The Role of Governance in Determining Foreign Aid Flow Composition

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Summary. — We hypothesize that selective donors will use types of aid over which they have more control when providing assistance to poorly governed countries. We use an original classification of project purpose codes in the AidData dataset to categorize aid flows from the period 2004 to 2010. Results from fixed effect and compositional data models provide evidence of selectivity in terms of overall aid flows, a tradeoff between technical assistance and programmatic lending, and a tradeoff between social sector and infrastructure projects.
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1. INTRODUCTION

Over the course of the 1990s, a narrative emerged among major international development institutions about "good governance" being a necessary condition for economic growth.[1] At the beginning of the decade, the idea was prominently stated in the World Bank study *Sub-Saharan Africa: From Crisis to Sustainable Growth* (1989), and by the end of the decade, the World Bank's *Assessing Aid* volume offered the logically persuasive – although soon empirically challenged – conclusion that aid works well in countries that have good policies or institutions in place (World Bank, 1998; see also Burnside & Dollar, 2000, 2004). The corollary conclusion was that foreign aid donors should take recipient country governance into consideration when making decisions about aid giving.

Over the course of the 1990s, nearly all bilateral and multilateral international development agencies incorporated language about allocating aid selectively with regard to recipient-country governance into their mission statements.[2] For some donors, such as the World Bank, governance is directly built into the allocation formulas used for divvying up their budgets. The United States, in the mid-2000s, created a new aid agency, the Millennium Challenge Corporation, explicitly charged with disbursing aid to a group of countries that were deemed to have governance of sufficient quality. The Netherlands, in trying to identify a set of partner countries in which to concentrate its aid giving, made governance quality a determinative criterion.[3] Replacing the *ex post* conditionality of structural adjustment programs from the 1980s and early 1990s in which aid flows could be suspended if countries did not implement certain policies, the good governance era that has followed has ostensibly been defined by *ex ante* conditionality (i.e., selectivity) in which countries with poor policies and institutions are either not given aid in the first place or else are given smaller amounts of aid.[4]

Much of the ensuing academic literature has confirmed that donors do respond to recipient-country governance when making aid allocation decisions (Bermeo, 2010; Claessens, Cassimon, & Van Campenhout 2009; de la Croix & Delavallade, 2013; Dietrich, 2013; Freytag & Pehnelt, 2009; Neumayer, 2003b; Schudel, 2008, ND), although some authors have raised questions about whether donors are responsive to corruption (Alesina & Weder, 2002; Easterly &

Pfutze, 2008; Easterly & Williamson, 2011; Neumayer, 2003a, 2003b; Svensson, 2000). The most recent literature looks beyond aggregate aid flows, examining instead how donors may find ways of structuring aid projects such that they avoid working directly with corrupt or incompetent governments (Dietrich, 2013) or use certain types of "governance-robust" development assistance in more poorly governed states (Bermeo, 2010; Clist, Isopi, & Morrissey, 2012; Nordveit, 2014).

We extend this recent literature on the relationship between governance and aid allocation by examining how governance predicts the distribution of aid across three modalities and four broad project sectors. We make use of the AidData dataset (Tierney *et al.*, 2011) to create an original categorization of aid flows based on project-level purpose codes. For each of the modalities and sectors that we study, we discuss the way in which governance problems are likely to affect that type of aid. If donors are being selective, they should prefer to use governance-robust development assistance in poorly governed countries. We analyze the patterns in aid commitments over 2004–10 using statistical models appropriate for the analysis of compositional data. Looking at overall aid flows, we find that donors provide higher levels of aid to better governed countries and do so using a larger number of modalities and across a larger number of sectors.[5] Looking at aid modalities, we find evidence that bilateral donors substitute programmatic aid for technical assistance and project aid in well-governed countries. We also find evidence that bilateral donors

Table 1. *Previous studies of governance and aid allocation. ICRG refers to the corruption component of the ICRG political risk index*

Study	Scope and outcome variable	Operationalization of governance	Findings
Nordveit (2014)	Probability of receiving general budget support from 23 bilateral donors over 1995–2009	WGI's Government Effectiveness index	Better governed countries are more likely to get general budget support and to get larger amounts, but better governed countries do not get more of other types of programmatic aid
de la Croix and Delavallade (2013)	Seemingly unrelated regressions model of corruption in and total aid to 159 recipients from 1996 to 2005	The political stability measure from the Governance Research Indicator Country Snapshot (GRICS)	Aid is significantly and positively correlated with corruption because donors give aid to countries where productivity is lower (which are also corrupt countries)
Dietrich (2013)	Proportion of bilateral aid from 22 donors delivered through non-state actors, 2005–09	Aggregate score on either all six or four of the six Worldwide Governance Indicators	Donors are more likely to bypass the state and use non-state actors to deliver aid in more poorly governed countries
Akramov (2012)	Overall aid flows and sector-specific aid flows from 1973 to 2002 for OECD-DAC donors	Freedom House Score and Category	Donors reward changes in Freedom House category (e.g., from "not free" to "partly free") but not smaller changes in Freedom House score within those categories. These effects can be seen across multiple sectors of aid
Easterly and Williamson (2011)	Proportion of bilateral and multilateral aid going to corrupt countries in 2008 and from 1984 to 2008	ICRG	Corrupt countries receive more aid in the period 1998–2008 than they did in the period 1984–97 Donors have continued to give the same amount of aid to the same countries over time, but some of these recipient countries have become more corrupt
Clist *et al.* (2012)	Existence of budget support and amount of budget support from EC and World Bank, 1997–2009	WGI Government Effectiveness	Government effectiveness predicts receiving general budget support but does not predict the amount
Clist (2011)	Any aid and total aid from seven major donors, 1982–2006	Freedom House combined index; Political Terror Scale	The Freedom House index positively predicts the existence of aid flows from all seven donors and significantly influences the amount of aid for three of them The Political Terror Scale significantly predicts eligibility for three of the donors
Bermeo (2010)	Proportion of bilateral aid delivered through different channels to 106 recipients, 2002–07; also total aid by sector	Average score on five of six Worldwide Governance Indicators	Donors channel aid through NGOs and multilateral organizations in poorly-governed countries Donors provide more technical assistance in poorly governed countries Governance positively predicts larger overall aid flows Governance predicts more aid in the forms of budget support, economic infrastructure aid and aid for productive sectors
Claessens *et al.* (2009)	Total bilateral aid per capita from 22 donors to 147 recipients, 1970–2004	World Bank's Country Policy and Institutional Assessment Score	Better-governed countries receive more aid in the 1999–2004 period but not in earlier periods
Freytag and Pehnelt (2009)	Debt relief to 109 recipients, 1990–2004	Component variables from Worldwide Governance Indicators	In the 1995–99 period, good governance did not predict debt relief, but in the 2000–04 period, countries with effective governments and a good rule of law received more debt relief Corruption levels do not predict the amount of debt relief in any period
Easterly and Pfutze (2008)	Proportion of bilateral and multilateral aid from 39 donors going to corrupt countries in 2004 and from 1984 to 2004	ICRG	Countries perceived as corrupt began receiving *more* aid in the late 1990s and early 2000s as compared to the mid-1980s and early 1990s Donors have continued to give the same amounts to the same countries over time, but some of these countries have become more corrupt

Table 1 (*continued*)

