Measurements of recipient fragmentation

reflect the diversity of sources of aid receipts.   Most are based on the HHI constructed using data

for aid flows from all donors to a single recipient. The recipient level measure is viewed *as* the

problem of fragmentation. The data suggest that both types of fragmentation have increased over

time despite several international attempts to combat the issue (Frot and Santiso, 2008).

The OECD DAC and some other scholars (Frot, 2009; Frot and Santiso, 2009a) use a

somewhat different measure of fragmentation. Donor i is classified as a significant donor for

recipient j if donor i's share of country j's total aid receipts is greater than donor i's share of world

aid receipts. The donor's degree of fragmentation is then the proportion of its aid partners in which

it is an insignificant donor.

Another important measurement issue arises from limitations of existing data sources

(including PLAID), i.e., determining which financial flows correspond to projects. Acharya *et al*.

(2006) suggest focusing on "significant aid events" (defined as cases where the individual aid flow

exceeds $500,000) to avoid counting transfers not linked to actual projects. The authors note that

"a substantial proportion of all aid events take the form of small grants, notably for travel and

education scholarships, or for in-country events financed directly from the donor's embassy. It seems

likely that these kinds of activities typically do not generate the kinds of transactions costs with

which we are concerned" (pp. 8-9). The discussion in Easterly and Pfutze (2008, p. 41) illustrates

a range of these small transfers, concluding that "when aid is this small, it's hard to believe it even

covers the fixed costs of granting and receiving it, much less any operating costs of actually helping

people." These different interpretations present a non-trivial issue for empirical work. For example

in the PLAID 1.9.1 data covering the 23 OECD bilateral donors, there are 653,368 separate aid

events listed, including 490,637 insignificant ones (averaging under $100,000) and 162,731 significant ones (averaging $10 million). In this work, I follow Acharya *et al*. (2006) in examining only significant aid events where commitments exceed $500,000 in constant 2000 U.S. dollars.[1]

The second strand of the literature assesses the impact of fragmentation. Problems caused by fragmentation have long been noted by practitioners (Morss, 1984; Easterly and Pfutze, 2008) and frequently featured in official publications (OECD, 2008, 2009a, 2009b; World Bank, 2003). Acharya *et al*. (2006) provide a concise catalogue of potential problems arising from fragmentation, some of which have been explored empirically.

Knack and Rahman (2007) explore a link between recipient fragmentation and bureaucratic quality in countries with a limited pool of skilled bureaucrats. They argue that skilled government bureaucrats provide important public goods that, among other effects, improve the development impact of all aid projects in the country. If a donor poaches these people away from the government to work directly on one of the donor's aid projects, the performance of that project will improve (in spite of the drop in the overall level of public goods). Because this reduction in public goods impacts all actors in the economy, the donor does not bear the full cost of its actions and there is the potential of a negative externality.[2] For a small donor with few aid projects in the country, the direct benefits of poaching (for individual projects) outweigh the indirect costs (across the donor's portfolio of projects). For large donors with many aid projects in the country, the reverse is true. Thus,

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[1]Many sums are so small that it is nearly inconceivable that they reflect actual development projects. Again looking just at DAC bilateral donors, over 100,000 entries are for less than $10,000, over 15,000 for less than $1,000 and over 2500 for less than $100.

[2]This argument assumes the government employee is not paid her marginal product, a reasonable assumption in the case of a public good.

greater recipient fragmentation (for a given amount of aid) means more small donors that poach qualified government employees rather than large donors that resist poaching. This links fragmentation of aid in a recipient country and reduced government bureaucratic quality. Knack and Rahman's empirical work verifies the posited link between high recipient fragmentation and declining bureaucratic quality, particularly in aid dependent countries where poaching is more likely to matter.

Two studies examine the link between fragmentation and the impact of aid on growth (Djankov *et al*., 2009; Kimura *et al*., 2007). Both use cross country growth regressions and find that too much fragmentation reduces the development effectiveness of aid.

