

# **Donors and Development**

## **Sector Allocation in Foreign Aid\***

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October 2008

### **Abstract**

This paper examines foreign aid allocation of OECD countries in the new millennium. During the Cold War, aid was often ineffective at promoting development because it was not given for development purposes. In more recent years, donors have increasingly cited the negative impact of underdevelopment abroad on their own countries. This suggests that the emphasis on development in aid policy should be much stronger. As such, donors are likely to care more about the needs of recipients and their capacity to use aid effectively. To test whether or not this is the case, I examine aid at the sector level. By disaggregating aid for the period 2000-2005, I show that donors condition aid on the quality of governance in recipient countries. The observed sector allocation suggests that donors respond to governance as a signal of recipient capacity to use aid effectively. Poorly governed countries receive significantly less aid for sectors where recipient government involvement is likely to be high. However, donors also recognize the increased need experienced by citizens in countries where the quality of governance is low. When donors are able to work around the recipient government, they may give more aid to poorly governed countries. The conditioning of aid on governance reflects a recent policy shift. There is no evidence of similar conditionality in the 1980s. I also introduce new measures of emergency need and immigration, which are shown to have a significant impact on aid allocation.

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\*Note: this paper represents a portion of my dissertation; the full document is available upon request. I thank Helen Milner, Robert Keohane, John Londregan, Christina Davis, Joanne Gowa, Jeff Colgan, Kris Johnson, Dustin Tingley, Christopher Achen, David Baldwin, Larry Bartels, Tom Callaghy, Angus Deaton, Jeffrey Frieden, Kosuke Imai, Joshua Loud, Andy Moravcsik, Richard Nielsen, Daniel Nielson, Christopher O'Keefe, Brad Parks, Kristopher Ramsay, Anne Sartori, Jeannie Sowers, Randall Stone, and Michael Tierney for useful feedback. I have also benefitted from participation in the International Relations Graduate Student seminar at Princeton and from conversations and presentations at Duke University, Stanford University, the University of Rochester, and the University of California-Irvine. Additionally, I received valuable feedback from panels at the 2006 annual meetings of the International Studies Association, American Political Science Association, International Studies Association - Northeast, the 2007 annual meeting of the International Studies Association, and the Oxford University Conference, "New Directions in Development Assistance," in June 2007.

There has been much scholarly debate regarding donor preferences in foreign aid policy. Attention has also been paid to differences in bilateral and multilateral aid strategies. Many studies contrast the relative importance of donor interest and recipient need in determining aid flows, following the influential work of McKinlay and Little (1977, 1978). In recent years, increased attention has been paid to the impact of recipient governance and/or policies on the allocation of aid. Neumayer (2003a) elevates these variables as a third category - “good governance” - to be tested alongside recipient need and donor interest.

This paper engages the debate regarding the importance of recipient need, donor interest, and good governance in determining aid flows. It asks whether or not donors are interested in promoting development abroad. I separately examine bilateral aid (summed across donors) and multilateral aid.<sup>1</sup> Although there have been several recent studies of aid allocation, the work presented here adds to the literature in significant ways. Perhaps most importantly, it changes the level of analysis from aggregate aid allocation to allocation by sector. Examining the pattern of sectoral aid allocation can give us insights missed at the aggregate level. This is particularly true with respect to the impact of recipient governance on aid flows. I also add new measures of recipient need and donor interest. Additionally, this is the first study to look at panel data for aid allocation in the new millennium and compare this period to the 1980s.

I analyze bilateral aid at the macro level, summing aid from all bilateral OECD donors. The goal is to determine whether donors, taken as a group, show an interest in giving aid to promote development. Examining the role of recipient need and good governance in allocation will help answer this. If donors have an interest in promoting development abroad, then both the need of the recipient and its capacity to use aid effectively (often measured by governance) should influence allocation decisions. If there is a global trend of donors increasingly concerned about problems caused by lack of development, then these effects should be strong enough to be observed at this macro level. Evidence that aid is not significantly conditioned on need and/or capacity would undermine the idea that development is a major goal of aid donors.

In what follows I first review the debate regarding aid allocation. I then offer a new interpretation of the role of governance in allocation decisions. Evidence is presented that disaggregating aid is an important step in better understanding donor intent. I then proceed with a panel analysis of bilateral aid at the sector level for 2000-2005. This is compared to multilateral aid as well as to bilateral aid from the 1980s. As part of the

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<sup>1</sup>In my dissertation, I also examine aid from individual donors.

analysis I introduce two new variables indicative of emergency needs, and a measurement of immigration.

## **1 Donor Interest, Recipient Need, & Governance**

In the evolution of the donor interest-recipient need-good governance literature, the need to analyze governance was emphasized after the donor interest/recipient need debate was underway. Therefore, it makes sense to begin a review of the relevant literature with this debate and then bring in the governance aspect.

### **1.1 Donor Interest and Recipient Need**

McKinlay and Little (1977) is the most obvious starting place for the modern empirical debate regarding the relative importance of donor interest and recipient need in determining aid flows. In this study of US aid, they find that measures of security and power better explain allocation than measures of economic interests and development concerns. Maizels and Nissanke (1984) look at the 1970s and find that allocation from bilateral donors is influenced mainly by donor interest, while multilateral donors are somewhat more attentive to recipient needs. Bilateral donors, they find, give more aid to richer countries (measured by GDP per capita) and to countries that receive larger arms transfers. Multilateral donors do not favor countries receiving more arms or rich countries, but they don't give significantly more to poorer countries either. However, McGillivray (2003) shows that methodological problems may have led some, including Maizels and Nissanke (1984), to underestimate the impact of recipient need on US allocation decisions during the Cold War. Looking at US aid in the 1980s, he finds evidence that poorer countries do receive more aid, but only after controlling for measures of donor interest.

Alesina and Dollar (2000) look at bilateral aid allocations from 1970-1994. They also find that aid is increasing in the income of the recipient (suggesting a low priority on need-based criteria) and that colonial status and similarity in UN voting patterns are important determinants of aid flows. Schraeder et al (1998) look at bilateral aid flows to Africa in the 1980s from the United States, Japan, France and Sweden. They conclude that economic and military factors play a role in determining aid flows from some donors, but that humanitarian need did not seem to play a role for any of the donors. Bueno de Mesquita and Smith (2007) examine US aid from 1945-2001. They present evidence that dyadic considerations and the size of the recipient's winning coalition are important determinants of aid, while development concerns are not.

Recent studies have been able to examine the post-Cold War period. Stone (2006) examines aid allocation for several bilateral donors from 1990-2001. Using colonial status, S-scores for alignment and UN voting similarities, a measure of exports, and measures of debt and donor debt exposure, as well as other controls, he concludes that donors use aid to buy influence, directing it to countries with low bilateral levels of strategic alignment and small populations where aid money can comprise a much larger portion of total receipts. He finds that concerns for development are secondary, at best. Neumayer (2003a) also looks at the 1990s and concludes that donor interest and recipient need each have a role in determining bilateral flows in that decade. Berthelemy and Tichit (2004) compare bilateral aid from the 1980s and 1990s. They find that recipient income is negatively associated with aid in both time periods. Status as a former colony is rewarded with more aid, although the effect is smaller in the 1990s. The impact of bilateral trade flows on aid receipts is the opposite: trade partners are more heavily rewarded with aid in the 1990s, although the effect is significant in both periods. These recent studies also address the impact of governance on aid flows, to which I now turn.

## **1.2 Governance, Growth, and Aid Allocation**

A substantial body of work links a country's governance and/or economic policies to its economic growth. Knack and Keefer (1995) show that countries with better scores on an index of governance indicators, including expropriation risk, rule of law, government repudiation of contracts, corruption, and bureaucratic quality have higher average annual growth in GDP per capita. Hall and Jones (1999) use the same index and conclude that countries with better governance experience more output per worker. Glaeser et al (2004) find significant evidence that lower expropriation risk and higher government effectiveness are associated with higher levels of growth in GDP per capita. Mauro (1995) finds that corruption lowers investment, and therefore growth.

Similarly, many economists have looked at the link between economic policies and growth. Easterly and Rebelo (1993) find that government budget surplus and government investment in transportation and communication are positively associated with growth. Fischer (1993) shows that large budget deficits, inflation and distorted foreign exchange markets are negatively associated with growth. Multiple studies conclude that openness or movements toward trade liberalization improve growth (e.g. Sachs and Warner,

1995; Wacziarg and Welch, 2003; Frankel and Romer, 1999; Dollar and Kraay, 2004, but see Rodrik et al (2004) and Rigobon and Rodrik (2004) for an opposing view). Thus, the cross-country growth literature suggests that countries with better scores on indicators of governance and economic policy experience more growth.

The literature on aid effectiveness has built off the finding that good governance and sound economic policies are important determinants of growth. Burnside and Dollar (2000) argue that the effect of aid on growth depends on the economic policies of the recipient country: aid is associated with growth in GDP per capita, but only in the presence of sound economic policies, measured as an index of government surplus, inflation, and trade openness. Several studies have questioned these results (e.g. Hansen and Tarp, 2000, 2001; Dalgaard and Hansen, 2001; Guillaumont and Chauvet, 2001; Easterly, Levine and Roodman, 2004; Rajan and Subramanian, 2005). However, the idea that policies are an important determinant of aid effectiveness has made its mark in the policy world, from the World Bank to the recently established Millennium Challenge Account (MCA) of the United States. In a new study Burnside and Dollar (2004) find that aid is effective only in countries with good scores on World Bank governance indicators. This, however, has not stopped the debate. Some studies have begun to argue for the disaggregation of aid flows when measuring aid effectiveness. Clemens et al (2004) show that when aid is limited to the subset of aid likely to have an impact on growth in a short time period, it is effective at spurring this growth. The impact is not only for countries with good policies in place, although the effect is greater in such countries. Bearce and Tirone (2008) conclude that aid is effective at promoting growth only in the post-Cold War period.