Study	Scope and outcome variable	Operationalization of governance	Findings
Isopi and Mattesini (2008)	Aid per capita from 12 major donors	ICRG	The U.K. gives less aid to more corrupt countries. The U.S., Italy, and Finland appear to give more aid to more corrupt countries. Results for other donors are mixed
Schudel (2008)	Total bilateral aid from 22 donors to 147 recipients, 1990–2003	ICRG	Countries perceived as corrupt receive less aid; the effect is more substantial among the set of donors that are perceived as less corrupt
Hout (2007)	Total aid to recipients from the World Bank, the Netherlands, and the Millennium Challenge Corporation	WGI	A WGI factor positive predicts aid eligibility and/or levels for all three donors in the study
Easterly (2007)	Total aid to recipient countries, 1960–2003	ICRG	Countries perceived as corrupt receive less aid; the effect is the same in the Cold War and post-Cold War periods and the same before and after Wolfensohn's 1996 "cancer of corruption" speech
Neumayer (2003a)	Multilateral aid for three-year periods, 1983–97	WGI Control of Corruption; ICRG	Perceptions of corruption do not affect aggregate multilateral aid flows. IADB and UNICEF give more aid to more corrupt countries
Neumayer (2003b)	Status as aid recipient and proportion of donor's total aid to 121 recipient countries, annually 1991–2000	Control of corruption, rule of law, and regulatory quality from WGI, as well as Freedom House and the Political Terror Scale	Regulatory quality is a consistently positive predictor of aid levels, while control of corruption and rule of law do not have as much predictive power
Alesina and Weder (2002)	Total aid per capita, 1975–95	Seven different measures of corruption (ICRG, TI, WDR, S&P, IMD and BI/EIU)	Perceived corruption does not predict overall aid flows. The U.S. gives more aid to more corrupt countries. Australia and the Scandinavian donors give less aid to more corrupt countries
Svensson (2000)	Aid/GDP for 66 recipient countries in five year periods from 1980 to 1993	ICRG	No evidence of perceived corruption affecting aid flows

substitute aid to infrastructure projects for aid to social projects in better governed countries. Although we find an effect of governance on overall multilateral aid flows, we find less evidence that governance affects the composition of multilateral aid.

2. GOVERNANCE AND AID FLOWS

If donors can be taken at their word, the evidence from the last 15 to 20 years of aid allocation should show that donors have responded to the governance quality of recipient countries. This might occur in one of two ways: either donors might reduce their overall aid flows to poorly governed countries or else donors might restructure the content of their aid flows to poorly governed countries. In Table 1, we review a number of previous studies of the relationship between governance and aid allocation.[6]

Although several studies find surprising evidence that corruption levels *positively* predict aid flows for at least some donors (Alesina & Weder, 2002; Easterly & Pfutze, 2008; Easterly & Williamson, 2011; Isopi & Mattesini, 2008), studies of governance tend to find that poor governance negatively predicts overall aid flows (Bermeo, 2010; Claessens *et al.*, 2009; Clist, 2011; Hout, 2007). Neumayer (2003b) compares the effects of various types of governance, while controlling for others, and finds that donors are most responsive to regulatory quality, as measured by the Worldwide Governance Indicators.

In line with the objectives of our research, a number of studies looking at particular types of aid flows find that governance has been an important predictor of certain types of aid. Freytag and Pehnelt (2009) show that well-governed countries receive more debt relief. Bermeo (2010) presents evidence that good governance positively predicts budget support aid, economic infrastructure aid, and aid to productive sectors, while poor governance positively predicts technical assistance and aid being channeled through NGOs. Clist *et al.* (2012) and Nordveit (2014) both show that better governed countries get more budget support aid. Dietrich (2013) finds that donors are more willing to channel aid funds through government institutions in better governed countries.

Our work builds on these earlier contributions that look at the constituent parts of aid flows and provides a new comprehensive categorization of aid and uses statistical tools appropriate for the study of compositional data. We think about the content of aid first in terms of modalities: project aid *versus* programmatic aid *versus* technical assistance. And second, we think about the content of project aid in terms of the sectors to which it is targeted: the infrastructure sector *versus* the social sector, the productive sector, and the industrial sector. We describe the expected relationship between governance and these different modalities and sectors here and then discuss their empirical operationalization in the next section.

Across the three modalities, programmatic aid, by which we mean both general budget support and sectoral budget support, is the most susceptible to being used in a way that donors might regard as inappropriate (Clist *et al.*, 2012; Cordella &

Dell'Ariccia, 2007). [7] Although programmatic aid often comes with a set of policy conditions attached to it, the limitations put on the purposes for which the money can be used are far less restrictive than for project aid or technical assistance, and the money may be provided without explicit monitoring and evaluation systems, making it harder to know whether the aid has been used for the purpose of development. At an extreme, various forms of budget support are susceptible to grand corruption in which government officials take directly from the national budget in order to line their pockets (Berkman, 2008). In other cases, the use of weak country systems to implement development projects funded with programmatic aid may lead to waste and petty corruption. [8] As donors have the least control over how these types of transfers get spent by recipient governments, they should be less likely to use programmatic aid in poorly governed states.

Technical assistance projects – aid that is given to support capacity building and knowledge transfer – on the other hand, might be preferred in poorly governed countries for two reasons. First, donors have substantial control over technical assistance, often directly contracting the firms that supply the capacity building and thereby reducing implementation problems linked to poor governance. [9] Second, the types of capacity building that are done under technical assistance projects often aim at helping countries increase the quality of their governance (Knack, 2001). [10] Both because these projects are themselves less susceptible to problems originating in weak governance and because they are likely to assist in improving governance overall, donors should be more likely to use them in poorly governed countries.

Project aid lies in between these two modalities. As compared to sectoral or general budget support, project aid more specifically delineates the intended destination of the aid dollars and typically includes more donor control over the implementation of the intervention financed by the aid and the monitoring and evaluation of that intervention. As compared to technical assistance, the actual outputs of project aid are often harder to observe and less likely to be directly contracted from the donor country, opening up the door to corruption and other governance issues.

In addition to variation across modalities, we also hypothesize that it will be possible to observe evidence of selectivity with regard to donors' choice of sectors for project aid. While previous research has explored the ways in which donors might strategically use aid modalities vis-à-vis recipients at varying levels of governance quality, our paper – along with Bermeo (2010) – is one of the first to provide an explicit theory of variation across sectors. [11] Large infrastructure projects may be particularly susceptible to governance problems, either to grand corruption (in which high-ranking officials who are negotiating aid projects channel project funding to preferred contractors and implementers) or to petty corruption (in which local-level project decisions are made with an eye to embezzlement or fraud). [12] These projects are also more difficult to implement in countries lacking country systems capable of handling large-scale projects, meaning that there are greater risks of project failure in poorly governed recipient countries. Donors might attempt to address such problems through more rigorous negotiation of project design or through better within-project anti-corruption monitoring, or as we propose here, donors might adopt ex-ante, project-type selectivity and reduce the levels of infrastructure aid going to poorly governed countries.

Large non-infrastructure projects (e.g., in the social sector) are also susceptible to both grand and petty corruption and to waste resulting from the poor oversight and monitoring

that is characteristic of poor-governance environments. However, the opportunities for corruption and government waste in these types of projects are slightly reduced because poor outcomes are more easily detectable. As compared to monitoring the costs and quality of inputs in a large infrastructure project, it is somewhat easier to monitor the delivery of medicines or vaccines in a health sector project or the provision of teachers or textbooks in an education sector project. [13] While governance problems will still affect these projects, they are likely to do so to a lesser extent than in infrastructure projects, suggesting that donors should be somewhat less reluctant to use such projects in poor-governance situations relative to infrastructure projects.

This will be the case to an even greater extent in those non-infrastructure projects that aim to stimulate specific economic activity (which we call "productive sector" projects). For instance, funding for agricultural production or for the development of small- and medium-sized enterprises implies or creates vested economic interests that want to protect the resources ostensibly being channeled in their direction (Winters, 2014). Certainly corruption and fraud do occur in foreign-funded development projects in these sectors, but the opportunities are less obvious and corrupt behavior is more constrained by the increased ease of monitoring outputs and outcomes and the incentivizing of such monitoring by the creation or identification of parties with a vested interest in project success.

Projects providing support to particular industries are even less likely to suffer from corruption or governance-related implementation problems for similar reasons: when foreign support is designed to benefit a particular set of business owners, a collective action problem that might otherwise prevent beneficiaries from monitoring a project or threatening sanctions can more easily be overcome improving the implementation of these projects (Winters, 2014). Whereas the larger scale projects discussed above must be monitored by donors in order to assure accurate use of funds, aid to the industrial sector encourages monitoring by the recipient country businesses who directly benefit from these projects. Therefore, we expect these types of projects to be relatively immune from governance problems, and we expect the propensity for donors to fund these types of projects therefore to be relatively less affected by the perceived governance quality of recipient countries.