The third – much less explored – direction in the literature seeks to explain why aid gets fragmented. Acharya *et al*. (2006) suggest that the "one country, one vote" system in the UN General Assembly makes it cheaper to buy influence through aid to small countries, giving donors a reason to run small aid programs in a wide range of small countries. Frot and Santiso (2009a) note that donors are attracted to poorer, more democratic countries, possibly for altruistic reasons, possibly to garner support for aid at home. The net effect of many donors in a given country, for whatever reason, is increased fragmentation of aid. Frot (2009) finds that "early aid partners" (those countries that received aid from a donor at the earliest opportunity) continue to get a substantial share of the donor's funds while "late aid partners" get a small share.[3] In other words, donors typically expand their distribution of aid by initiating smaller programs in additional countries. Using the DAC

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[3]The "first opportunity" is either at the start of the DAC data set (1960), the year the donor country became an aid donor, or the year the recipient country gained its independence.

measure of fragmentation, this increases aid fragmentation for both donors and recipients.[4] Frot and Santiso (2009b) find evidence of herding among donors, a behavior that can contribute to fragmentation in "aid darlings." They do not find clear determinants of herding, an outcome that is "what we would expect if donors did not herd 'rationally' and [instead] followed what others did in an informational cascade fashion with no clear rationale" (Frot and Santiso, 2009b, 26).

Roodman (2006a, 2006b) straddles the "impact" and "causes" categories, developing a model in which recipient fragmentation leads to smaller projects (i.e., project fragmentation). Roodman (2006a) sets out a model with an exogenously given donor menu of projects of various sizes (aid amounts). "Production" requires input of complementary recipient resources so the recipient government effectively decides which projects to implement through the allocation of its own resources. The recipient has dual objectives, development impact and "throughput" (a catch-all for any private benefits accruing to decision makers). In addition, for each project the recipient faces fixed administrative costs. The result is that an increase in aid (project proliferation) can drive the recipient to select smaller projects.

Roodman (2006b) extends the model in two ways. First, more recipient "oversight" raises a project's development impact but oversight requirements increase less than proportionately with project size. Given the costs of oversight, this leads to an optimal project size. Comparative statics based on this indicate that "projects should be larger in countries that a) are better governed, b) have less administrative capacity in absolute terms, or c) receive more aid—all else equal" (Roodman, 2006b, 3). However, if donors care disproportionately about their own projects, competition

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[4]Using an HHI measure, this approach increases fragmentation less than the alternative of equal division among all recipients.

between donors will link greater recipient fragmentation to smaller projects.

III.   Notation and Data

The analysis of project size in this paper uses a range of fragmentation measures, all based on HHI of aid concentration. In addition to the standard donor, recipient, and sector fragmentation variables, I introduce "agency fragmentation." These measures are conceptually simple but difficult to describe succinctly so this section develops the necessary notation for precise definitions then proceeds to describe the data.

Throughout this section, c stands for commitments while different subscripts on c indicate different aggregations of commitments. To index donors, I use $i = 1,...,n$; for recipients, $j = 1,...,m$. Projects are indexed by $k = 1,...,K$, donor funding agencies by $a = 1,...,A$, sectors by $s = 1,...,S$, and years by $t = 1,...,T$.

The measures of fragmentation are of the basic form $(1-\text{HHI})$ where the HHI is defined differently for each measure. Using the notation above, the fragmentation of donor i's aid budget across its recipients in year t is

$$Donor\ Fragmentation_{it} = 1 - \sum_{j=1}^{m} \left(\frac{c_{ijt}}{\sum_{j=1}^{m} c_{ijt}} \right)^2 \tag{1}$$

where c_{ijt} is the total commitment amount from donor i to recipient j in year t (across all sectors and funding agencies). Similarly, the fragmentation of donor i's aid budget across its various bilateral funding agencies in year t is

$$Agency\ Fragmentation_{it} = 1 - \sum_{a=1}^{A} \left(\frac{c_{iat}}{\sum_{a=1}^{A} c_{iat}} \right)^2 \qquad (2)$$

where c_{iat} is the total commitment amount from donor i's funding agency a in year t (across all

recipients and sectors). Fragmentation of donor i's aid budget across sectors in year t is

$$Sector\ Fragmentation_{it} = 1 - \sum_{s=1}^{S} \left(\frac{c_{ist}}{\sum_{a=1}^{S} c_{ist}} \right)^2 \qquad (3)$$

where c_{ist} is the total commitment amount from donor i to projects in sector s in year t (across all

funding agencies and recipients).