It is beyond the scope of this study to resolve the heated debate about the impact of governance on aid effectiveness. Rather, this debate is presented as a backdrop that has prompted interest in the effect of recipient governance on aid allocation. Scholars have chosen to view governance as a measure of recipient capacity (or, more cynically, willingness) to use aid to promote growth. If donors care about promoting growth, according to this argument, they should give aid disproportionately to countries with good governance. The relationship between governance and aid flows is viewed as an indicator of donor intent. Failure to prioritize governance demonstrates that donors care little about the effectiveness of aid. Alesina and Weder (2002) argue that “if one finds that governments that are more corrupt receive more foreign aid, one could safely interpret this finding as a failure in the decision process allocating aid amongst developing countries” (1127).

Alesina and Dollar (2000) claim that “the allocation of bilateral aid across recipient countries provides evidence as to why it is not more effective at promoting growth and poverty reduction” because “bilateral aid has only a weak association with poverty, democracy and *good policy*”(55, emphasis added).

If targeting good governance is a sign of donor intent with regard to development, the existing evidence suggests donors care little about this. Alesina and Weder (2002) examine bilateral and multilateral flows from 1970-1995. They find that more corrupt countries do not receive less aid either from bilateral (summed across donors) or multilateral sources, although this pattern varies across individual bilateral donors. Stone (2006) finds that “aid is only weakly related to development needs and the quality of domestic governance” (17) in the period 1990-2001. Alesina and Dollar (2000) find that, on average, donors do not reward respect for civil liberties and rule of law with more aid. Aid is increasing in democracy and openness, but they find these effects to be small in comparison with the impact of former colonial status and UN voting similarities. Collier and Dollar (2002) claim that reallocating aid based on a country’s poverty rate, elasticity of poverty with respect to income, and *policy profile* would allow the present volume of aid to lift almost twice as many people per year out of poverty through increased growth. In a study of multiple donors, Neumayer (2003a) finds that good governance was not a factor influencing bilateral aid flows in the 1990s.

A few recent studies have conducted comparisons across time. Burnside and Dollar (2004) find that better scores on a measure of rule of law were associated with higher amounts of total aid in the 1990s, but not in the 1980s. However, this improvement in the 1990s appears to be limited to multilateral donors, as the impact on aid from the World Bank is much larger and more significant than that on total (bilateral plus multilateral) aid flows. In a contrasting piece, Berthelemy and Tichit (2004) find some evidence that better economic policies (measured by a higher growth rate) influence aid in the 1990s but not in the 1980s. Many studies have found that democracy is positively associated with aid receipts. It is not democracy but separate components of governance, such as rule of law, level of corruption, or economic policies, that most studies find have little impact on aid flows.

### **1.3 New Thoughts on an Old Debate**

This paper makes several contributions to the crowded literature on the importance of recipient need, good governance, and donor interest in aid allocation. The first is to disaggregate aid. Donors may use different

tools to target aid, based on the varying characteristics of the recipients. This might be particularly true for governance.

**Reinterpreting the Role of Governance** As was seen above, it has become the norm to include measures of governance, institutions, or government policy as potential determinants of aid flows. For shorthand I will refer to these as “governance,” following the terminology in recent literature. They are generally included as a measure of government capacity. Governments that have better institutions, sound policies and low levels of corruption are more likely to be successful at stimulating their economies and improving per capita income in their countries.

However, governance is not only a measure of capacity, but also of recipient need. This point has been overlooked in recent studies of aid allocation. Countries that are well managed may simply need less assistance from the outside. For example, Sen (1999) argues that the incidence of economic calamities is inversely related to the level of political rights in a society. Kahn (2005) argues that there are more annual deaths per capita from natural disasters in countries with poor governance: he shows that better scores for democracy, protection against expropriation risk, rule of law, control of corruption, voice and accountability, and regulatory quality are all associated with significantly fewer deaths per capita from natural disasters. And, it is not obvious that countries with poor governance have greater need only in the face of emergencies. Individuals living in countries with worse governance may also have less access to quality social services, for instance. Their government may lack the desire or ability to provide these services to broad sections of the population.

Recognizing the relationship between governance and need is quite important for understanding the role governance may play in determining aid flows. Good governance may simultaneously indicate two different things: an increased capacity to use aid effectively for development and a decreased need for external assistance. Donors may seek to give more aid to countries with the capacity to use it well. If this is the case, according to the traditional argument, we should see more aid channeled to recipients with good governance. However, donors may have an interest in development even in poorly governed countries. If this is the case, and if poor governance indicates increased need, then it is possible for *worse* governance to be associated with *more* aid as part of a donor development strategy.

**Aid by Sector** To address the governance issue, as well as to look more closely at the recipient need and donor interest variables, I examine aid allocation by sector. Donors have many tools at their disposal to target aid for development. They can alter the total amount of aid that they give a recipient. However, they can also change the composition of the aid. It may be that countries with poor governance get a different basket of aid than countries with good governance. When worried about capacity, donors may choose to give aid through outside providers, such as NGOs or multilateral organizations, rather than give it directly to the recipient government. They may decide to give aid in the form of technical cooperation (knowledge building), as opposed to through a program grant. Governance may have a positive impact on aid to some sectors and a negative impact in other instances.

This point was illustrated by Former British Secretary of State for International Development, Hilary Benn, in an open debate with William Easterly. He writes, “some have argued that in the worst cases - where corruption is rife and governance poor - we should walk away. But we cannot abandon aid just because a country has corrupt leaders. What we have to do in such circumstances is to shield aid from corruption while continuing to help the poor. Around the world, DfID finds practical ways to ensure that aid cannot be siphoned off. We can and do directly fund the concrete things which, as you say, can help make the poor more able to contribute to change from below. Or we can earmark aid for a particular programme of work in a sector and account for that money independently through a separate bank account. We do this in the education sector in Kenya, where the financial risk of handing over money to the government is too great.”<sup>2</sup>

This paper analyzes donors’ use of different tools for allocating aid. If donors systematically behave the way the last paragraph suggests, we should see evidence of this in allocation patterns. Disaggregating aid allows us to look for this evidence.

**Changes over Time** This is the first study to compare aid in the new millennium to Cold War aid. Earlier studies analyzing post-Cold War aid were necessarily limited to the 1990s. This is problematic for several reasons. The 1990s were a period of transition. A major motivation for aid had been eliminated across the globe almost overnight. It is likely that it would take time to formulate and implement a new global policy

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<sup>2</sup>See the debate, “Is Foreign Aid Working?” between Hilary Benn and William Easterly, Prospect Magazine, Issue 128: November 2006, at [http://www.prospect-magazine.co.uk/article\\_details.php?id=7914](http://www.prospect-magazine.co.uk/article_details.php?id=7914).



for aid. Additionally, aid in the 1990s was likely influenced disproportionately by aid to former communist areas. Many new states formed rapidly. Some have since graduated from aid eligibility and themselves joined the OECD. Others are still aid recipients. Yet aid commitments to Eastern Europe in the immediate wake of the Cold War may not be representative of their long-term trends.

Finally, the relationship between richer and poorer nations is different today than it was in the early 1990s. This was a period of rapid increases in economic integration between industrialized and developing countries. Concerns about the environment and global warming have grown significantly. And terror attacks around the globe, particularly the attacks of September 11, 2001, have shown the devastating impact of hatred and discontent bred half a world away. To better understand aid policy today, the empirical analysis here focuses on sectoral aid allocation for the period 2000-2005. It then compares this period with the final years of the Cold War, 1984-1988.

**New Variables** All studies of aid allocation necessarily control for some measure of need. Typically these include per capita income, life expectancy, infant mortality, the human development index and/or the physical quality of life index. It is essential to include some measure of the underlying needs of the society. Each of these measures goes some way toward that, although there remains some disagreement over which is the most appropriate. However, there are also immediate needs created by shocks to a country that can occur from natural or man-made disasters. The idea behind controlling for recipient need is to determine the extent to which donors consider this when making aid allocation decisions. If they do consider need, they are likely to consider these sudden needs in addition to underlying needs. To capture this, I include for each recipient the number of refugees in the country and the number of people affected by a natural disaster in the country in a given year. I also include an indicator variable for the presence of civil war, although this last is not an innovation of the current work.

I include a measure for immigration to OECD countries as an explanatory variable. Immigration is an important topic in the foreign aid debate. The website for the US aid organization USAID contains numerous references to immigration.<sup>3</sup> While conducting research on foreign aid in Nicaragua I had the opportunity to speak with a Swiss foreign aid official. When asked which issues, if any, come up in debates about foreign

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<sup>3</sup>See [www.usaid.gov](http://www.usaid.gov).

aid, the first response dealt with immigration.<sup>4</sup> Surprisingly, the scholarly literature has paid little attention to the potential link between immigration and aid flows. Policy makers may view promoting development abroad as a way to cut down on low-skilled migration. Aid may be disproportionately targeted at those countries sending more immigrants to donors. If so, it would suggest a strategic motive for giving aid - one that is linked with development promotion. While this variable may be more meaningful in a dyadic setting, I introduce it here to examine its effect on total bilateral aid.

## 2 Methods and Hypotheses

This section demonstrates the different tools available to donors for distributing aid. It shows how the use of those tools differs by sector. These differences increase the validity of using sector analysis to better understand donor intent in recipient countries. I also describe the data available on sector allocation of aid.

### 2.1 Tools in Aid Delivery

Donor governments can choose among multiple channels for aid delivery. For instance, if a donor desired to circumvent recipient government involvement in aid, it might channel its aid through a multilateral organization or a NGO. The OECD recently began collecting data on channel of delivery, where channel can be specified as NGO/civil society, multilateral organization, public-private partnership (a very small category) or public sector. Public sector is somewhat ambiguous, as it can apply to public sector for the donor or recipient. However, in practice donors seldom have their own government agencies operating on the ground without some involvement from the recipient government. On average we would expect recipient government involvement to be higher for aid delivered through public sector channels than for aid delivered through multilateral organizations or NGOs.