We summarize our expectations about the relationship between recipient-country governance quality and donor preferences for using different types of development aid in Table 2. Note that we focus on development aid and therefore exclude from our analysis humanitarian and emergency aid, which emerge under special circumstances where donor decision making may take on a different character, and also debt relief, which does not involve new aid flows and is therefore not subject to governance-related implementation problems.

3. OPERATIONALIZING AID MODALITY AND SECTOR

Our goal is to discover whether or not donors are selective in terms of the types of aid that they provide to recipient countries; we also look at selectivity in overall aid flows in the dataset that we construct. We use data on dyadic aid commitments during 2004–10 as reported in AidData. We look at commitments data because we are interested in the decision-making process within donor governments and aid agencies: we want to see how they respond to perceived governance levels in

Table 2. *Types of aid and their susceptibility to governance problems*

Type of aid	Relationship to governance	Expectations
Modality		
Programmatic Aid (including general and sector-specific budget support)	This type of aid is highly fungible and therefore more easily channeled to places within government budgets where it can be used for ends other than those intended by donors	Selective donors should provide less programmatic aid to poorly governed countries
Project aid	Donors have more control over project aid, yet some forms of project aid may be more susceptible to governance-related implementation problems than others	Selective donors might vary the amounts of programmatic and technical assistance aid relative to project aid. We also expect variation within the sectors of project aid based on recipient-country governance quality
Technical assistance aid	Donors control the direction of contracting in technical assistance to a great extent, reducing opportunities for fraud and waste	Selective donors will prefer to use technical assistance in poorly governed countries both because of the greater control over the projects and because of the possibility that capacity building will improve governance
Sector of project aid		
Large infrastructure projects	Opportunities for kickback schemes and other forms of contracting fraud are most prevalent in large infrastructure projects	Selective donors will prefer other projects to large infrastructure projects in poorly governed countries
Social sector projects	There exist opportunities for contracting fraud in social sector projects (e.g., in contracts for personnel or to provide supplies). However, these opportunities are smaller and more easily detectable than is the case for large infrastructure projects	To some extent, selective donors will prefer this type of project to large infrastructure projects in poorly governed countries
Productive sector projects	There exist some opportunities for contracting fraud or waste in productive sector projects. However, these opportunities are smaller and more easily detectable, and the beneficiaries of projects in these sectors are increasingly able to deter corruption	Selective donors will prefer this type of project to large infrastructure projects in poorly governed countries
Industrial sector projects (including support to the financial industry)	Although there exist opportunities for fraud in project funding that goes to benefit particular industries involved in production and manufacturing, these projects are likely defined with specific beneficiaries in mind, who are more likely to work to insure their direct benefit from these projects, making governance problems in such projects a less likely outcome	Selective donors have less reason to avoid these types of projects in poorly governed countries

recipient countries when determining overall aid flows and the types of aid flows for recipient countries. Since AidData includes some financial flows to developed countries, we restrict the sample to non-high-income countries (i.e., countries with a GDP per capita of less than $12,746).

To measure total aid flows, we sum all types of aid that we study in our modality and sector analyses for each dyad in our dataset. As described above, this means that we are looking at development aid projects reported in the AidData database and not at humanitarian assistance, other emergency aid, or debt relief. The measure therefore resembles the OECD-DAC's measure of "country programmable aid" (Benn, Rogerson, & Steensen, 2010). Unlike that measure, we do not eliminate aid that is channeled through NGOs from the construction of our indicator.

In order to label each project for modality or sector, we rely on the AidData purpose code assigned to the project. The AidData codings are largely based on the OECD-DAC CRS project purpose codes, which specify the area within the recipient country's social or economic structure the project is intended to develop. Each project is labeled with only one purpose code.

Our coding scheme, which is described in depth in the Online Appendix, consists of exclusive modality and sector categories, and all of the sector categories that we study are nested within the project modality. We first sorted the purpose codes into the modality categories of programmatic aid,

project aid, and technical assistance. [14] We determined which purpose code fits into which category with reference to information about the types of projects within each purpose code and information on modalities from the CRS database. [15] After having determined modality, we took the set of project aid flows and further sorted them into the categories of infrastructure, social, productive and industry assistance based on the descriptions of the purpose codes. In a number of cases, we reviewed a random sample of projects with a given purpose code in order to determine the sector category to which that purpose code most clearly corresponded.

This comprehensive coding scheme differs from previous studies looking at channels of aid delivery, where the data have come from incompletely coded CRS variables (Bermeo, 2010; Dietrich, 2013) or have been limited to particular donors for which comprehensive data was available (Clist, 2011). Since purpose codes are complete within AidData, we assign nearly every development project listed in that database to one of the categories that we have outlined above. [16] This allows for a comprehensive examination of financial flows across modalities and sectors during the time period we study.

4. MODEL SPECIFICATION

After having classified all of the purpose codes into modality categories and, for project aid, sector categories, we collapse

the data to the donor-recipient-dyad level for the whole time period, 2004–10.[17] Since our central concern is the composition of aid flows, we restrict our analysis to dyads in which positive aid flows occur.[18] Like the outcome variables, the explanatory variables are averaged over the seven-year period for each dyad. Given the long stretch of time represented by each observation, we do not lag the explanatory variables. In all of our models, we include donor fixed effects, which means that our coefficient estimates are based on within-donor comparisons. The coefficients represent the average effect of the variables across all donors based on how recipient country characteristics predict the relative aid flows that each donor gives to all recipient countries in its portfolio.[19] The fixed effects are particularly important, since they account for individual donors' heterogeneous propensity to give aid of one type or another and also the variation in total aid provided by the different donors.

For the total aid analysis, we run a linear regression predicting the logarithm of the total aid amount. In the tradition of previous aid allocation studies, we log-transform the outcome variable in order to address skewness in the distribution. As described above, we study only dyads where there are positive aid transfers. Our results tell us how recipient-country governance affects total aid amounts among the set of donor-recipient dyads where a decision has been made to transfer aid. If donors are selective in terms of overall aid allocation, then poor governance should reduce the amount of aid received by any given country. In the Online Appendix, we provide results from the selection stage and show there that governance is not one of the factors predicting whether a given recipient receives any aid at all from a donor.

Next, we model as a function of recipient-country governance the number of modalities through which and the number of sectors to which each donor provides aid. The outcome variable here is a count variable that varies from 1 to 3 for the modalities analysis and 1 to 4 for the sectors analysis. We ideally would model the distribution of the outcome variable using an ordered logistic regression. However, ordered logistic regression models are inconsistent in the presence of fixed effects, and we believe that controlling for donor heterogeneity using fixed effects is essential. Therefore, we again use linear regression models with donor fixed effects to estimate the average effect of governance across all donors on the number of modalities through which and the number of sectors to which a donor provides aid. If donors are selective, they should give aid through all modalities and to all sectors in recipients with high-quality governance; therefore, we would consider a positive relationship between governance and the number of modalities or sectors as evidence of donor selectivity.[20]

In this analysis, the outcomes are jointly determined with the total amount of aid. That is, as the total amount of aid increases, we expect the likelihood of observing a larger number of types of aid to increase, and similarly, as the number of types of aid increase, we expect overall aid flows to be larger. This might suggest controlling for the total size of the donor-recipient aid portfolio in each dyad when looking at the diversity of modalities and sectors as outcomes. Doing so, however, introduces simultaneity bias into the estimation. We therefore opt to estimate reduced form equations in which exogenous variables predict each of the two related outcomes and to think of the reduced-form parameter estimates as representing long-run multiplier effects (see the discussion in Kennedy, 2003, chap. 10). While our models do not let us say which increases first – the total amount of aid or the diversity of aid flows – they provide evidence that both are responsive to governance quality.