Turning to recipient measures, fragmentation of recipient j's aid receipts across donors in year

t is

$$Recipient\ Fragmentation_{jt} = 1 - \sum_{i=1}^{n} \left(\frac{c_{ijt}}{\sum_{i=1}^{n} c_{ijt}} \right)^2 \qquad (4)$$

where c_{ijt} is as in (1). Finally, fragmentation of recipient j's aid receipts across sectors in year t is

$$Recipient\text{-}Sector\ Fragmentation_{jt} = 1 - \sum_{s=1}^{S} \left(\frac{c_{jst}}{\sum_{s=1}^{S} c_{jst}} \right)^2 \qquad (5)$$

where c_{jst} is the total commitment amount to projects in recipient j in sector s in year t (across all

donors and agencies).

The data use in this analysis are described in Table 1. Variables include measures

constructed from the project-level aid commitments of 22 DAC bilateral donors (PLAID 1.9.1 data)

and characteristics of recipient countries.[5] The unit of observation is the project, where I follow

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[5]My original data extract included 23 donors but missing data in one field eliminates Korea
entirely.

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Acharya *et al*. (2006) in defining a project as a significant aid event, i.e., an entry in the PLAID data set with a commitment amount greater than $500,000 in constant year 2000 U.S. dollars. After imposing this condition, the sample is determined by data availability. PLAID 1.9.1 data on DAC bilateral donors run from 1973 to 2008 and include 162,731 project observations. For 5,492 projects (including all 335 observations for Korea), no data exist on the concessionality of funding (*Grant Element*). Missing data for country characteristics further reduce the sample by 13,680 projects across a range of countries and years. An additional 8,973 observations drop because the donor funded only one project in the country that year.[6] The resulting estimation sample includes 134,586 projects funded by 22 donors in 156 recipient countries.

Table 1 lists descriptive statistics for this sample. *Project Size* (the dependent variable) is defined as the log of the commitment amount, measured in constant year 2000 dollars and is drawn from the PLAID database. *Project Size* averages 14.72 (about $2.5 million) and ranges from 13.2 (just above the $500,000 cutoff) to 22.67 ($7 billion – Germany aid to Poland in 1992). About thirty percent of the observations are for projects of less than $1 million and 43 observations are for projects of more than $1 billion.[7] *Donor Budget* is the log of the sum of the donor's commitments to the recipient country in that year. This budget sum is calculated without the amount for the project at hand to avoid endogeneity and therefore equals zero when the donor funds only one project in the

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[6]This represents about 10 recipients per donor per year where the donor funds only one project. These observations drop due to log of zero. See the description of the donor budget variable below.

[7]The relatively low average project size reflects the impact of the log transformation. Directly using dollar amounts yields an average of $8.5 million. Given the number of small "significant aid events," it is possible this definition still includes some transfers that are not proper aid projects.

recipient country in the given year. These cases drop from the sample (log of zero). *Donor Budget* averages 17.36 ($35 million), running from 13.12 ($500,000 from Ireland to Rwanda in 2004) to 22.73 ($7.4 billion from the United States to Egypt in 1991). About 2.5% of the observations have *Donor Budget* values of less than 13.8 ($1 million) and a similar number have *Donor Budget* values greater than 20.7 ($1 billion).[8]

The five fragmentation measures described above have a theoretical maximum range from 0 to (N-1)/N where N is the number of categories considered (recipient countries, donor agencies, sectors or donors, depending on the measure). All five variables reach the minimum of 0 fragmentation. For example, fourteen projects in Mozambique funded by Portugal in the 1980s have zero *Donor Fragmentation* since Portugal's only aid recipient in those years was Mozambique. The average *Donor Fragmentation* across recipients is 0.92. The maximum *Donor Fragmentation* is 0.971 (U.S., 2002); 15 donors average over 0.9. The average *Agency Fragmentation* is 0.43, the maximum is 0.82 (France, 1973), 10 donors average over 0.35, and 3 donors average less than 0.05. The *Sector Fragmentation* is 0.83, the maximum is 0.93 (Switzerland, 2003), and 12 donors average above 0.85. The average *Recipient Fragmentation* is 0.67, the maximum is 0.92 (Mozambique, 2005), 3 recipients average over 0.85 while 2 always receive aid from only one donor (*Recipient Fragmentation*=0). Finally, the average *Recipient-Sector Fragmentation* is 0.77, the maximum is 0.93 (Nicaragua, 2008), 4 recipients average over 0.85 while 2 recipients average less than 0.1. Correlations between the various fragmentation measures are low (less than 0.1 in absolute value)

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[8]The average without the log transformation is $140 million. The 1991 value for U.S. aid to Egypt includes military debt forgiven by the U.S. following Egypt's support in the first Gulf War. At this time, Japan was emerging as the largest aid donor. In a related move, the OECD DAC temporarily changed its rules to allow write-offs of military aid loans to count toward individual donor's development assistance totals, mainly benefitting the U.S. (Raffer, 1998).

except between *Donor Fragmentation* and *Sector Fractionation* (ρ=0.48), *Sector Fragmentation* and

Agency Fragmentation (ρ=‒0.20), and *Recipient Fragmentation* and *Recipient-Sector*

Fragmentation (ρ=0.50).