Additionally, donors can provide aid in different forms. These range from cash grants, to in-kind aid, to knowledge exchange that requires no physical or monetary resources to change hands. The OECD refers to this as the “type” of aid, and it breaks it down into sector programme aid, investment project aid, and technical cooperation. *Sector programme* aid is generally viewed as the type where recipient government involvement will be greatest. It has come into common usage only recently, as a way to give recipients more

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<sup>4</sup>Author interview, Managua, Nicaragua, March 2006.

ownership over their programs. According to OECD reporting directives it “comprises contributions to carry out wide-ranging development plans in a defined sector such as agriculture, education, transportation, etc. Assistance is made available ‘in cash’ or ‘in kind’, with or without restriction on the specific use of the funds, but on the condition that the recipient executes a development plan in favour of the sector concerned.” *Investment project* aid is a more traditional form of aid. According to the OECD’s CRS reporting directives, “investment projects comprise a) schemes to increase and/or improve the recipient’s stock of physical capital and b) financing the supply of goods and services in support of such schemes.” *Technical cooperation* has also been around a long time. In fact, the first aid program to the developing world after WWII, announced by Harry Truman, consisted of technical cooperation. DAC defines technical cooperation as “the provision of know-how in the form of personnel, training, research and associated costs.”<sup>5</sup> Since it involves the transfer of knowledge, it does not consist of financial resources that a recipient government could choose to use for other purposes.

As seen above, quality of recipient governance may simultaneously serve as a signal of the capacity (or willingness) of recipient government to use aid for its intended purpose and of the need for outside assistance. Concerns about capacity would lead donors to give more aid to countries with good governance, if these donors care about using aid to promote development and help the poor. However, donors may want to give aid in poorly governed countries where the need is likely to be greatest. In the latter case, they might look for ways to give aid that are less susceptible to the problems of poor governance.

Table 1 examines donors’ use of aid channel and type to differentiate among recipients based on their governance. Aid data are from the OECD International Development Statistics online CRS dataset. The variable *Governance (GM)* is an aggregation of measures published by the World Bank Governance Matters Project, with higher scores indicating better governance. These and the control variables are described more fully below. I choose to analyze 2005 because reporting of channel and type has improved over time, particularly for channel. There are still some coverage limitations which should make us cautious about drawing too strong a conclusion from Table 1. I examine these more below. However, with this in mind, the results presented are certainly suggestive.

In Model 1, the dependent variable is the percent of aid allocated through the public sector (as opposed

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<sup>5</sup>Definitions are from CRS reporting directives for type of aid, except in the case of technical cooperation where the DAC directives provided a more concise definition.

	Percent Public Sector (1)	Percent Technical Cooperation (2)
Governance (GM)	0.307*** (0.056)	-0.337*** (0.060)
Civil War	-0.138** (0.066)	-0.081 (0.071)
Income	0.043 (0.029)	0.057* (0.032)
Population	0.020 (0.014)	-0.039*** (0.015)
Constant	0.219 (0.308)	0.653* (0.329)
Observations	103	103
R-squared	0.378	0.256

Table 1: Impact of Governance on Channel and Type of Aid, 2005. Dependent variable is aid channeled through the public sector as a percent of all aid reported by channel in column 1. Dependent variable is aid in the form of technical cooperation as a percent of all aid reported by type in column 2. Low and lower-middle income aid recipients. OLS, with standard errors in parentheses. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

to through NGOs or multilateral organizations). Donors may attempt to use non-government methods of delivery when the recipient government lacks the capacity or willingness to use aid for its intended purpose. If so, we would expect to see a greater share of aid channeled through the public sector as governance improves. In Table 1 we see that this is the case. The percent of aid channeled through the public sector is increasing in governance. Additionally, less aid is channeled through the government when there is a civil war in progress, further suggesting a role for capacity in determining channel of delivery. Model 2 shows a significant, negative relationship between governance and the percent of aid given as technical cooperation (as opposed to program assistance or investment projects). As this is likely to be the least fungible form of aid, it provides further evidence that donors use the tools available to them to customize aid across recipients.

The poorer the governance in a recipient, the more likely donors are to opt for less tangible forms of aid, such as technical cooperation. Additionally, in poorly governed recipients donors are less likely to choose public sector providers. Previous studies have not analyzed the impact of governance on channel or type of aid delivery. These new results suggest that donors may care about governance more than has been found in the past. However, the limitations on these data mean that we need a more robust test of the importance of governance. Analyzing the sectoral composition of aid can provide this. The following section summarizes

the data available on sector allocation and the differences in channel and type across sectors.

## 2.2 Sector allocation

For this analysis I use data on aid commitments by sector. The reporting directives for DAC define a commitment as “a firm written obligation by a government or official agency, backed by the appropriation or availability of the necessary funds, to provide resources of a specified amount under specified financial terms and conditions and for specified purposes for the benefit of a recipient country or a multilateral agency.”<sup>6</sup> Commitment data are used rather than disbursement data because commitments will adjust more quickly based on changes in a recipient. There is a greater lag for disbursements since they in part represent commitments made in a previous year. Note that commitment as defined here is not equivalent to a press release, which often promises more than is actually delivered. Instead, there has historically been a high correlation between commitment and disbursement data as reported by the OECD.

Data on aid commitments by sector for each country were obtained from the OECD’s International Development Statistics CRS online Database on Aid Activities. For the bilateral analysis I use data on aid aggregated for all DAC members (“Bilateral”), reported by recipient and sector on an annual basis. DAC consists of 22 industrialized aid donor countries.<sup>7</sup> The aid referred to as “Total DAC” includes all bilateral aid from DAC members, but not aid from multilateral organizations such as the IMF, World Bank, UN or regional development banks, even though this is partially financed by these same donors. For the multilateral analysis I use aid aggregated across 15 Multilateral donors reported in CRS, mainly international development banks and UN agencies.<sup>8</sup>

DAC reporting breaks aid down by the following sectors: Social Infrastructure and Services, Economic Infrastructure, Production Sectors, Multi Sector, Commodity Aid/General Program Assistance (including general budget support and development food aid), Action Relating to Debt, Emergency Assistance and Reconstruction, Administrative Costs of Donors, Support to NGOs, and Unallocated/Unspecified; sub-sector

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<sup>6</sup>DAC STATISTICAL REPORTING DIRECTIVES, April 6, 2007, available online at <http://www.oecd.org/dataoecd/28/62/38429349.pdf>.

<sup>7</sup>DAC members include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States.

<sup>8</sup>Multilateral donors include the African Development Bank, African Development Fund, Asian Development Bank, Asian Development Fund, European Communities, IBRD, IDA, Inter-American Development Bank, Inter-American Development Bank Special Fund, IFAD, UNDP, UNICEF, UNAIDS, FTI, and GFATM.

	Bilateral (DAC)	Multilateral
Social Infrastructure & Services	33	37
Economic Infrastructure	13	19
Production Sectors	6	10
Multisector	7	7
General Budget Support	3	13
Food Aid/Food Security	2	2
Debt Relief	19	1
Emergency Assistance/Reconstruction	8	8

Table 2: **Composition of Aid by Sector, 2001-2005.** Author calculations based on aid commitment data from the CRS online database. Numbers reflect each sectors percent of the total allocated by sector. Totals do not sum to 100 because of small amounts to other categories not reported here.

data are also available. Table 2 shows the percent of multilateral and DAC bilateral aid from 2001-2005 that was spent in each major sector. Note that for bilateral aid the percentages for other sectors are negatively impacted by the historically high amount of debt relief during this period.

Social Infrastructure and Services (social sector) aid includes funds for education, health, population, water, and government and civil society. Economic infrastructure aid is mainly used in transportation, communications, energy, banking and finance, and business services. Production sectors include agriculture, forestry, fishing, industry, mining, construction, trade, and tourism. Multisector covers general environmental protection, and “other multisector” including urban and rural development; most of this aid is simply classified as “other multisector”. General budget support consists of “unearmarked contributions to the government budget; support for the implementation of macroeconomic reforms (structural adjustment programmes, poverty reduction strategies); transfers for the stabilisation of the balance-of-payments (e.g. STABEX, exchange rate guarantee schemes); general programme assistance (when not allocable by sector)”.<sup>9</sup> Food aid includes food for development purposes, but not emergency food aid (which is included in emergency relief and reconstruction). Debt relief includes debt forgiveness, debt swaps, assistance in paying multilateral debt, etc. Emergency assistance and reconstruction is meant to include help rendered for a situation that is the result of a man-made or natural disaster.

<sup>9</sup>This and all sector descriptions comes from the REPORTING DIRECTIVES FOR THE CREDITOR REPORTING SYSTEM, 11/4/07, available online at <http://www.oecd.org/dataoecd/16/53/1948102.pdf>.

## 2.3 Channel and Type of Aid Across Sectors

A general reading of the sector descriptions suggests that there may be differences across sectors in how aid is allocated. Particularly, some sectors may require more involvement from the recipient government. NGOs routinely work with food aid and provide social services. It seems less likely that they would be involved in revamping communications, building roads, or modifying trade policy. United Nations organizations such as UNICEF and UNDP often have a role in disaster assistance; one rarely hears of them providing funding to fix problems in the banking sector or business services. On the other end of the scale, general budget support is money given without earmarks to the recipient government to support their budget as they best see fit. Additionally, some sectors will lend themselves more to knowledge transfers through technical cooperation. Donors can choose to give to the social sector by providing teachers or training midwives, for example. This section analyzes channel of delivery and type of aid by sector to see if there is a pattern indicating differences across sectors.

**Channel of Delivery** Table 3 shows the percent of bilateral aid by channel of delivery for five main sectors. Budget support and debt relief are not analyzed since all of the aid in these categories is intended directly for the government. Some caution must be exercised in examining the data in Table 3. Data by channel did not become available until quite recently, and coverage is still improving each year. For that reason, the analysis is restricted to 2005 to get a snapshot of the year with the best coverage. Still, some donors do not report aid by channel of delivery, and the amount of aid with “no mark” exceeds 60 percent for economic infrastructure, production sectors and social sector aid. Food aid does relatively better with 71 percent of its aid categorized by channel; emergency relief has over 50 percent categorized. Percents in the table are based on the total for which channel is specified.