In our final analysis, we use compositional data analysis (Aitchison, 1986; Dietrich, 2013; Katz and King, 1999; Pawlowsky-Glahn & Buccianti, 2011) to model the impact of recipient-country governance on the relative amounts of aid given across modalities and across sectors. Compositional data analysis has been used in the earth sciences to model the composition of rocks, in political science to model the distribution of voting returns in multiparty elections, and in economics to measure the distribution of household expenditures. Compositional data analysis explicitly takes into account the fact that the observed proportions of different components of a whole must sum to unity and therefore restricts the space that the related outcome variables can occupy to the unit simplex. Since we are interested in the distribution of an overall aid flow into a set of component parts, these models are particularly valuable for understanding the data that we are studying, and the use of standard linear regression models predicting a total amount or an untransformed ratio might lead to biased inferences.[21]

For the compositional data analysis, we create a set of log-ratio variables that describe the prevalence of all other types of aid relative to one baseline type of aid. That is, for each outcome i except for one particular outcome j, the outcome variable is specified as:

$$\log\left(\frac{y_i}{y_j}\right)$$

The resulting vector of outcomes

$$\mathbf{y} = \left\{ \log\left(\frac{\mathbf{y_1}}{\mathbf{y_j}}\right), \log\left(\frac{\mathbf{y_2}}{\mathbf{y_j}}\right), \ldots, \log\left(\frac{\mathbf{y_{j-1}}}{\mathbf{y_j}}\right) \right\}$$

recognizes the joint determination of the distribution of shares across categories and ensures the possibility of mapping from the outcome space to the unit simplex. In our particular case, we recognize that the proportional composition of aid flows in terms of the three modalities or four sectors is jointly determined and must sum to one. Once the outcome variables have been defined in log-ratio terms, they can be analyzed using standard linear regression techniques, including fixed effects. Therefore, we run a series of models where for each category of aid i,

$$\log\left(\frac{\mathbf{y_i}}{y_j}\right)_{dr} = \alpha + X_{dr}\beta + \delta_d + \epsilon_{dr}$$

where β is a vector of coefficients associated with a matrix of recipient-specific or dyad-specific predictors X_{dr}, δ_d is a set of donor fixed effects, and ε_{dr} is a normally-distributed error term.

If the outcome variables were specified as a fraction of the whole, rather than relative to a base category, the predicted values for any given dyad might sum to more or less than one. If an untransformed fraction was used as the outcome variable, the predicted values for any given category might be outside the [0, 1] range. Therefore, the correct specification for compositional data analysis is with the logarithm of the ratio of two of the components of a mixture as the outcome variable.

For these compositional data models, we first limit the sample to those dyads where either all modalities of aid or all types of project aid are present. By doing this, we avoid having to make any strong assumptions about the zero values that otherwise would be undefined in the log-ratio outcome variables. From these analyses, we can generalize about donor

behavior in the set of "comprehensive dyads" where all modalities or sectors of aid are present. We then extend the analysis to include dyads where some of the aid flows may be zero for a given modality or sector. We substitute the smallest observed value for a given log-ratio for these zero values. [22] In this second set of models, although we move beyond comprehensive dyads, we still limit the sample to "comprehensive donors," those donors who use all three modalities or who provide project aid in all four sectors, such that we can reasonably assume that they *might* have provided aid using a given modality or to a given sector in any recipient in their portfolio but made a decision not to do so for the particular recipient where a zero value is observed.

We have structured our analysis to look at bilateral and multilateral donors separately because we believe that decision making across these two types of donors might be different (Girod, 2008; Maizels & Nissanke, 1984; Martens, Mummert, Murrell, & Seabright, 2002; Rodrik, 1995) and because some of the variables that are available for bilateral donor-recipient dyads are not available for multilateral donor-recipient dyads. In the Online Appendix, we present a preliminary disaggregation of the main results to the level of individual donors; we believe that exploring differences across donors is an important direction for future research.

We use the same set of explanatory variables across all models (with some differences across models for bilateral and multilateral donors). Our key explanatory variable is the level of perceived governance in the recipient countries. We operationalize this variable using an average of the six Worldwide Governance Indicators. The variable measures "the traditions and institutions by which authority in a country is exercised", which "includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them" (Kaufmann, Kraay, & Mastruzzi, 2009, p. 5). This measure should capture how donors view recipient countries and the likelihood of aid to those countries falling prey to mishandling and poor implementation. It is worth noting that the Worldwide Governance Indicators are explicitly used by donors, both in aid allocation formulas and also in discussions of recipient country deservingness (Hout, 2007).

We control for GDP per capita PPP, the most common proxy for a country's level of development, as a potential confounder that might result in spurious correlation between governance and aid. Cross-country work on governance robustly concludes that poorer countries are more corrupt and more poorly governed (e.g., Acemoglu, Johnson, & Robinson, 2001; Montinola & Jackman, 2002; Svensson, 2005; Treisman, 2000, 2007). As poorer countries might also have different developmental needs, it is crucial to include this covariate as a control. Similarly, we control for population because of the possibility that perceptions of governance might correlate with a country's population and because of the likely fact that countries with large populations require more aid and different portfolios of aid than do countries with small populations. [23] For these variables, we take the logarithm of the original variables, as is common elsewhere in the aid allocation literature (e.g., Akramov, 2012; Clist, 2011; Neumayer, 2003b), in order to address skewness in the distributions and because we believe that changes in the outcome variables will be proportional to changes in these key predictors.

We also control for the investment rate and the level of external debt for efficiency reasons. A low investment rate certainly indicates a general need for foreign assistance – as suggested in the classic "financing gap" models justifying foreign aid (e.g., Chenery & Strout, 1966) – and also may indicate need for particular types of foreign assistance. We operationalize this variable as the ratio of investment to GDP. [24] Similarly, a high external debt ratio should increase a country's need for foreign assistance and also might affect the composition of a country's foreign aid portfolio (by encouraging more programmatic aid, in particular); therefore, we include the ratio of total external debt to GDP in our main specification. [25]

There may be some concern that investment and debt are "post-treatment" variables relative to governance. That is, if poor governance within a country causes either low rates of investment (see Campos, Lien, & Pradhan, 1999, for example) or else high levels of external debt because of high government spending motivated by corruption or caused by waste, then these variables may be taking on the values that they do because of the quality of governance in the country. However, since we are estimating coefficients that reflect how donor countries respond to observable characteristics of recipient countries, we are not worried about this fact introducing bias into our estimates. [26] Even if governance is affecting investment and debt during the period that we study, donors nonetheless are still observing the realized levels of all variables and making aid allocation and composition decisions based on those observed country characteristics.

Much of the literature on aid allocation has emphasized the reasons why donors are not selective in choosing beneficiaries or the level of funding that is reaching them. As McKinlay and Little (e.g., 1977, 1978, 1979) proposed, donors might either be responsive to recipient needs (most commonly operationalized as GDP per capita) or else their own strategic interests (i.e., geopolitical, military, or commercial objectives). Papers consistently find that donor interest plays a substantial role in determining overall aid flows (e.g., Alesina & Dollar, 2000; Bueno de Mesquita & Smith, 2007, 2009; Dreher et al., 2009; Fleck & Kilby, 2010). Donor strategic interests might also affect the composition of aid portfolios: for instance, donors might prefer channeling quick-disbursing, highly-fungible programmatic aid to allies, or they might prefer providing commerce-facilitating infrastructure projects to trade partners. For our analyses of bilateral donors, we include three "strategic interest" variables that are prominent in the literature: the logarithm of the average annual dollar amount of bilateral trade (as a measure of commercial ties), [27] an indicator for the existence of a formal military alliance (as a measure of military ties), [28] and an indicator for whether or not the recipient was a colony of the donor (which has proved consistently statistically significant in past studies (e.g., Alesina & Dollar, 2000)). [29] For our analysis of multilateral donors, we include one control variable representing whether or not the aid recipient was a colony of any of the Western powers.