The number of funding agencies (*# Funding Agencies*) of an individual donor ranges from

1 to 16 (U.S., 2005-2007); four other donors have at least 10 separate funding agencies at some

point. Grant Element measures the concessionality of aid as some flows take the form of low

interest, long maturity concessional loans rather than outright grants. That said, the average grant

element is high at 95.6 on a 0 to 100 scale; 89 percent of the projects are pure grants. Among the

projects financed via loans, the average grant element is 61 percent and only a relatively few cases

fall below the 25 percent concessionality normally needed to qualify as official development

assistance (ODA).

Table 1 also describes recipient country characteristics. These include population and a

purchasing power parity measure of GDP per capita. The Freedom House index (*Freedom House*)

is the simple average of the political rights and civil liberties indices; the index is inverted

(subtracted from 7) so that higher values indicate greater rights/liberties. The *Polity* variable ranges

from ‒10 (complete autocracy) to +10 (complete democracy). The dummy variable *War* indicates

a major conflict with more than 1000 conflict related deaths in that year. These are important control

variables since both *Project Size* and aid fragmentation may be correlated with them.

Appendix Table A1 describes the sectoral composition of the sample. Designations follow

the OECD sector/purpose codes at the two digit level except that a few closely related sectors are

combined (Emergency Assistance and Reconstruction combined with Emergency Relief; unspecified

sector combined with no sector reported). The result is a set of 27 sectors with an average of 5,000

observations per sector, ranging from 51 observations (Disaster Prevention) to over 14,000 observations (Civil /Public sector and Agriculture).

IV.   Estimation Results

All estimations include donor, recipient, sector and year dummies with the exception of Table 4 which excludes recipient dummies. The tables report recipient-clustered t-statistics (using the 155 recipient countries); results are generally similar with donor-clustered t-statistics. Table 2 presents two baseline specifications that omit the central fragmentation variables. Column 1 reports results for country characteristics alone. As one would expect in a regression including recipient country fixed effects, few characteristics emerge as significant. *Population* (in log terms) is weakly positively related to *Project Size* (also in log terms) with a one percent higher-than-normal *Population* corresponding to a 0.3 percent higher-than-normal *Project Size*.[9] Per capita income (in log terms) is negative related to *Project Size* with a one percent higher-than-normal income corresponding to a 0.2 percent lower-than-normal *Project Size*. There is no statistically significant association between the *Freedom House* index, the *Polity* score or the existence of a major conflict, on the one hand, and *Project Size* on the other in this fixed effects specification. In an estimation excluding recipient fixed effects, the association between *Population* and *Project Size* is more consistent (p<0.0005) but still small (0.1) while the *GDP per capita* link is no longer evident. The model including all fixed effects and country variables accounts for 25 percent of the variation in

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[9]This comparison with the norm (average value) for the country reflects the fixed effects specification.

Project Size.[10]

Column 2 adds three donor or project related variables. *Donor Budget* is the log of the sum of all the budgets for the donor's *other* projects in the same country and year. A one percent increase in that budget is associated with 0.1 percent higher budget for the current project. Thus, a big donor does big projects. As noted above, *Donor Budget* is a key control variable because the interesting questions about the link between fragmentation and project size are conditional on the donor's budget.