While care must be used when examining these data, they suggest that the use of delivery channels differs across sectors. This appears to reinforce what common knowledge would suggest. Economic infrastructure has very little aid channeled through NGOs or multilateral organizations (8 percent), 22 percent of aid to production sectors comes through these channels, and 36 percent of aid for social sectors. This suggests that the ability to work around the recipient government may be larger in the social sector than in economic infrastructure. The vast majority of food aid and emergency relief is channeled through non-governmental

Delivery Channel	Economic Infrastructure	Production Sectors	Social Infrastructure & Services	Food Aid	Emergency Relief
Public Sector	92%	78%	63%	13%	9%
NGO & Civil Society	2%	11%	20%	66%	29%
Multilateral Org.	6%	11%	16%	18%	62%

Table 3: Channel of Delivery by Aid Sector, 2005. Author calculations based on data in the OECD International Development Statistics online CRS dataset. Totals may not sum due to rounding and a very small percentage that is channeled through public private partnerships. Data are partial and should be interpreted with care, as much aid is not reported by channel of delivery. Percents are based on the channel percent of the total reported by channel.

Type of Assistance	Economic Infrastructure	Production Sectors	Social Infrastructure & Services
Sector Programme	11%	16%	14%
Investment Project	70%	40%	22%
Technical Cooperation	19%	44%	64%

Table 4: Type of Aid by Sector, 2005. Author calculations based on data in the OECD International Development Statistics online CRS dataset. Percents are based on the type percent of the total reported by type.

sources, suggesting even less of a role for the recipient government in these sectors. The higher rate of reporting for these sectors gives additional confidence that these numbers approximate the true percentages.

**Type of Aid** Table 4 provides the percent of bilateral aid by type for each sector for which this is relevant. Coverage here is much higher than for channel of delivery. For economic infrastructure 92 percent of aid has a type indicated; the comparable numbers are 86 percent for production sectors and 85 percent for social sectors.<sup>10</sup> The analysis is again restricted to 2005 to get the best coverage for a single year. Percents are calculated from the amount of aid allocated to one of these three types in each sector.

The results again indicate important differences across sectors. More than 60 percent of the aid given to the social sector is in the form of technical cooperation. The corresponding number for economic infrastructure is only 19 percent, with production sectors falling in the middle.

**Analysis** The question often asked is whether donors distinguish between recipients based on their governance. The implication is that examining the relationship between aid allocation and governance can tell

<sup>10</sup>In addition to the categories reported here, CRS also has marks for combined categories, such as “sector programme and technical cooperation”. These numbers are not included here, since it was not possible to divide the categories. These combined categories represent only small amounts; most aid is indicated by a single type. Note that while coverage is quite high in these sectors, in some sectors type is less often indicated, perhaps because it is not applicable (e.g. budget support or debt relief).



us something about donor preferences regarding aid. Because good governance can simultaneously indicate increased capacity and decreased need, the relationship between aggregate aid flows and governance is not very helpful in providing information about donor intent. Differences exist in channel of delivery and type of aid across sectors. These suggest that recipient governments are more involved in aid activities in some sectors than in others. Because of this, sector analysis provides a useful environment for understanding donor reactions to the two different messages sent by quality of governance in a potential recipient.

Suppose that poor governance signals an increased need for assistance in all sectors. It also indicates a decreased likelihood that the recipient government will use aid for development purposes in all sectors, *if the recipient government has another option*. If donors care about using aid effectively *and* about helping those who need it most, the relative salience of these two signals to donors will vary across sectors. As the role of the recipient government in providing aid in a sector falls, the importance of the need-based signal, relative to the capacity signal, will increase. For example, in economic infrastructure public involvement in aid delivery is high and a relatively small percent of aid is given in the form of technical cooperation. This suggests that the capacity of the recipient government will be important for ensuring aid is used for development purposes in this sector . We might reasonably expect that a donor interested in building up economic infrastructure would strongly condition this aid on governance, knowing that it would be ineffective in a poor governance environment.

For social sectors the salience of the capacity signal would be less. Here donors have a greater ability to limit recipient government involvement by providing aid through non-government channels and in the form of technical cooperation. In analyzing food aid and emergency relief one would expect that the impact of the need signal would dominate. Most of this aid is given through non-government channels. In general, as a donor's ability to circumvent the recipient government increases, the ability to respond to poor governance as a signal of increased need, rather than of diminished capacity, also increases. Of course, donors may not care about recipient need or capacity at all. If that is the case, there would be no reason for them to allocate aid differently across sectors based on the quality of recipient governance.

Figure 1 shows the general relationship we would expect to see between the salience of the need signal relative to the capacity signal on the vertical axis, and the amount of recipient government involvement in aid on the horizontal axis. It is used to illustrate a point; nothing is meant to be implied about the exact

### Relative Salience of Need to Capacity Signal Sent by Governance

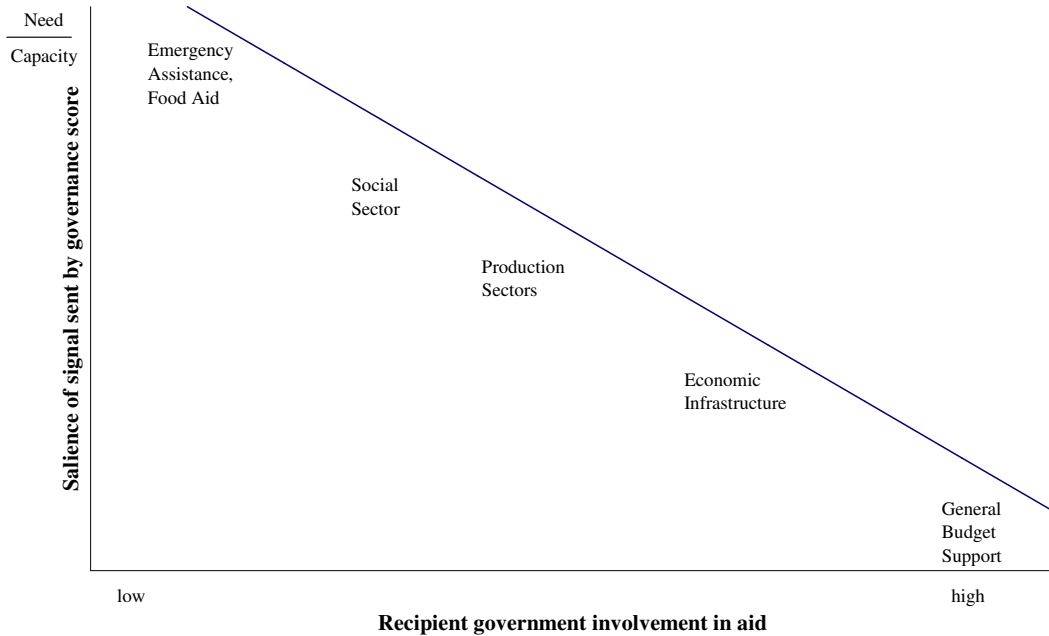


Figure 1

functional form such a relationship might take. When recipient government involvement in aid delivery is low, as occurs on the left side of the figure, donors will place more importance on the degree of need signaled by a country's governance score. On the right side of the figure, government involvement in aid delivery is high. Therefore, donors place a larger significance on the amount of recipient capacity signaled by its level of governance. The main sectors analyzed here have been placed along the line. They are ranked by the degree of government involvement we might expect based on the breakdown of aid type and channel of delivery in each sector. The figure is meant to present a rough ordering, not to imply anything specific about the distances between sectors.

If donors care both about capacity and need, then the increase in aid given for better governance should be at its lowest (and likely negative) for sectors on the top left in Figure 1. This is where the salience of the need signal, relative to the capacity signal, is highest. Better governance would have an increasingly positive impact on aid levels in sectors as one moves down the line from the top left to the bottom right.

I will test the hypothesis that donors consider the capacity and need of a recipient when making aid allocation decisions. To do so, I will examine the impact of governance on aid commitments across sectors. The expectation is that this will vary as described here, based on the relative salience of capacity and need for the sector. This hypothesis will be tested against the alternative that governance does not impact aid, and the alternative that the impact of governance, if significant, is not different across sectors. This latter might arise if donors viewed better governance as a signal of increased capacity, but not also of diminished need.

### **3 Data and Variables**

The main analysis looks separately at bilateral and multilateral aid commitments from 2000-2005. This actually covers only 5 years of data, as the main governance indicator, described below, is not available for 2001. Following this I extend the analysis back to look at commitments during 1984-1988. I include all countries classified by the World Bank as “low” or “lower-middle” income. I exclude aid recipients that are not countries. This is both because donor practices may be different for territories and because many sources for data on independent variables do not include territories. It is necessary to exclude aid to high income countries when doing the analysis in order to be consistent across time. While donors may still give money to countries such as Israel, in recent years they are no longer allowed to classify this as official development assistance. Therefore, it is not captured in the aid data. This was not true in earlier time periods, when Israel was a large recipient of ODA. To avoid the possibility that changes across time are due to changes in the population of countries, I do not include high income countries in any time period.

I also exclude countries classified as “upper middle income.” It is possible that these countries, which often have access to significantly more private capital than lower income countries, represent a population of aid recipients with different needs. While there are more than 20 countries in this category at any time, they received only about six percent of ODA commitments in 1985 and less than four percent in 2005.<sup>11</sup>

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<sup>11</sup> Author calculations based on data in the OECD International Development Statistics online database, table DAC3a, based on

Previous studies have shown results on aid effectiveness to be sensitive to the inclusion of countries in this category. Therefore, I have chosen to exclude these countries, while recognizing that the results reported below may not hold for the five percent of aid allocated to them.