5. RESULTS: EVIDENCE OF DONOR SELECTIVITY IN CHOOSING THE AMOUNT AND TYPE OF AID

Table 3 presents our results with regard to overall aid flows. The coefficients are from linear regression models with donor fixed effects where the outcome variable is measured as the log of total aid committed over the entire 2004–10 period in a given dyad. The first column shows the average effect of the explanatory variables across 41 bilateral donors, and the second column across 39 multilateral donors. For both bilateral and multilateral donors, better governance significantly

Table 3. *Overall aid allocation to recipient countries. Linear regression models with donor fixed effects*

Overall aid allocation, 2004–10		
DV: Log (Total Aid, 2004–10)	Bilateral donors	Multilateral donors
WGI Average	0.44***	0.26**
	(0.12)	(0.11)
Log (GDP per capita)	2.14**	0.69
	(0.87)	(0.67)
Log (GDP per capita)^2	−0.18***	−0.07
	(0.05)	(0.04)
Log (Population)	0.49***	0.46***
	(0.09)	(0.05)
External debt ratio	0.001	−0.001
	(0.001)	(0.001)
Investment ratio	−0.002	0.003**
	(0.002)	(0.001)
Log (Trade)	0.12**	
	(0.05)	
Former colony	2.83***	0.12
	(0.51)	(0.11)
Alliance	0.88***	
	(0.29)	
Constant	−0.05	7.74***
	(3.65)	(2.42)
Observations	2,853	1,875
R-squared	0.27	0.30
Number of donors	41	39

Robust standard errors clustered on donor in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

predicts more aid.[30] The substantive effect is substantial: a one-standard-deviation increase in the quality of governance – holding other country and dyad characteristics constant – corresponds to an average increase of 44% in the amount of aid that a recipient country receives from a given bilateral donor.

The other predictors in these equations are in line with previous literature. Wealthier countries receive less aid, whereas more populous countries receive more aid, although a 10% larger population corresponds to only a 5% larger aid allocation for bilateral donors. Countries with greater external debt do not receive greater assistance from either bilateral or multilateral donors. Bilateral aid is not responsive to investment levels, whereas multilateral aid appears to complement domestic investment.

For the bilateral donors, the three strategic variables are all highly significant. A 10% increase in dyadic trade corresponds to a 1.2% increase in overall aid, while military allies can expect nearly double the aid from a bilateral donor with which they are in alliance as compared to other recipient countries to which that same donor provides foreign assistance. The very large coefficient for the indicator of former colonies suggests that bilateral donors, on average, dramatically increase the amount of aid that they give to those states that were part of their colonial empires, regardless of the other characteristics of those states.

Therefore, we find that donors give more aid to better governed countries, holding other characteristics of those countries equal. This is evidence of donor selectivity during the time period that we study. The effect of governance is statistically and substantively significant for both bilateral and multilateral donors. In the Online Appendix, we show that this result is robust to a number of additional covariates. It is

not, however, robust to operationalizing the external debt variable as the ratio of external debt to exports; we discuss this finding more in the Online Appendix.

Do these increases in aid correspond to the use of additional modalities and the distribution of aid to additional sectors? In Table 4, we examine the way in which the number of modalities and sectors in a given donor-recipient relationship varies with the quality of governance observed in the recipient country. We limit the analysis here to "comprehensive donors" (i.e., those donors that provide aid using all three modalities or in all four sectors). Columns 1 and 2 take the count of modalities as their outcome variable. Donors might give only project, programmatic, or technical assistance aid to any given recipient, some a combination of the three, or all three. We find that governance quality is a positive and statistically significant predictor of the number of modalities for bilateral donors and a positive but not significant predictor for multilateral donors.[31] The effect size is quite small, however. Holding all else equal, going from the minimum to the maximum score on the average governance quality index would not result in the use of an additional modality. The estimated effects of the economic variables are equally small. At the mean value of GDP per capita, a country would need a five-fold increase in national income per capita in order to see an additional modality in use. The effects of moving from either non-former colony or non-ally status to being a former colony or in a formal military alliance are larger, but still neither is sufficient to induce the introduction of an additional modality.

The results are similar when looking, in columns 3 and 4, at the number of sectors in which project aid is given. Improvements in governance have a positive and statistically significant but relatively small effect on the number of sectors to which bilateral donors give aid in a particular recipient. The strategic variables again suggest that donors diversify their aid flows when providing assistance to allies and former colonies.

Table 4, therefore, suggests that donors are not overly concentrating their aid flows within specific modalities or sectors in poorly governed countries.[32] Insofar as Table 3 suggests that donors reduce their aid flows to poorly governed countries, the small substantive effects found in Table 4 implies that they nonetheless continue to provide that aid using a variety of modes and to a variety of sectors in those same countries.

Table 5 presents the compositional data analysis for comprehensive dyads (i.e., dyads where all modalities or all sectors are in use). Whereas the analyses in Table 4 may simply have identified a relationship where the number (and therefore diversity) of modalities and sectors increases as the total amount of aid increases, the compositional data analysis presented in Table 5 looks at ratios of types of aid. These ratios are less affected by changes in the size of overall aid flows, since a small portfolio of aid may be dominated by programmatic aid or productive sector aid to the same extent as a large portfolio of aid may be dominated by these same types of aid.[33] Compositional data analysis provides a more accurate way of looking at mode and sector aid allocation as each modality and sector is considered as part of a whole portfolio rather than a separate entity.

The model in the first column of Table 5 looks at the ratio of technical assistance to project aid within dyads. Governance quality is not a significant predictor of the prominence of technical assistance relative to project aid, whereas the other variables reveal that poorer countries get larger amounts of technical assistance relative to project aid. In the second column, however, we see that better governed countries receive larger amounts of programmatic aid relative to project

Table 4. *Total number of types of aid giving to recipients. Linear regression models with donor fixed effects*

	Total number of modalities and sectors from 2004 to 2010			
DV: total number of modalities or sectors	Modalities		Sectors	
	Bilateral donors	Multilateral donors	Bilateral donors	Multilateral donors
WGI Average	0.12***	0.12	0.14***	0.12
	(0.04)	(0.07)	(0.05)	(0.07)
Log (GDP per capita)	0.61***	0.20	1.44***	1.25*
	(0.22)	(0.38)	(0.42)	(0.64)
Log (GDP per capita)^2	−0.05***	−0.02	−0.10***	−0.09*
	(0.01)	(0.02)	(0.03)	(0.04)
External debt ratio	0.0002	0.0003	0.00	0.001
	(0.0002)	(0.0003)	(0.0004)	(0.001)
Investment ratio	−0.001	0.002*	−0.002***	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
Log (Population)	0.09***	0.06**	0.14***	0.15***
	(0.02)	(0.02)	(0.04)	(0.03)
Log (Trade)	0.03*		0.03	
	(0.01)		(0.03)	
Former colony	0.56***	−0.01	0.87***	
	(0.15)	(0.05)	(0.17)	0.01
Alliance	0.30***		0.38***	(0.08)
	(0.11)		(0.13)	
Constant	−1.54*	0.81	−5.08***	−4.87*
	(0.77)	(1.62)	(1.67)	(2.59)
Observations	2,724	922	2,322	900
R-squared	0.17	0.06	0.15	0.10
Number of donors	36	18	34	18

Robust standard errors clustered on donor in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

aid – exactly what we would expect if donors are being selective with their aid modalities. The third column similarly shows that better governance also results in large amounts of programmatic aid relative to technical assistance. The point estimates in columns 2 and 3 suggest that a country with a one-standard-deviation higher score on the governance index would receive an aid portfolio where the proportion of programmatic aid relative to either technical assistance or project aid was more than 55% larger as compared to an otherwise similar country. This is the average effect across 32 bilateral donors who use all three aid modalities in some subset of recipient countries.

Columns 4, 5, and 6 show that better governance leads to relatively more infrastructure project spending among bilateral donors. The variation is only statistically significant for the measure that looks at social sector aid relative to infrastructure aid. A country with a one-standard-deviation better score on the governance index would have 75% less social spending relative to infrastructure spending as compared to an otherwise similar country. These results correspond to a world in which donors selectively avoid large infrastructure projects in countries where governance is worse, preferring instead non-infrastructure projects in which outputs might be more easily monitored and accountability mechanisms might be more resilient.