The second variable added is the number of funding agencies in the donor government that year (# *Funding Agencies*). This variable is global (i.e., includes agencies not operating in the country in question) and varies by donor and year. As one would expect from a bureaucratic model, this enters with a negative and significant coefficient. Evaluated at the mean, this indicates that going from the lowest value (1 agency) to the highest (16) is associated with a $1.5 million reduction in project size. However, the significance of this coefficient is driven entirely by the Food Aid sector; the estimated coefficient drops by half and is no longer significant if Food Aid projects are omitted. Other estimation results are comparable if # *Funding Agencies* is included when the sample contains Food Aid projects or if # *Funding Agencies* is omitted and Food Aid projects dropped. The results for fragmentation are effected if # *Funding Agencies* is omitted without dropping Food Aid

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[10]Some types of projects may scale more with country size, for example large infrastructure projects (in the Transportation and Energy sectors) and budget support. To allow for this, I interact sector dummies (excluding Education) with *Population*. Projects in a number of sectors do scale up more in larger countries (Population programs, Transportation, Communications, Energy, Finance, Budget Support, Food Aid, Import Support). I also allow income effects to vary by sector; there are significant differences in a few sectors (Agriculture, Industry, Debt Relief, and Administration). Interactions with *Polity* finds different effects for Other Social Sector, Food Aid, Import Support, and Debt Relief; for *Freedom House*, it is the Health and Other Social Sector categories. Results reported are robust to including these interaction terms.

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projects. In short, the number of funding agencies the donor has appears to control for differences in the role of fragmentation in the Food Aid sector relative to the role of fragmentation in other sectors.[11]

Finally, the grant element of a project is significantly related to *Project Size*, with more concessional financing linked to smaller projects. The relationship persists if we restrict the sample to ODA qualifying concessionality (*Grant Element* ≥ 25) or exclude pure grants, though the size of the effect is substantially reduced in the latter case.[12]

Table 3 adds the key fragmentation variables to the baseline specification from Table 2, Column 2. I introduce each fragmentation variable separately, in groups (donor v. recipient measures) and then simultaneously. The relatively low correlations between the various fragmentation measures suggests that results will be similar whether the variables are introduced individually or jointly. Looking across the eight columns of Table 3 confirms this.

The first variable introduced measures the fragmentation of the donor's aid budget across the recipient countries. *Donor Fragmentation* enters with a significant, negative coefficient across all three columns; including other fragmentation variables only reduces the magnitude of the estimated coefficient by 10 percent. The estimated coefficient indicates that *Project Size* decreases as the donor's aid budget becomes more fragmented across recipients. The estimated effect is non-trivial

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[11]Excluding *# Funding Agencies* but including Food Aid projects strengthens the coefficients for *Agency Fragmentation* and *Sector Fragmentation* but weakens the coefficient for *Donor Fragmentation*. I maintain the reported specification because those results (*inter alia*, the insignificance of *Sector Fragmentation*) are more robust across specifications. Either formulation supports the main results reported.

[12]As one would anticipate given the massive t-statistic on *Grant Element*, omitting this variable increases the economic and statistical significance of the estimated coefficients on the central fragmentation variables reported below.

for large changes in fragmentation. Assuming the lowest *Donor Fragmentation* (0) for an otherwise average project predicts a project size of $3,346,750. For the same project with *Donor Fragmentation* increased to the highest value in the sample (0.97), predicted project size falls to $2,352,525, a decrease of almost $1 million or 30%.

To understand what this result means in a regression context, it is important to consider the other included variables. One explanation for the link between a proliferation of recipients and smaller projects is purely mechanical. If the donor expands its reach to new countries without a proportionate increase in its overall aid budget, its per-country budget is reduced. A natural response to a diminished budget might be to shrink rather than cut projects. However, the estimated equation includes the donor's budget in the recipient country (*Donor Budget*) and thus already controls for this effect directly.[13] In short, the impact of fragmentation on *Project Size* measured here is not through the budget. The most apparent alternative interpretation is that fragmentation serves as a proxy for another factor that both increases *Donor Fragmentation* and reduces *Project Size*.

The second fragmentation variable introduced in Table 3 measures the fragmentation of the donor's aid across its various implementing agencies (*Agency Fragmentation*). Again, this variable enters with a significant, negative coefficient that is stable across the three specifications. The estimated coefficient indicates that *Project Size* decreases as the donor's aid budget becomes more fragmented across its implementing agencies. Assuming the lowest *Agency Fragmentation* (0) for an otherwise average project predicts a project size of $2,730,790. For the same project with *Agency Fragmentation* increased to the highest value in the sample (0.82), predicted project size falls to

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[13]To avoid concerns about endogeneity, *Donor Budget* excludes the amount for the current observation (i.e., it is the sum of the commitment amounts for donor's other projects in that country in that year). However, results are identical without this refinement.