The result is a dataset of 114 countries, although three of them graduate to upper-middle income status by 2005. As with any statistical analysis of developing countries, some observations will get dropped because of data availability. For the most inclusive results reported country coverage is quite high. For example, in 2005 it is possible to include 103 out of 111 potential recipients. The following countries are dropped for that year because they lack data on key indicators such as income: Afghanistan, Cuba, Iraq, North Korea, Somalia, Turkmenistan, Tuvalu, and Zimbabwe. By far the most important of these, based on aid receipts, are Afghanistan and Iraq. However, it would have been necessary to treat these two cases as outliers. Furthermore, it is unclear how one should interpret the impact of governance on aid flows in these countries. It is likely that donors think differently about governance when they have a military presence on the ground and when the donor can control distribution of a significant portion of aid in the country if it chooses. Nevertheless, the lack of data for these countries is regrettable.

**Dependent variable** Data for the dependent variable come from OECD's International Development Statistics online CRS database. They represent aid commitments by sector, either summed across bilateral (DAC) donors or multilateral donors. I use data in constant (2005) US dollars and take the natural log. Because of the possibility of zero values, I add one to the data before taking the log. For many sectors this is not necessary when aggregating across donors, as most recipients receive some aid for each of the major sectors in any given year. For sectors such as budget support, however, which are used less often, this proves necessary.

**Governance Variables** In the main analysis I use as a measure of governance an aggregate measure from the Governance Matters (GM) project (Kaufmann et al, 2006). This project reports data on six variables: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. These data are available every other year beginning in 1996 and annually from 2002. To create these variables, researchers collect data from 31 sources across 25 organizations that track governing aid to UMIC by total aid from DAC country donors.

nance, including the World Bank, regional development banks, universities, NGOs, and business consultant groups. In addition to rankings by country experts from many organizations, these sources also include surveys of business owners and polls of individuals conducted by organizations such as Afrobarometer. Values range from -2.5 to 2.5, with higher numbers representing better governance. Multiple scholars have used these individual variables or some combination of them in work on growth and policies. I use the average of a country's score on these variables, excluding voice and accountability, as a measure of governance (*Governance*). It is necessary to exclude voice and accountability since the Freedom House measures of political rights and civil liberties are components of this variable. I use Freedom House data below to control for democracy.

The greatest advantage of this governance indicator is its availability across countries: all countries included in this analysis have data on this indicator for at least one year (coverage has improved over time, although it is quite high in all years). Several other commonly used measures of governance lack coverage on as many as one-third of the relevant countries, and it is doubtful that observations dropped in this manner are randomly selected across the variables of interest. A drawback of this governance variable is that it is only available from 1996 and only for every-other year until 2002, which limits comparisons across time and the number of data points available for statistical analysis.

Lack of historical data on the GM variable make it necessary to rerun the analysis with a different measure to compare the recent period with the Cold War period. I introduce this variable at the relevant point below. An advantage of this is that it will also serve as a robustness check on the results reported here, to see if they are dependent on the choice of governance indicator.

The analysis will examine whether the size and sign of the coefficient on governance vary across sectors. The expectation is that if donors read scores on governance as indicative of both capacity and need (but in opposite directions) then the impact of governance will vary across sectors as described in the previous section. This is tested against the null hypothesis that donors do not respond to signals of governance differently by sector.

**Democracy** Previous studies on foreign aid allocation have generally used data from Freedom House as measure for democracy, and I follow this convention here. I use the average of a country's score on the Freedom House civil liberties and political rights indicators as a measure of democracy *Democracy*. I invert

the Freedom House scale for this analysis so that 1 is associated with the lowest levels of democracy and 7 with the highest levels of democracy. As a robustness check I also ran the regressions reported here using the Polity2 variable from the Polity IV dataset (Marshall and Jaggers, 2002). Although not reported here, there are no significant changes to the conclusions if Polity is used instead of Freedom House. The country coverage for Freedom House is slightly better than that of Polity for countries in this dataset, which might explain its more widespread use in the aid literature. The literature has produced mixed results regarding the impact of democracy on aid allocation.

**Traditional measures of need** In keeping with other studies, I also control for the average income (*Income*) and population (*Population*) of potential aid recipients. Data are from the World Bank's World Development Indicators online database. I take the natural log of GDP per capita measured in constant purchasing power parity terms (from variable: "GDP per capita, PPP (constant 2005 international\$)") as a measure of income. I also compute the natural log of population (from variable: "Population, total"). The expectation is that if donors target recipient need the coefficient on income will be negative, since need would be greater in poorer countries. Similarly, since larger countries are expected to have, *ceteris paribus* greater need, a positive coefficient on population might indicate attention to recipient needs.

**Emergency variables** To measure the impact of natural or man-made disasters on a country, I include a measure of the number of people affected by a natural disaster, a measure of the number of refugees, and an indicator variable that takes the value one if there is a civil war in the country. The first measure is from the International Disaster Database,<sup>12</sup> which collects data on the impact of individual natural disasters. From this database I used the total of the "total affected" category for each country year. This is the number of people injured, left homeless, or requiring other immediate assistance as a result of natural disasters in a country in a given year. A score of zero was given if no people in a country were recorded as being affected by a natural disaster in this data set. The natural log of one plus "total affected" is used as an explanatory variable in the regressions below (*Natural Disaster*). To capture the impact of refugee populations living in a recipient, I use data from the United Nations High Commissioner on Refugees (UNHCR) Statistical

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<sup>12</sup>EM-DAT: The OFDA/CRED International Disaster Database - [www.em-dat.net](http://www.em-dat.net) - Universit Catholique de Louvain - Brussels - Belgium.

Yearbook for various years.<sup>13</sup> This variable measures the number of refugees from other countries that are in a country in a given year, regardless of when the refugees arrived (*Refugees*). The civil war variable (*Civil War*) takes on the value of 1 if the UCDP/PRIO Armed Conflict Dataset codes the country as having a civil war (defined as a type 3 or 4 war in the data). To be included a conflict must cause at least 25 battle related deaths and the state must participate as one of the players (Gleditsch et al, 2002).<sup>14</sup> A positive coefficient on these variables is indicative of donors responding to emergency need in a recipient.

**Measures of donor interest** To account for possible security interests I include the natural log of (one plus) the amount of military assistance a country received from the United States in a given year (*US military*). Data are from the US Greenbook available on the USAID website.<sup>15</sup> Unfortunately, I do not know of data available for a comparable measure for other donor countries. I also include an indicator that takes the value of 1 if the recipient had an offensive or defensive alliance with the United States, based on data from the Alliance Treaty Obligations and Provisions (ATOP) dataset (Leeds et al, 2002).<sup>16</sup> Data are available through 2003. For this analysis the variable takes on its 2003 value in 2004 and 2005, under the assumption that alliances have remained stable during this time. I include an indicator variable that takes the value 1 if a recipient is a former colony of any DAC member state. This was coded using information available in the CIA World Factbook (*Colony*). I also include indicator variables for Middle East/North Africa and Europe/Central Asia based on World Bank regional classifications. The control for Europe and Central Asia is to capture the desire by Western donors (particularly the US) to combat Russian influence in the region following the end of the Cold War (see, e.g. Stone, 2006). The control for the Middle East is due to its generally privileged place in the aid literature, especially regarding Egypt (and Israel, although it is not part of this analysis). Recall that Iraq is dropped from the analysis due to constraints on data availability.

To account for economic interests, I include the log of a recipient's trade with industrialized countries from the IMF's Direction of Trade Statistics (*Trade*).<sup>17</sup> To account for the strategic importance of oil, I include a measure of the natural log of (one plus) oil production (*Oil*) from the BP Statistical Review of

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<sup>13</sup> Available online at [www.unhcr.org/statistics](http://www.unhcr.org/statistics). The most recent report with statistics for the year under observation were used.

<sup>14</sup> Most recent version of the data and the codebook are available at <http://www.prio.no/CSCW/Datasets/Armed-Conflict/>. Version 4-2007 was used for coding in this analysis.

<sup>15</sup> See ([www.usaid.gov](http://www.usaid.gov)).

<sup>16</sup> Updated data available at <http://atop.rice.edu/data>.

<sup>17</sup> I added together exports to and imports from a country to get a value for trade - e.g. exports to Angola from industrial countries and imports from Angola to industrial countries.

World Energy 2008.<sup>18</sup> Countries not listed as oil producers by this source are coded as having zero oil production, although in reality they may produce a small amount of oil.

Immigration is often mentioned by aid policy makers. Yet, to date, I know of no study that has examined the impact of immigration on aid allocation. I include the natural log of (one plus) the number of foreign born individuals from the potential recipient living in OECD countries. Data on immigration are collected by the OECD.<sup>19</sup> They report the number of foreign born persons living in each OECD country separately for each sending country; they also provide the data for the OECD as a whole. Data include both naturalized citizens and “foreigners.” I used the data summed across OECD member countries for this variable (*Immigrants*). These data are not time series, but represent a single snapshot. For most DAC countries they are based on the most recent census data, surveys, or population registers. A sample observation would be the number of migrants from Kenya living in all OECD countries.

## 4 Results

The purpose of this analysis is to revisit the debate regarding the impact of recipient need, good governance and donor interest on aid allocation. The novelty is to perform the analysis at the sector level. Conventional wisdom suggests that the greater the importance donors place on promoting development abroad, the greater will be the impact of need and governance on aid flows. Evidence that donors largely ignore these factors in favor of concerns for donor interest would suggest a low priority is placed on using aid for development.

The previous section argued that governance may send two simultaneous signals. Countries with worse governance may have a greater need for aid, while at the same time being less able to put aid to effective use. The central hypothesis tested here is whether donors act on both the need and the capacity signal contained in a potential recipient’s governance score. As shown above, the level of recipient government involvement in aid provision likely varies across sectors. If donors care about using aid effectively, then good governance should be rewarded with more aid in sectors where recipient government involvement is high. However, donors may also care about giving aid where the need is greatest. In this case, in sectors where recipient government involvement is low, donors will increase aid to countries with poor governance in recognition of

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<sup>18</sup> Available online at <http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622>.

<sup>19</sup> Available from [www.sourceoecd.org](http://www.sourceoecd.org). Data are from the “Immigrants and expatriates: Total population by nationality and country of birth” table, Vol. 2006, available under International Migration Statistics.



their increased need for assistance. The result would be a change in the impact of governance on aid flows across sectors.