It is worth calling attention to several of the control variables here. Although not statistically significant, the coefficients in column 1 and column 3 suggest that aid to military allies is allocated away from technical assistance and toward project and programmatic aid. Since programmatic aid has the fewest strings attached to the use of the money, this makes

it a way for donors to quickly provide funds for military allies. Columns 4 and 5 suggest that large trading partners receive significantly more infrastructure funding relative to social or productive sector aid, holding all else equal, which again makes sense if a donor's primary interest is in improving the depth of commercial connections by building infrastructure that helps get goods to international markets.

In columns 7 through 12, we present the results for multilateral aid flows. We find less evidence that multilateral donors increase the proportion of programmatic aid that they provide to well-governed countries. Across all six columns, the governance variable is signed the same way as in the bilateral donor regressions, but it is smaller in magnitude in all cases and estimated with substantial uncertainty. [34] In column 8, however, we find evidence that multilateral donors increase the amount of programmatic aid relative to project aid. A country with a one-standard-deviation better score on the governance index would have 30% more programmatic spending relative to project spending as compared to an otherwise similar country.

In Table 6, we add to the analysis dyads that are not comprehensive (i.e., dyads in which the value of aid for one or more modalities or one or more sectors is zero). We continue to limit the analysis to donors that give aid – to at least some recipients – using all modalities or in all sectors. In this fashion, the results generalize to a set of dyads with donors that could have chosen to give aid using a particular modality or in a particular sector but did not for some subset of recipients. As compared to Table 5, in these analyses, we replace the zero values with the minimum observed value for each log-ratio; doing so opens the possibility that the results might reflect the fact that some recipients are receiving more aid in general

Table 5. *Compositional Data Analysis among Comprehensive Dyads. Linear regression models where the outcome variable is specified as the log-ratio of two types of aid in a given dyad. All models include donor fixed effects*

	Relative amounts for types of aid from 2004 to 2010: Bilateral donors					
DV: log ratio of aid	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	TA/project	Programmatic/project	Programmatic/TA	Social/infrastructure	Productive/infrastructure	Industry/infrastructure
WGI Average	−0.05	0.55*	0.60**	−0.76***	−0.25	−0.28
	(0.13)	(0.27)	(0.23)	(0.22)	(0.21)	(0.29)
Log (GDP per capita)	−3.22***	−1.10	2.12	−1.06	1.43	−2.09
	(0.76)	(1.79)	(1.64)	(1.23)	(2.28)	(2.42)
Log (GDP Per capita)^2	0.23***	0.04	−0.18*	0.06	−0.08	0.16
	(0.05)	(0.12)	(0.10)	(0.08)	(0.14)	(0.15)
External debt ratio	−0.00004	−0.00005	−0.00	−0.002	0.0003	−0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Investment ratio	0.005	−0.001	−0.01	0.01	0.0004	0.01
	(0.004)	(0.01)	(0.004)	(0.01)	(0.01)	(0.01)
Log (Population)	−0.01	−0.14	−0.12	0.14*	0.17*	−0.04
	(0.04)	(0.11)	(0.11)	(0.08)	(0.09)	(0.13)
Log (Trade)	0.01	−0.08	−0.09	−0.17**	−0.24***	−0.00
	(0.03)	(0.08)	(0.07)	(0.08)	(0.07)	(0.12)
Former colony	0.03	0.99*	0.97	0.86*	0.30	−0.38
	(0.08)	(0.53)	(0.58)	(0.45)	(0.36)	(0.62)
Alliance	−0.35	0.18	0.53	0.07	0.41*	−0.37
	(0.35)	(0.32)	(0.57)	(0.28)	(0.21)	(0.37)
Constant	11.24***	6.63	−4.62	4.38	−5.73	2.72
	(2.79)	(7.18)	(6.78)	(4.80)	(9.33)	(10.02)
Observations	901	901	901	565	565	565
R-Squared	0.08	0.06	0.11	0.09	0.03	0.04
Donors	32	32	32	30	30	30
	Relative amounts for types of aid from 2004 to 2010: Multilateral donors					
DV: log ratio of aid	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	TA/project	Programmatic/project	Programmatic/TA	Social/infrastructure	Productive/infrastructure	Industry/infrastructure
WGI Average	−0.00	0.29*	0.30	−0.29	−0.59	−0.20
	(0.25)	(0.15)	(0.36)	(0.53)	(0.59)	(0.84)
Log (GDP per capita)	−0.28	1.04	1.32	−4.98	−3.11	6.36
	(1.27)	(1.66)	(0.89)	(4.49)	(6.40)	(4.90)
Log (GDP Per capita)^2	0.03	−0.08	−0.11	0.32	0.18	−0.35
	(0.09)	(0.12)	(0.07)	(0.27)	(0.39)	(0.31)
External debt ratio	−0.0002	0.001	0.001	0.001	0.01	−0.001
	(0.0004)	(0.001)	(0.001)	(0.01)	(0.02)	(0.01)
Investment ratio	0.001	0.003	0.002	−0.0001	−0.01	0.02
	(0.005)	(0.005)	(0.002)	(0.02)	(0.01)	(0.02)
Log (Population)	−0.05	−0.19**	−0.14*	−0.24*	−0.02	−0.31***
	(0.06)	(0.08)	(0.07)	(0.11)	(0.18)	(0.09)
Former Colony	0.44*	0.48***	0.04	−0.66	−0.30	0.41
	(0.23)	(0.09)	(0.22)	(0.50)	(0.35)	(0.61)
Constant	1.16	−1.90	−3.06	21.87	10.76	−27.04
	(3.88)	(5.36)	(2.42)	(19.16)	(24.81)	(18.19)
Observations	372	372	372	78	78	78
R-Squared	0.05	0.08	0.08	0.09	0.04	0.18
Donors	14	14	14	14	14	14

Robust standard errors clustered on donor in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Table 6. *Compositional data analysis among comprehensive donors. Linear regression models where the outcome variable is specified as the log-ratio of two types of aid in a given dyad. All models include donor fixed effects*

			Relative amounts for types of aid from 2004 to 2010: Bilateral donors			
DV: log ratio of aid	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	TA/project	Programmatic/project	Programmatic/TA	Social/infrastructure	Productive/infrastructure	Industry/infrastructure
WGI Average	−0.15	1.21***	1.44***	−0.77**	0.19	1.34***
	(0.19)	(0.39)	(0.44)	(0.29)	(0.23)	(0.40)
Log (GDP per capita)	−3.79***	4.62*	6.48**	1.45	0.63	7.36**
	(0.94)	(2.48)	(2.90)	(2.12)	(2.54)	(3.15)
Log (GDP Per capita)^2	0.26***	−0.38**	−0.52***	−0.12	−0.08	−0.48**
	(0.06)	(0.16)	(0.19)	(0.14)	(0.16)	(0.20)
External debt ratio	−0.001	−0.0005	−0.001	0.0004	−0.001	0.0001
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Investment ratio	0.003	−0.01	−0.01	0.001	−0.01	−0.01
	(0.003)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log (Population)	0.07	0.43**	0.45**	0.27*	0.35**	0.86***
	(0.06)	(0.17)	(0.18)	(0.13)	(0.14)	(0.22)
Log (Trade)	0.08**	0.21**	0.27**	0.03	0.06	0.12
	(0.04)	(0.10)	(0.10)	(0.08)	(0.08)	(0.13)
Former colony	−0.09	5.94***	6.33***	1.31*	2.68***	5.68***
	(0.14)	(1.22)	(1.46)	(0.64)	(0.69)	(1.70)
Alliance	0.23	2.50***	3.15***	0.98**	1.62**	1.03
	(0.37)	(0.84)	(1.04)	(0.46)	(0.65)	(1.00)
Constant	10.48***	−33.14***	−41.65***	−10.76	−9.66	−56.51***
	(3.84)	(9.09)	(10.73)	(8.68)	(9.83)	(14.04)
Observations	2,290	2,523	2,527	1,741	1,741	1,741
R-Squared	0.05	0.11	0.11	0.06	0.05	0.08
Donors	36	36	36	34	34	34