$2,143,820, a decrease of nearly $600,000 or 20%. The most direct interpretation of this result is that increased bureaucratic competition in the donor country (proxied by *Agency Fragmentation*) is linked to smaller projects in developing countries.[14]

The estimated coefficients for the other fragmentation variables are small and statistically insignificant across all specifications in Table 3. The contrast between the significant donor variables and the insignificant recipient variables is particularly interesting. It suggests that reductions in project size accompanying aid fragmentation are driven by donor country forces rather than administrative factors in the recipient country.

One important caveat on the first fragmentation result (*Donor Fragmentation*) is in order: the result depends critically on the U.S. The results reported in Table 3 hold across all samples that include U.S.-funded projects but disappear if those projects are dropped. In contrast, the *Agency Fragmentation* result is robust to dropping donors or sectors from the estimation sample. This means that the first result, while important, reflects factors idiosyncratic to the forces driving fragmentation of U.S. aid. In contrast, the bureaucratic competition behind the link between *Agency Fragmentation* and reduced *Project Size* appear to be more universal.

The evidence that bureaucratic competition among donor agencies reduces project size suggests exploring a more direct public choice-type question. Do the narrow self-interests of aid agency bureaucrats influence the size of development projects? To address this question, I test

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[14]One could, again, include the agency budget to separately identify what is explained by *Agency Fragmentation* and what is explained by agency budgets. Both prove to be statistically significant (with the expected sign). Using these estimates to construct a best case (going from the highest agency budget and lowest fragmentation) to worst case scenario (lowest agency budget and highest fragmentation) leads to an 85% reduction in project size. However, it is not clear that separately identifying these two components is useful since both reflect the same underlying bureaucratic process.

whether aid projects in countries that are popular tourist destinations are smaller than those in less attractive locals, *ceteris paribus*. Given a predetermined country-level aid budget, a strategy of proliferating small projects would maximize the number of trips by aid agency administrators to these popular destinations.

Table 4 reports results. The *Tourism* variable simply counts the number of tourist arrivals in the country (in millions); data are available in cross section only and not for every country.[15] The results are consistent with a public choice interpretation. Looking across all donors (Column 1), there is a marginally significant, negative effect. Moving from the least popular to the most popular tourist destination reduces the predicted size of an otherwise average project by about $150,000. However, the impact is not homogeneous across donors. There is no apparent effect for France, Germany, Italy and Spain. Column 2 reports results for the remaining donors. The effect is now statistically significant ($p=.001$) and the shift from least popular to most popular tourist destination predicts a $500,000 reduction in the size of an otherwise average project. Again, these results control for the donor's country-wide budget. For a given budget, a donor bureaucracy can justify more trips to the country with a portfolio of many small projects than with a portfolio of a few large projects. While these results are far from conclusive (particularly because shortcomings in the available data preclude use of recipient fixed effects), they do lend support to a public choice interpretation of the earlier findings.[16]

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[15]The ideal data would report tourist arrivals in each year and from each donor country.

[16]Because these specifications do not include recipient country fixed effects, it is difficult to interpret the meaning of the increased size of the coefficients on the recipient fragmentation variables.

V.   Conclusion

What is the right size for an aid project? Is a given project too big or too small? There are important costs associated with either bias. The early literature (e.g., Tendler, 1975) focused on a bias toward inefficiently large, capital-intensive projects. Such projects are more administratively efficient for the donor agency, more attractive to special interest groups in the donor country (particularly for tied aid), and more likely to make it through the bureaucratic approval process. The result, according to Tendler, is a pardoxical abundance of development assistance, a bias toward overly large, capital and import intensive projects and against the development of local industry. This bias undermines the individual aid project's return per dollar spent as well as its contribution to the development of the wider economy.

The recent literature on aid fragmentation and absorptive capacity focuses on exactly the opposite phenomenon, a multitude of donor agencies and small projects that threaten to overwhelm the institutional capacity of recipient governments. Fragmentation can undermine the development effectiveness of aid and, more broadly, the development effectiveness of the recipient government. Higher transactions costs reduce the value of aid and the lack of coordination between donors can generate an incoherent overall approach (even if each component is well-executed). Transactions costs rise and coordination worsens with increases in the number of donors, the number of donor agencies, and the number of projects. Recipient governments face sunk costs for each donor, each funding agency of that donor, and each project of that funding agency. At the sectoral level, the more fragmented is sectoral aid, the greater the odds of an incoherent overall approach. For these reasons, fragmentation at the donor, funding agency, sector and project level are all critical issues.