#### 4.1 Governance and Need in Aid Allocation

Table 5 analyzes bilateral (DAC) aid by sector controlling only for measures of governance and recipient need. Later I will add in measures of donor interest. McGillivray (2003) suggests that failure to include measures of donor interest may underestimate the true impact of need on aid allocation. It might be that need and governance play a role in determining aid flows only after we control for donor interest. In this case we might consider their impact to be secondary, or conditional: it is dependent on first capturing the impact of donor interest variables. Here, I first choose to examine whether need and governance have an impact on aid allocation regardless of motivations related to donor interest. I then analyze whether this relationship changes when donor interest variables are included.

The data analyzed are panel data for low and lower-middle income aid recipients for 2000-2005. Where possible an OLS specification is used, with robust standard errors calculated by clustering on recipient. In most sectors all, or almost all, potential recipients receive some aid from a DAC member(s) in each year. For two sectors, budget support and food aid, this is not the case. To better analyze these sectors with a relatively large number of zeros, a Tobit model is used.<sup>20</sup> I include a time trend variable (*Year*) to ensure that any observed pattern between sector aid and the independent variables is not caused by a general trend of changes over time.

The sectors in Table 5 are arranged in descending order of likely recipient government involvement in aid provision. Column (1) analyzes general budget support, which consists of non-earmarked funds given directly to the recipient government. In contrast, column (6) looks at emergency assistance, which is channeled almost completely through multilateral organizations and NGOs. The final column analyzes total

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<sup>20</sup>There has been much debate in the aid literature regarding the correct method to use to deal with situations where there are multiple zeros on the dependent variable. It is essentially a selection issue, as some recipients are not chosen to receive a certain type of aid. Different scholars have used a Heckman model (e.g. Stone, 2006), a two-step model (e.g. Neumayer, 2003a) or a Tobit model (e.g. Berthelemy and Tichit, 2004). Both Neumayer (2003a) and Berthelemy and Tichit (2004) contain a discussion of the strengths and weaknesses of each approach. A Heckman model would be ideal if there were a theoretical reason to believe that factors influencing the two stages (selection and level) were different. However, that is not the case. Regarding the two-step model, Berthelemy and Tichit (2004) note that it “suffers from the risk of introducing a selection bias in the second step, since the fact that a country receives strictly positive aid flows is not independent from the right-hand variables” (259). I follow Berthelemy and Tichit (2004) in using a Tobit specification where necessary, although recognizing that this debate is far from settled.

	Budget Support (1)	Economic Infrast. (2)	Production Sectors (3)	Social Sectors (4)	Food Aid (5)	Emergency Assistance (6)	Total (7)
Governance	2.90 (3.29)	1.195** (0.554)	0.881** (0.357)	0.146 (0.191)	-0.72 (1.91)	-1.774*** (0.660)	0.348* (0.178)
Democracy	2.00** (0.89)	0.282* (0.149)	0.215** (0.103)	0.206*** (0.054)	0.61 (0.55)	0.167 (0.198)	0.147*** (0.053)
Income	-7.58*** (1.43)	0.156 (0.212)	-0.156 (0.133)	-0.010 (0.096)	-4.20*** (0.76)	-0.813** (0.328)	-0.050 (0.092)
Population	1.37 (0.88)	0.805*** (0.122)	0.698*** (0.077)	0.530*** (0.058)	1.69*** (0.44)	0.407** (0.185)	0.513*** (0.056)
Disaster	0.01 (0.16)	0.029 (0.027)	0.022* (0.013)	0.009 (0.010)	0.03 (0.09)	0.233*** (0.052)	0.015 (0.010)
Refugees	0.77** (0.34)	0.020 (0.048)	-0.004 (0.029)	0.011 (0.023)	-0.03 (0.18)	0.212*** (0.061)	0.018 (0.022)
Civil War	-3.47 (2.33)	-0.286 (0.348)	-0.256 (0.197)	-0.163 (0.149)	-0.49 (1.19)	0.654 (0.455)	0.069 (0.127)
Year	-0.64 (0.45)	0.064 (0.060)	0.010 (0.043)	0.044** (0.017)	0.02 (0.19)	0.435*** (0.104)	0.034** (0.016)
Constant	1,308.02 (888.84)	-125.938 (120.622)	-14.804 (85.663)	-78.219** (34.065)	-22.77 (368.60)	-863.257*** (206.630)	-56.653* (31.079)
Sigma	13.85*** (0.86)				7.71*** (0.59)		
Observations	494	494	494	494	494	494	492
Countries	109	109	109	109	109	109	109
R-squared		0.344	0.418	0.597		0.392	0.646
Censored Obs.	275				125		
Uncensored Obs.	219				369		

Table 5: **Sector Analysis of Bilateral Aid Commitments, 2000-2005.** Dependent variable is the log of (one plus) bilateral (DAC) aid commitments to a recipient in a given year. Columns 2, 3, 4, 6 and 7 are OLS models; Columns 1 and 5 are Tobit models. Robust standard errors in parentheses. Based on panel data for low and lower-middle income countries. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

aid commitments (excluding debt relief). Capacity concerns would suggest rewarding good governance with more aid; need would suggest the opposite relationship between aid flows and governance. If donors are responding to governance as a signal of capacity and need, we should see a positive impact of governance on aid flows in columns on the left of Table 5, declining (and possibly turning negative) as one moves from column (1) to column (6). As a combination of the other columns, there is no *a priori* expectation about the impact of governance on total aid reported in column (7).

The pattern observed in general supports the hypothesis that donors consider the needs and capacity of recipients when making aid allocation decisions. The largest, positive coefficient on governance is in budget support, but it is not statistically significant. This category of aid is used much less often than other categories reported here, and the number of zeros in the data is high (more than 50%). Some large donors, such as the US and Japan, use budget support very infrequently.

Examining the more commonly used categories of aid, governance has a significant, positive impact on aid used for economic infrastructure and production sectors. Social sector aid contains a large amount of technical cooperation and uses non-governmental channels for provision more frequently than the first three categories. As such, one would expect the impact of governance as a signal of capacity to be felt less strongly in this sector. As Model (4) shows, this is indeed the case. The coefficient on governance for social sector aid, while positive, is much smaller than that observed in first three sectors and does not approach significance at conventional levels ( $p=0.444$ ). Donors are able to rely less on recipient government involvement when distributing food aid and emergency assistance, which are most often channeled through non-government agencies. Models (5) and (6) show that donors take this opportunity to respond to the need-based signal contained in the governance measure in these sectors. For both sectors the coefficient on governance is negative; for emergency assistance this effect is statistically significant. Governance has a positive impact on total aid (Model 7).

Donors also respond to other measures of recipient need. The coefficient on income is negative in all sectors except economic infrastructure, although only significant for budget support, food aid, and emergency assistance. As the results on the population variable show, countries with more people receive more aid. The coefficient on population in the total aid regression is less than 1, suggesting that increases in population are not met with proportionate increases in aid. I will return to this point later. Having a large refugee population or experiencing a natural disaster has a significant, positive impact on the amount of emergency assistance a country receives. There is also evidence that more democratic recipients are rewarded with increased aid in most sectors.

It is important to ask the substantive effect of these results on aid flows. This paper contains several sets of regression results, and reporting simulated changes in the dependent variable for changes in the independent variables for every table would become somewhat redundant. Instead, the final tables of this chapter, which also control for donor interest, are used to analyze the importance of changes in the independent variables.

Table 6 analyzes the same sectors for multilateral aid commitments. Once again, with the exception of budget support, the hypothesized pattern holds. The impact of better governance on aid is positive and significant for economic infrastructure and production sectors, small and not statistically significant for the

	Budget Support (1)	Economic Infrastr. (2)	Production Sectors (3)	Social Sectors (4)	Food Aid (5)	Emergency Assistance (6)	Total (7)
Governance	1.31 (3.50)	5.76*** (2.22)	5.23*** (1.75)	0.497 (0.345)	-6.77* (3.57)	-6.11*** (2.02)	0.688*** (0.252)
Democracy	1.79* (1.03)	-0.00 (0.57)	1.31*** (0.46)	-0.073 (0.113)	-0.26 (0.99)	0.24 (0.58)	0.055 (0.082)
Income	-9.37*** (1.68)	-5.35*** (1.07)	-4.29*** (1.00)	-0.731*** (0.166)	-6.49*** (1.71)	-0.54 (0.80)	-0.781*** (0.150)
Population	-0.33 (0.95)	1.02 (0.69)	1.86*** (0.51)	0.673*** (0.160)	0.16 (1.08)	0.89 (0.57)	0.464*** (0.103)
Disaster	0.02 (0.22)	0.03 (0.14)	-0.08 (0.14)	0.027 (0.021)	0.59*** (0.22)	0.49*** (0.14)	0.034** (0.016)
Refugees	0.55 (0.42)	0.22 (0.30)	0.17 (0.22)	0.050 (0.035)	-0.15 (0.39)	-0.03 (0.18)	0.054* (0.032)
Civil War	-0.08 (2.81)	-5.31*** (2.00)	-1.93 (1.74)	-0.540* (0.284)	-7.98** (3.70)	4.81*** (1.22)	-0.415* (0.236)
Year	1.18** (0.51)	0.13 (0.32)	-0.01 (0.29)	0.049 (0.046)	-2.76*** (0.48)	-0.88*** (0.28)	-0.036 (0.035)
Constant	-2,293.50** (1,013.02)	-222.90 (629.90)	29.30 (587.18)	-86.512 (91.534)	5,557.00*** (958.27)	1,757.80*** (562.67)	88.110 (69.335)
Sigma	16.37*** (0.97)	11.78*** (0.70)	10.85*** (0.66)		16.27*** (0.94)	10.05*** (0.68)	
Observations	494	494	494	494	494	494	492
R-squared				0.343			0.379
Censored Obs.	304	193	183		343	197	
Uncensored Obs	190	301	311		151	297	

Table 6: **Sector Analysis of Multilateral Aid Commitments, 2000-2005.** Dependent variable is the log of (one plus) multilateral aid commitments to a recipient in a given year. Columns 4 and 7 are OLS models; Columns 1-3 and 5-6 are Tobit models. Robust standard errors in parentheses. Based on panel data for low and lower-middle income countries. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

social sector, and negative and significant for food aid and emergency relief. The magnitude of the impact appears larger across sectors for multilateral aid than it was in bilateral aid.