			Relative amounts for types of aid from 2004 to 2010: Multilateral donors			
DV: log ratio of aid	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	TA/project	Programmatic/project	Programmatic/TA	Social/infrastructure	Productive/infrastructure	Industry/infrastructure
WGI Average	0.45*	1.21	1.69	−0.67	0.37	0.48
	(0.25)	(0.82)	(0.99)	(0.43)	(0.30)	(0.97)
Log (GDP per capita)	0.49	−0.41	−3.09	2.23	1.09	14.14***
	(1.96)	(5.65)	(5.59)	(3.37)	(5.27)	(3.95)
Log (GDP Per capita)^2	−0.02	−0.09	0.06	−0.13	−0.12	−0.87***
	(0.13)	(0.36)	(0.34)	(0.22)	(0.34)	(0.23)
External debt ratio	0.001	0.00	−0.001	0.01*	0.002	0.002
	(0.001)	(0.002)	(0.004)	(0.003)	(0.004)	(0.005)
Investment ratio	−0.0003	0.03**	0.04**	0.005	0.01	0.01
	(0.004)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Log (Population)	0.19**	0.21	0.29	0.55***	0.43***	0.77***
	(0.08)	(0.27)	(0.33)	(0.13)	(0.11)	(0.19)
Former Colony	0.19	0.48	0.42	0.39	0.71	−0.52
	(0.22)	(0.73)	(0.93)	(0.40)	(0.52)	(0.70)
Constant	−7.33	−4.12	5.41	−23.78	−15.11	−84.50***
	(8.10)	(23.73)	(24.03)	(13.77)	(20.49)	(18.04)
Observations	847	739	746	652	652	652
R-Squared	0.02	0.06	0.07	0.06	0.05	0.06
Donors	18	18	18	18	18	18

Robust standard errors clustered on donor in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

rather than reflecting specific decision making about modalities and sectors.[35]

The results with regard to governance are quite consistent with those revealed in the previous table. Among bilateral donors, we find evidence that programmatic aid is larger relative to both project aid and technical assistance for countries that score high on the governance measure. We also see additional evidence that bilateral donors substitute more easily monitored social sector projects for infrastructure projects in poorly governed countries. Two of these three associations are estimated with less statistical uncertainty in this table as compared to Table 5. Here we also find new evidence that better governed countries are more likely to receive industry aid relative to infrastructure aid from bilateral donors. For multilateral donors, we continue to see coefficients that are similar to those from the regressions for the bilateral donors but that are estimated with much more uncertainty. The exception is in column 7, which provides evidence that multilateral donors allocate more technical assistance aid relative to project aid for donors with higher scores on the governance measure.

Given that total aid flows and the components of aid flows are jointly determined, it is a challenge to observe the extent to which donors are altering the composition of their aid flows separately from changing the overall total levels of aid. Having first provided some evidence that overall aid flows are increasing to better governed countries, we then showed that better governed countries also receive more diverse aid (i.e., aid that arrives using a larger variety of modalities and in a larger number of sectors). Then we used a series of compositional data analysis models to show that aid increases more in particular categories in better governed recipient countries. Analysis of bilateral donors with and without zero values provides evidence that programmatic aid increases relative to project aid and technical assistance in better governed countries and that rising levels of infrastructure aid may come at the expense of social aid (as the selectivity hypothesis would predict) in those same countries. These compositional models more accurately reflect the data-generating process as compared to models that take amounts or shares as their outcome variable.

It is interesting that multilateral donors, while selective in their overall aid flows, do not appear to be selective in the type of aid given to a recipient country. While many scholars have argued that multilateral donors are more selective when allocating funds to recipients, it appears that bilateral donors are more selective when choosing the type of aid to allocate to a particular recipient. This result deserves further investigation.

6. ADDITIONAL ROBUSTNESS CHECKS

In the Online Appendix, we provide a number of robustness checks and additional analyses. With one important exception, our results are robust to alternative operationalizations of key variables and the addition of other potential confounding covariates. In a number of the additional analyses, governance becomes a significant positive predictor of either the programmatic-to-project or programmatic-to-technical-assistance log-ratios for multilateral donors.[36]

First, we show that the coefficient on the governance variable changes if the basic controls for GDP per capita and population are not included; once these variables are included, the coefficient estimate is relatively consistent when the remaining core control variables are added. Beyond operationalizing level of development as GDP per capita, we test the robustness of the results to including additional proxies for development.

There is some slight attenuation of the governance variable when we control for infant mortality rate, school enrollment, or those variables in combination. The governance variable retains its sign across all replicated regressions and remains significant except for two cases when we include all of the alternative indicators at the same time. For multilateral donors, the inclusion of the poverty rate increases efficiency in such a way that governance becomes a significant predictor of the log-ratio of programmatic-to-project aid.

We explore alternative operationalizations of external debt and commercial ties. In the former case, operationalizing external debt as the ratio of bilateral debt to total exports causes the governance variable to attenuate and drop in significance to just below the 90% confidence level ($p < 0.12$) for the analysis of overall aid only; the changes to the compositional data analysis results from the inclusion of this variable are minor. All of the original results are robust to operationalizing trade as exports rather than combined imports and exports.

When we test the robustness of the results to the presence of four additional potentially confounding variables – democracy, an index of economic freedom, an indicator for the recipient country's status as a fuel exporter, and an indicator for the existence of civil war within the recipient country during the time period that we study – we retain all of our original results and find new evidence in several specifications that multilateral donors increase the amount of programmatic aid relative to either project aid or technical assistance.

Although we believe that the Worldwide Governance Indicators are the most appropriate operationalization of governance – since donors have stated the fact that they are attuned to these measures – we replicate our analyses using other governance variables. Using three alternative indices, we show that the overall aid flow results are the same as presented above for both bilateral and multilateral donors. Our results for allocation across modalities are also quite similar for bilateral donors and become newly significant for multilateral donors when using one of the alternative measures. In our analysis of allocation across sectors, there are some differences when alternative governance indices are used: rather than identifying a substitution of social sector assistance for infrastructure assistance in poorly governed countries, we are more likely to identify a substitution of productive assistance for infrastructure assistance.

We also disaggregate the combined governance index to show that, in most cases, it predicts as well as any of its individual components. We also examine what happens when each component is included alongside an aggregate measure of the other five components. The results seem to generally reinforce the idea that there is significant overlap among the Worldwide Governance Indicators, and no clear preference for one indicator over another is suggested.

Finally, we show that our results are robust to eliminating small emerging donors from the analysis and studying only the largest donors included in the dataset, and we show that the governance effects are mostly found among OECD-DAC donors and are not present for non-DAC donors.

7. CONCLUSIONS: WEAK GOVERNANCE BREEDS SEVERAL FORMS OF DONOR SELECTIVITY

Hout (2002, p. 511) described a "volte-face" in the late 1990s in the development policy world with regard to good governance being a prerequisite for development assistance. Studying the Dutch case, however, he noted that the implementation of selectivity might not live up to the rhetoric. Overall, while a

number of studies have found donor responsiveness to good governance in terms of their overall aid flows, others have found signs that donors' actions do not match their words, particularly when it comes to corruption. Studies that disaggregate aid into certain constituent parts have more consistently found a correspondence between recipient governance and certain types of aid flows. We look at overall aid flows, the choice of modalities, and the choice of project sectors using the comprehensive AidData database and find several indications of donor selectivity in the data. Looking at multiple levels of aid allocation allows for an examination of the many ways in which recipient-country governance might affect donors' allocation decisions.

In the period 2004–10, we find some evidence that overall aid flows are responsive to the extent of perceived quality of governance in recipient countries. Among the set of aid-receiving countries, our results generally indicate that those countries that are perceived as better governed obtain significantly more aid from both bilateral and multilateral donors during this period than otherwise similar countries that are perceived as poorly governed. An alternative operationalization of one of our key control variables does cause the estimate on this relationship to attenuate to an extent that the coefficient fails to achieve conventional levels of statistical significance. We also find some evidence that better governed countries receive aid through a greater number of modalities and in a greater number of sectors. The effect sizes for these differences, however, are small, and the increasing diversity may simply result from the increased aid flows that well-governed countries receive.