Given potential biases in both directions, questions about the efficient size of projects are

best explored by studying the mechanisms at work rather than looking directly at outcomes such as trends over time. This is particularly true since time trends in reporting compliance are likely to confound any purely temporal analysis.

This paper focuses on the role bureaucratic competition and staff self-interest play in determining the size of aid projects. I measure bureaucratic competition via an aid agency fragmentation variable that mirrors concentration indices from the industrial organization literature. The empirical analysis is at the project level and draws on PLAID data covering 22 bilateral aid donors from 1973 to 2008. Estimation results demonstrate that projects are smaller when the donor's administrative structure is more fragmented. There is suggestive evidence of a tourist effect, i.e., the popularity of a recipient country as a travel destination influences project size. These two findings together support a public choice interpretation of donor agency behavior, providing another explanation for aid fragmentation.

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Table 1: Descriptive Statistics (N=134,586)

Variable	Mean	St. Dev.	Min	Max	Description
Project Size	14.69	1.273	13.12	22.67	log commitments, constant 2000 USD
Donor Budget	17.38	1.711	13.12	22.73	log sum of donor commitments in country (excluding current project), constant 2000 $
Fragmentation					
Donor	0.9159	0.06856	0	0.971	1 - Herfindahl-Hirschmann Index for donor (across recipient countries)
Agency	0.4376	0.2732	0	0.82	1 - Herfindahl-Hirschmann Index for donor agencies (across recipient countries)
Sector	0.828	0.1138	0	0.931	1 - Herfindahl-Hirschmann Index for donor sectors (across recipient countries)
Recipient	0.6678	0.183	0	0.9156	1 - Herfindahl-Hirschmann Index for recipient (across donors)
Recipient-Sector	0.7714	0.1455	0	0.9314	1 - Herfindahl-Hirschmann Index for sectors, by recipient (across donors)
# Funding Agencies	5.478	3.942	1	16	Number of aid funding agencies, by donor & year
Grant Element	95.6	13.77	0	100	Grant element of project
Population	3.014	1.689	-4.061	7.19	log of population in millions
GDP per capita	7.617	0.7984	4.194	10.19	log of PPP GDP per capita in chained 2000 $
Freedom House	4.391	1.566	1	7	Averaged Freedom House Rating (inverted)
Polity	0.633	6.348	-10	10	Polity IV index
War	0.09961	0.2995	0	1	Dummy indicating on-going major conflict (>1000 dead)

Fragmentation Correlations (N=134,586)

	Donor	Agency	Sector	Recipient	Recipient-Sector
Donor	1				
Agency	0.0886	1			
Sector	0.4790	-0.1736	1		
Recipient	-0.0143	-0.0920	0.0563	1	
Recipient-Sector	0.0218	-0.0295	0.0329	0.5029	1

Table 2: Baseline Regressions

	(1)	(2)
	Dependent Variable: *Project Size*	
Donor Budget		0.119**
		(14.92)
# Funding Agencies		-0.0271**
		(-5.55)
Grant Element		-0.0228**
		(-18.73)
Freedom House	-0.0268	-0.00657
	(-1.56)	(-0.52)
Polity	-0.00221	0.00196
	(-0.67)	(0.71)
War	-0.0319	-0.0221
	(-0.77)	(-0.60)
Population	0.283*	-0.0863
	(1.71)	(-0.68)
GDP per capita	-0.204**	-0.183**
	(-3.63)	(-3.76)
N	134,586	134,586

All specifications include year, sector, donor and recipient dummies.
t statistics in parentheses based on recipient-clustered standard errors.
* p<.1, ** p<.05