Multilateral donors appear quite responsive to other measures of recipient need. Income has a negative impact on aid in all sectors; the effect fails to reach statistical significance only for emergency assistance. Population has the expected effect in all sectors except budget support, and is significant or near significant in most. Countries experiencing a disaster or enduring a civil war receive more emergency assistance, although those with larger numbers of refugees do not. Democracy appears to play less of a role in determining multilateral aid allocation than is observed for bilateral allocation.

**Robustness** A number of different tests were performed to check the robustness of these results. First, in any analysis, one must be concerned about potential endogeneity. For instance, in the present analysis it is possible that aid in period  $t$  influences aid in subsequent periods *and* causes a change in governance in

subsequent periods. In that case, while aid will appear to be responding to different levels of governance, it will in fact be prior levels of aid that are causing both changes in governance and aid. For this to be an alternative explanation for the cross-sector pattern observed, the impact of previous aid on either current aid or governance would need to differ across sectors, which seems unlikely.

One way to deal with potential endogeneity is to calculate the above equations using a first differences estimation. This estimates the impact of year-to-year changes in the independent variables on the dependent variable. As such, it has the advantage of showing how donors respond to changes within a recipient. Looking for changes in aid between year  $t$  and year  $t+1$  based on changes in governance in the same time is a difficult test. Because many aid decisions are made as five-year plans, small changes in governance are unlikely to see big swings in aid. Short-term changes in aid will be at the margin in many instances, with larger changes realized in a slightly longer time horizon.

Table 7 shows coefficients on the governance variable across sectors for both bilateral and multilateral aid. The models include the same variables as above with the exception of the time trend variable. As regressions were run using OLS (with robust standard errors), some sectors with a significant proportion of the observations receiving zero aid are not reported. Although there are some differences, the evidence presented in Table 7 generally supports the patterns observed above. For both bilateral and multilateral donors, improvements in governance have a significant, positive impact on aid commitments to Economic Infrastructure. For multilateral donors, the response of aid commitments to improvements in governance is also significant, large and positive in production sectors. For bilateral donors this impact is smaller and does not reach standard levels of statistical significance ( $p=.185$ ). The response of bilateral donors to changes in governance is larger for social sector aid than was observed above and statistically significant, but still much smaller than that observed in economic infrastructure. For both types of donors governance remains negatively associated with emergency assistance, although this variable is not significant. It is encouraging to see that the greatest positive impact of improved governance comes in Economic Infrastructure, while the sector farthest from this in terms of likely government involvement, Emergency Assistance, does not appear to experience increases in aid when governance improves. Although the middle sectors behave somewhat differently than above, even under this difficult test it is clear that the impact of changes in governance on aid commitments is not constant across sectors.

	Economic Infrast. (1)	Production Sectors (1)	Social Sectors (3)	Emergency Assistance (4)	Total (exc. debt) (5)
Bilateral	1.637* (0.911)	0.616 (0.461)	0.625*** (0.219)	-1.528 (1.741)	0.459*** (0.155)
Multilateral	5.282* (3.000)	5.273* (3.043)	-0.777 (1.343)	-0.488 (1.942)	1.281 (0.561)

**Table 7: Coefficients on the Governance Matters variable; first differences.** The dependent variable is the natural log of (one plus) aid to each of these sectors. Additional explanatory variables included: democracy, income, disaster, refugees, and civil war. Each equation included data for 107 countries. Robust standard errors calculated by clustering on recipient in parentheses. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level. Based on panel data for low and lower-middle income countries.

I performed other tests for robustness. I re-estimated the OLS models using a random effects specification with robust standard errors. For bilateral aid, the cross-sector pattern observed in the main analysis on the governance variable remains and the coefficient is significant in each regression (economic infrastructure, production sectors, social sector, emergency relief, and total). Note that the coefficient in the social sector regression is significant and positive in this specification. However, it is only about one-third the size of the coefficient on governance for economic infrastructure (0.368 for social sector v. 1.113 for economic infrastructure). Performing the same analysis for multilateral aid also resulted in no significant changes.

To control for the possibility of serial correlation within a recipient over time, I re-estimated the OLS models including a lagged dependent variable. This made no difference to the pattern observed on the governance indicator in Table 5. Furthermore, the coefficient on the lagged variable, while always positive, was not large enough to create concerns that all aid is explained by its lagged value. The coefficient on the lagged variable was 0.34, 0.36, 0.74 and 0.38 for the economic infrastructure, production sectors, social sectors, and emergency relief regression, respectively. Obviously the impact of the lagged variable is highest for social sector aid. This suggests that this aid is more stable, while aid to the other sectors is more responsive to changes in the recipient. This, too, would fit with the hypothesis that the conditions placed on receiving aid vary across sectors. One would expect, given the results on the emergency needs variables, that emergency assistance responds to changes in emergency needs from year to year. For multilateral aid the pattern observed above was also not significantly altered by including a lagged dependent variable. In this case, even on the social sector the impact of the lag was relatively low (0.24), although it was significant and positive across sectors.

Finally, I estimated the models for bilateral aid including multilateral aid to the sector as an explanatory variable. Potential problems arise when doing this if bilateral and multilateral donors are simultaneously making their decisions in the same way based on the available information. However, the inclusion of this variable did not significantly change any results reported here. Furthermore, while generally positive and significant, the effect is often quite small. The exception is budget support (0.58,  $p < 0.001$ ). This last effect fits with observed behavior in the field. At times there is a clustering of donors providing budget support. This is done in order to have a larger impact on the recipient budget by pooling efforts. Also, it can be used to regularize the stream of income to the recipient, which can be erratic if several donors are giving smaller amounts of aid at varying times.<sup>21</sup>

## **4.2 Historical Comparison**

The evidence presented here shows that, at least in recent years, donors consider recipient governance when making allocation decisions. It is unclear, however, if donor concern with governance is a recent development. Previous studies examining earlier periods found evidence that donors responded, at most, in a small way to recipient governance. Of course, the pattern observed above may have existed in the past as well. No other studies have examined allocation at the sector level. It is therefore important to look back in time to see if this nuanced targeting of aid based on governance is a recent phenomenon.

There are difficulties in analyzing aid allocation over time that did not arise when looking at the more recent period. First, the measure of governance from the Governance Matters project is only available starting in 1996. While other measures of governance are commonly used, none has the country coverage found in Governance Matters. In the analysis that follows I use the often employed measure of Law and Order from the International Country Risk Guide to compare the period 1984-1988 with the more recent period 2000-2005. This variable measures the strength and impartiality of the legal system as well as popular observance of the law. Higher scores are indicative of greater respect for law and order. An advantage of this indicator is that it is available starting in 1984. A disadvantage is that there are a non-negligible number of low and lower-middle income countries for which this indicator is not available. For the recent period regressions using this variable cover 68 countries, as opposed to the 109 covered in the same analysis using

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<sup>21</sup> Author interviews with foreign aid officials from different countries providing sector budget support to education in Nicaragua through a unified effort. Managua, Nicaragua, March 2006.

the Governance Matters measure. Obviously, this drawback is not unique to the current study, but is an issue in any historical analysis of aid allocation.

The second data issue involves the dependent variables. Prior to 2000 donors were not required to report aid by sector, although it appears most of them did so. However, the data quality is not as high prior to 2000. Examining the data reveals relatively few zero values. This does not mean that each positive value contains information from as many donors in this earlier period. It does suggest that there was not a systematic lack of reporting for some recipients. Additionally, every major donor has data reported by sector at this time, although it might not be available for every aid project financed. If the presumed loss of information is systematically related to the variables in the analysis, this could lead to erroneous interpretations. There is no particular indication that this is the case, but it cannot be ruled completely out. For it to impact our ability to analyze the hypotheses presented here, it would need to be the case that donors were systematically reporting aid by sector differently based on the governance of the recipient. If, for instance, donors wanted to hide the fact that they were giving more fungible forms of aid to corrupt governments, that might result in this kind of bias. In that case, sector analysis could make donor aid appear more conditional on governance in the past than was actually the case. As will be seen below, this is unlikely to be a concern given the observed results.

Analysis of aid allocation by sector for bilateral donors in 2000-2005 is compared with the period 1984-1988 in Table 8. All models are OLS with robust standard errors computed by clustering on recipient. In addition to including the Law and Order variable, I have also included an indicator value for openness. This is based on dates found in Wacziarg and Welch (2008). The authors coded the “year uninterrupted openness began” as well as start and end dates for prior periods of “temporary liberalization.” The *Open* variable takes on the value one for any year in which a country was considered open based on their coding, and zero otherwise. This indicator also suffers from missing values, which is why it is not included in the earlier regressions. However, once one considers the observations already dropped due to lack of data on the Law and Order measure, the additional loss from including openness is small. In order to conserve space, I have not included in Table 8 an analysis of budget support or food aid, since these are less frequently used forms of aid. I will, however, discuss the results for these sectors below.