Using compositional data analysis techniques to look at the relative proportions of different types of aid that countries receive, we find evidence that bilateral donors give increasing proportions of programmatic aid to better governed countries, relative to both project aid and technical assistance. In addition, we find that bilateral donors give a larger proportion of infrastructure aid, relative to social aid, in better governed countries. Both of these results support the donor selectivity hypothesis: bilateral donors are giving less total aid and less fungible types of aid to poorly governed recipients. Perhaps surprisingly, we find more evidence of donor selectivity among bilateral donors than among multilateral donors, although in the additional analyses provided in the Online Appendix, there are a number of occasions on which governance becomes a statistically significant predictor of the log-ratios with programmatic aid in the numerator for multilateral donors as well.

Beyond selectivity with regard to governance, we find other patterns in the data that follow logical assumptions and results from previous scholarship. We find that donors provide larger and more diverse aid flows to military allies and former colonies, and in particular, we find some evidence that donors give more of their aid to military allies in the form of programmatic assistance, which is quick-disbursing and fewer-strings-attached money that allies can make ready use of.

The post-Washington Consensus era in development that has followed the end of the structural adjustment era has been defined by an emphasis on good governance. When looking for evidence that donors selectively provide aid in response to good governance, some scholars have suggested that this does not seem to be happening among international donors. However, we find evidence that it is and that it is happening at multiple levels, both in terms of overall aid flows and also in terms of the composition of those aid flows. Based on the evidence that we present here, criticisms that donors are not selective when it comes to governance appear to be overstated. Further work using appropriate statistical techniques for examining aid composition will continue to give us a better understanding of the ways in which aid allocation varies in relation to the recipient-country characteristics often cited in the best practices literature.

NOTES

1. For varying accounts of the development of the good governance agenda among major development institutions, see, among others, Neumayer, 2003b; Nanda, 2006; Grindle, 2007; Hout, 2007; Weaver, 2008; Diarra & Plane, 2011; and Gisselquist, 2012.

2. Gisselquist (2012) provides a summary of the different governance definitions that donors have used.

3. See the discussion of these three cases in Hout (2002, 2007)).

4. Not all voices in the aid community are in favor of this shift. Pronk (2001) describes a preference for an enlightened version of traditional conditionality over blanket selectivity.

5. This result is not robust to one modification in the operationalization of one of our core covariates. See the discussion in the Online Appendix.

6. Neumayer (2003b) provides a comprehensive review of literature from the 1990s.

7. With the term "programmatic aid," we seek to identify those types of aid flows that give significant amounts of implementing discretion to the host government. We view general budget support as the most extreme form of programmatic aid, where the government has almost total discretion over where and how the foreign assistance will be spent. For more information about how these terms are used, see the OECD-DAC "Coding Rules" spreadsheet available at http://www.oecd.org/dac/stats/dacstatisticsanewclassificationbytypeofaid.htm (accessed 15 June 2014).

8. See Koeberle and Stavreski (2006), however, for the argument that general budget support will lead to improvements in the quality of country systems. Koada and Samreth (2012) argue that foreign aid flows, in general, reduce corruption levels.

9. This fact causes some to doubt the extent to which technical assistance should be considered as a transfer to recipient countries at all. The actual aid often flows back to the donor country through consulting contracts (see the discussion in Easterly & Williamson, 2011, p. 1939).

10. A reviewer referred to this type of allocation of technical assistance to poor-governance recipients as "positive selectivity."

11. Akramov (2012) studies variation in aid allocation to different sectors but does not offer an explicit theory of the likely variation across those sectors.

12. Corruption in foreign-funded infrastructure projects has been discussed in previous work (e.g., Berkman, 2008; Cremer, 2008; Olken, 2007).

13. For examples of how social sector projects suffer from corruption, see Indonesian Corruption Watch (2005) and Wall Street Journal (2008).

14. Investment projects might include technical assistance components, and programmatic aid might be used to fund technical assistance activities. The types of aid that we include in our technical assistance category are those that are most likely to be stand-alone technical assistance.

15. We resort to using purpose codes because of the incomplete nature of the modality coding in the OECD-DAC data and also because of changes over time in the modality coding that we observed and that are described in the Online Appendix.

16. For the 2004–10 period that we study, there are 826 projects (out of 685,461) in AidData Research Release 2.1 for which no purpose code is available. We drop these projects from the analysis. We also drop 119 projects for which the commitment amounts were recorded as negative; all of these projects were reported by Australia in 2009 and most likely are the result of adjustments that Australia was making to its CRS data (authors' correspondence with AidData staff).

17. The chosen time period reflects a moment in time after the good governance agenda had become instantiated in donor discourse and therefore likely in donor policies as well and also starts shortly after the rise in aid and the changes in aid allocation associated with the beginning of the Global War on Terror (Fleck & Kilby, 2010). We were limited by the fact that the current AidData research release (2.1) only goes through February 2012 and by the limited availability of the OECD-DAC CRS modality variables that we use to craft our coding scheme.

18. In the Online Appendix, we provide the results of first-stage models that examine the decision to allocate any aid at all. The governance variable is not a significant predictor in these models.

19. In the Online Appendix, we present some preliminary donor-by-donor results.

20. In the Online Appendix, we show the results for an analysis of whether or not better governance leads to the use of each individual type of aid. Nearly all of the coefficient estimates are positive, which suggests that the analysis is mostly revealing that donors use more types of aid as they give more aid.

21. In the Online Appendix, we present models in which the outcome is a share variable that ranges from 0 to 1.

22. We also considered substituting for zero values with 65% of the smallest observed value for each log-ratio, but this value varies significantly across the different categories of aid. Given that the log-ratios follow normal distributions, such that the minimum values are in the tails of the distributions with few neighboring values, we prefer to instead duplicate the minimum observed value for the values that are observed as true zeros.

23. Both variables come from the World Development Indicators as recorded in the Quality of Government dataset (Teorell et al., 2013).

24. As measured in the Penn World Tables as recorded in the Quality of Government dataset.

25. From the World Development Indicators. The external debt variable has been found particularly influential in studies of IMF and World Bank lending (Dreher, Sturm, & Vreeland, 2009; Sturm, Berger, & de Haan, 2005).

26. In the Online Appendix, we show that the substantive effects of the governance variable are only slightly changed in specifications excluding these variables.

27. From the IMF's Direction of Trade Statistics.

28. From the Correlates of War database.

29. From Wahman, Teorell, and Hadenius's (2013) Authoritarian Regime Dataset as recorded in the Quality of Government dataset.

30. The estimated coefficients for bilateral and multilateral donors are not statistically distinguishable from each other; the 95% confidence interval for 10,000 simulated differences overlaps zero.

31. The coefficients, however, are very similar in size and are not statistically distinguishable from one another.

32. These results hold when we use a series of logistic regression models to look at the presence/absence of each type of aid within each dyad. We report these results in the Online Appendix.

33. The way in which this is not true is that technical assistance projects are generally smaller than investment projects and programmatic aid. Therefore, if a donor is scaling up aid to a particular recipient country, aid may disproportionately increase to the project and programmatic modalities relative to technical assistance.

34. Because of this high level of uncertainty, it is again impossible to say that the coefficient for multilateral donors is statistically distinguishable from that for bilateral donors.

35. Note the way in which the coefficients on the population variable have changed in this table *versus* the previous one. When looking at comprehensive dyads, population was not a statistically significant predictor for any of the bilateral models and was a negative and statistically significant predictor for three of the multilateral models; here, it is always positively signed and often statistically significant. These coefficients may be estimated off of differences between the large number of observations at the zero value mark and other observations.

36. In the Online Appendix, we report robustness checks for Table 6; we find very similar results when replicating Table 5.

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APPENDIX A. SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.worlddev.2014.09.020.