Table 3: Regressions including Fragmentation measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Dependent Variable: *Project Size*				
Donor Budget	0.119**	0.119**	0.119**	0.119**	0.118**	0.119**	0.118**	0.119**
	(14.93)	(14.79)	(14.89)	(14.74)	(14.63)	(14.89)	(14.63)	(14.44)
Fragmentation								
Donor	-0.404**			-0.364**				-0.363**
	(-4.23)			(-3.47)				(-3.48)
Agency		-0.311**		-0.294**				-0.295**
		(-6.25)		(-5.86)				(-5.90)
Sector			-0.0737	0.0329				0.0318
			(-1.16)	(0.46)				(0.45)
Recipient					-0.0624		-0.0704	-0.0761
					(-1.30)		(-1.24)	(-1.34)
Recipient-Sector						-0.0111	0.0209	0.0276
						(-0.22)	(0.35)	(0.47)
# Funding Agencies	-0.0285**	-0.0220**	-0.0260**	-0.0241**	-0.0270**	-0.0271**	-0.0270**	-0.0239**
	(-5.71)	(-4.26)	(-5.56)	(-4.55)	(-5.51)	(-5.55)	(-5.49)	(-4.49)
Grant Element	-0.0228**	-0.0225**	-0.0228**	-0.0225**	-0.0228**	-0.0228**	-0.0228**	-0.0225**
	(-18.69)	(-18.71)	(-18.69)	(-18.69)	(-18.75)	(-18.72)	(-18.76)	(-18.72)
N	134,586	134,586	134,586	134,586	134,586	134,586	134,586	134,586

Specifications include *Freedom House*, *Polity*, *Population*, and *GDP per capita* plus year, sector, donor, recipient & *War* dummies.
t statistics in parentheses based on recipient-clustered standard errors.
* p<.1, ** p<.05

Table 4: Regressions including Tourism

	(1)	(2)
	Dependent Variable: *Project Size*	
Tourism	-0.00533*	-0.00999**
	(-1.82)	(-3.40)
Donor Budget	0.135**	0.145**
	(13.19)	(10.80)
Fragmentation		
Donor	-0.393**	-0.209
	(-3.29)	(-1.52)
Agency	-0.325**	-0.319**
	(-5.16)	(-4.62)
Sector	0.0688	0.287**
	(0.84)	(2.63)
Recipient	-0.152**	-0.207**
	(-1.99)	(-2.67)
Recipient-Sector	0.0943	0.170*
	(1.11)	(1.89)
# Funding Agencies	-0.0233**	-0.0216**
	(-3.85)	(-2.88)
Grant Element	-0.0227**	-0.0199**
	(-17.89)	(-11.89)
N	105,634	77,237

Specifications include *Freedom House*, *Polity*, *Population*, and *GDP per capita* plus year, sector, donor, recipient & *War* dummies.
Column (2) excludes France, Germany, Italy and Spain.
t statistics in parentheses based on recipient-clustered standard errors.
* $p<.1$, ** $p<.05$

Appendix

Table A1: Sector Variables

Variable	Mean	Description
Admin	0.003931	Dummy indicating administrative costs
Agr	0.1083	Dummy indicating project in agriculture sector
Budget Support	0.01557	Dummy indicating budget support
Civil	0.1099	Dummy indicating civil or public sector project
Communications	0.01462	Dummy indicating communications sector
Debt	0.02865	Dummy indicating debt relief/rescheduling
Disaster	0.0003046	Dummy indicating disaster prevention sector
Ed	0.09181	Dummy indicating Education sector
Emergency	0.0862	Dummy indicating Emergency sector
Energy	0.03586	Dummy indicating Energy sector
Environment	0.02415	Dummy indicating Environment sector
Finance	0.01467	Dummy indicating Financial sector
Food Aid	0.0518	Dummy indicating Food Aid
Health	0.06753	Dummy indicating Health sector
Import	0.01366	Dummy indicating Import sector
Industry	0.03841	Dummy indicating Industrial sector
Multi	0.07143	Dummy indicating multi-sector project
NGO	0.004391	Dummy indicating NGO project
Other Business	0.01304	Dummy indicating other business sector
Other Social	0.04145	Dummy indicating other social sector projects
Pop	0.03743	Dummy indicating Population sector
Reconstruction	0.00662	Dummy indicating Reconstruction sector
Refugee	0.003507	Dummy indicating Refugee spending
TT	0.006435	Dummy indicating Trade and Tourism sector
Transportation	0.04616	Dummy indicating Transportation sector
Water	0.04748	Dummy indicating Water sector
Unspecified	0.01672	Dummy indicating unspecified sector

Table A2: Data Sources

Variable	Source
Aid Data	Nielson *et al*. (2010)
Freedom House	Freedom House (2007)
GDP per capita	Heston *et al.* (2002), World Bank (2008)
Polity	Polity IV Project (2005)
Population	Heston *et al.* (2002), World Bank (2008)
Tourism	Nationmaster (2010)
War	Gleditsch *et al.* (2002)