Focusing on the first four Models in Table 8, it is clear that the cross-sector pattern observed above is ro-



	2000-2005			1984-1988				
	Economic Infrastr. (1)	Production Sectors (2)	Social Sectors (3)	Emergency Assistance (4)	Economic Infrastr. (5)	Production Sectors (6)	Social Sectors (7)	Emergency Assistance (8)
Law and Order	0.33** (0.15)	0.22** (0.09)	0.01 (0.08)	-0.27 (0.22)	-0.02 (0.61)	-0.89** (0.39)	-0.63 (0.41)	-0.42 (0.41)
Democracy	0.42*** (0.13)	0.26*** (0.10)	0.15** (0.06)	-0.08 (0.25)	1.18*** (0.40)	0.95*** (0.34)	1.14*** (0.35)	1.07*** (0.31)
Open	0.76 (0.49)	0.95*** (0.30)	0.25 (0.18)	0.24 (0.68)	1.60 (0.97)	1.27* (0.69)	1.32* (0.69)	0.24 (1.01)
Income	0.29 (0.26)	-0.12 (0.15)	0.02 (0.10)	-0.77*** (0.28)	-3.02*** (0.83)	-2.18*** (0.82)	-2.48*** (0.74)	-1.54** (0.66)
Population	0.85*** (0.17)	0.71*** (0.10)	0.48*** (0.08)	-0.12 (0.25)	0.43 (0.52)	0.55** (0.27)	0.37 (0.31)	-0.33 (0.36)
Disaster	0.04 (0.04)	0.02 (0.02)	0.02 (0.01)	0.26*** (0.07)	-0.08 (0.05)	-0.07* (0.04)	-0.05 (0.04)	0.24*** (0.07)
Refugees	0.01 (0.05)	-0.02 (0.04)	0.02 (0.03)	0.21** (0.08)	0.19 (0.12)	0.16* (0.10)	0.17* (0.10)	0.45*** (0.10)
Civil War	-0.17 (0.37)	-0.27 (0.22)	-0.19 (0.17)	1.98*** (0.48)	1.25 (1.63)	-0.81 (0.87)	-0.73 (0.91)	2.22* (1.18)
Year	-0.00 (0.06)	-0.07** (0.03)	0.04** (0.02)	0.52*** (0.11)	-0.13 (0.19)	0.18 (0.11)	0.18 (0.15)	0.03 (0.21)
Constant	-3.59 (128.64)	152.50** (58.99)	-70.29** (30.83)	-1,021.69*** (223.78)	274.73 (373.25)	-329.65 (227.63)	-334.38 (303.95)	-48.35 (412.48)
Observations	386	386	386	386	285	285	285	285
Countries	68	68	68	68	64	64	64	64
R-squared	0.341	0.501	0.517	0.297	0.252	0.342	0.339	0.327

**Table 8: Sector Analysis of Bilateral Aid Commitments: Comparison Across Time.** Dependent variable is the log of (one plus) bilateral aid commitments to a recipient in a given year for the sector being analyzed. OLS models with robust standard errors in parentheses. Based on panel data for low and lower-middle income countries. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

bust to changes in measures of governance. Better scores on the Law and Order variable are associated with significantly more aid to economic infrastructure and production sectors. There is virtually no measurable impact, on average, of governance on aid allocation to the social sectors. The relationship between better governance and emergency assistance is negative, although not statistically significant. Democracy remains an important determinant of aid flows. Open economies receive, on average, more aid for production sectors than do closed economies. Performing the same analysis on budget support shows a significant, positive relationship between both democracy and openness and the amount of aid received. The coefficient on Law and Order is relatively large and positive, but not statistically significant (0.660; p-value=0.312). Higher scores for Law and Order are associated with significantly less food aid (-0.784; p-value=0.02). Food aid also appears to be disproportionately channeled to democracies and open countries in this period.

Models 5-8 in Table 8 perform the same analysis for the period 1984-1988. For that time period, the coefficient on Law and Order is negative in all sectors, and significantly so for production sectors. The findings here support those of previous studies that have looked at past aid allocations. At least in the later years of the Cold War, it does not appear that better governed countries received more aid in any sector analyzed. Also consistent with previous findings on aggregate aid, a greater degree of democracy is associated with more aid in each sector, and there is some evidence that open societies received more aid. The corresponding analysis for budget support in this period reveals a negative but insignificant coefficient on Law and Order (-0.813; p=0.374). Democracy is associated with more budget support in the 1980s as well. However, in contrast to more recent years, closed economies were also recipients of higher levels of budget support. The coefficient on Law and Order for Food Aid is negative and significant (-1.48; p=0.003). With the exception of this one sector, there is no evidence that donors used sector allocations to differentiate across recipients based on their respect for Law and Order in the 1980s.

The results in Table 8 provide evidence that donor attention to governance has changed over time. However, it appears that donors were more likely to disproportionately target poorer countries with aid in the earlier time period. It is unclear exactly how to interpret this. Of course, it may be that donors are using income as a signal of need. Alternatively, some scholars have suggested that donors target smaller, poorer countries so that their aid dollars can go further toward “buying influence” in the recipient. Without evidence that donors were conditioning on recipient capacity to use this money effectively, it is difficult to draw the

conclusion that they were strongly motivated by the needs of the recipient population.

Table 9 shows the same analysis performed for multilateral donors. Here a Tobit model is used, since multilateral donors do not make commitments to each sectors in all countries every year, creating a significant number of zeros in the dependent variable. For the 2000-2005 period, multilateral donors rewarded better law and order with more aid for economic infrastructure. Emergency assistance is negatively associated with respect for law and order. Somewhat surprisingly, better scores for law and order do not lead to more production sector aid; the coefficient is small and not statistically significant. However, openness is rewarded generously with aid for both production sectors and economic infrastructure. It may be that economic aspects of governance, some of which are captured by the broad GM measure used above, are a driving force in determining aid for production sectors.

It appears that for multilateral donors as well, the targeting of sector aid based on aspects of governance has increased over time. Law and Order has a negative, although not significant, coefficient in each sector in the 1984-1988 period. Similarly, openness does not appear to have been significantly rewarded in any sector. This once again confirms previous findings about the lack of donor attention to governance in earlier periods. It suggests that donor aid allocation has indeed changed over time.

### **4.3 Donor Interest and Sector Allocation**

The final analysis of this paper includes measures of donor interest in the models. It also simulates changes in the expected value of aid for specified changes in different independent variables. This exercise will provide some context about the magnitude of the impact on aid allocation from the different effects discussed.

Looking first at bilateral aid, Table 10 contains the same analysis as in Table 5, except this time controlling for oil production, trade with industrialized countries, immigration from the recipient to OECD countries, status as a former colony of a DAC country, military assistance from the US, an indicator representing an alliance with the US, and indicator variables for the strategic areas of Europe/Central Asia and the Middle East/North Africa.

The differential influence of governance on aid across sectors is robust to the inclusion of strategic variables. Indeed, in Model (1), the impact of governance is positive and quite large for budget support. It is also statistically significant, now that there are controls for donor interest. On the far right, the same

	2000-2005				1984-1988			
	Economic Infrastr. (1)	Production Sectors (2)	Social Sectors (3)	Emergency Assistance (4)	Economic Infrastr. (5)	Production Sectors (6)	Social Sectors (7)	Emergency Assistance (8)
Law and Order	1.32* (0.75)	0.16 (0.62)	0.11 (0.08)	-1.55** (0.71)	-1.12 (1.41)	-0.90 (0.87)	-0.36 (1.13)	-1.18 (1.40)
Democracy	0.99 (0.77)	1.32** (0.60)	0.15** (0.08)	-0.83 (0.75)	1.25 (0.98)	1.25** (0.63)	2.37** (0.99)	-0.17 (1.24)
Open	4.22* (2.33)	6.74*** (1.92)	0.26 (0.23)	2.35 (2.22)	-0.52 (3.13)	0.27 (1.89)	-0.78 (2.82)	-0.90 (4.76)
Income	-4.71*** (1.13)	-3.88*** (0.98)	-0.65*** (0.12)	-0.87 (0.86)	-11.82*** (1.82)	-10.64*** (1.16)	-11.03*** (1.78)	-8.69*** (1.87)
Population	0.12 (0.90)	1.54*** (0.56)	0.36*** (0.11)	0.23 (0.84)	0.19 (1.24)	0.67 (0.76)	0.94 (1.04)	-5.82*** (1.42)
Disaster	0.04 (0.16)	0.08 (0.15)	0.02 (0.02)	0.49*** (0.18)	-0.02 (0.22)	-0.12 (0.16)	-0.27 (0.18)	0.57* (0.34)
Refugees	0.15 (0.34)	0.31 (0.24)	0.05 (0.03)	0.10 (0.20)	0.34 (0.37)	-0.01 (0.20)	0.29 (0.32)	0.98** (0.42)
Civil War	-5.19*** (1.97)	-1.41 (1.70)	-0.03 (0.26)	6.71*** (1.46)	-7.32** (3.50)	-5.49*** (1.74)	-6.23* (3.52)	8.27** (3.39)
Year	0.39 (0.32)	-0.12 (0.31)	0.14*** (0.03)	-1.08*** (0.32)	-0.43 (0.65)	-1.18** (0.48)	0.01 (0.82)	-3.20** (1.32)
Constant	-755.60 (642.46)	241.33 (613.56)	-258.58*** (66.18)	2,179.29*** (633.16)	934.50 (1,292.28)	2,423.85** (951.08)	39.55 (1,622.93)	6,500.41** (2,608.33)
Sigma	10.98*** (0.85)	9.87*** (0.76)	1.26*** (0.06)	9.35*** (0.75)	14.60*** (1.26)	9.68*** (0.82)	14.54*** (1.20)	17.87*** (1.56)
Observations	386	386	386	386	285	285	285	285
Countries	68	68	68	68	64	64	64	64

Table 9: **Sector Analysis of Multilateral Aid Commitments: Comparison Across Time.** Dependent variable is the log of (one plus) bilateral aid commitments to a recipient in a given year for the sector being analyzed. Tobit analysis with robust standard errors in parentheses. Based on panel data for low and lower-middle income countries. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

coefficient is negative, significant, and also fairly sizeable in the Emergency Assistance regression (Model 6). Countries with better governance appear to be rewarded with more aid for economic infrastructure and production sectors, although the former doesn't quite earn its star ( $p=0.11$ ). The coefficient on governance for social sector aid, while also positive, is small and does not approach statistical significance ( $p=0.57$ ). The coefficient for governance on food aid is higher than would be expected, but this also is not significantly different from zero ( $p=0.54$ ). The net result is that, controlling for several measures of potential donor interest, there is evidence that donors respond to governance differently across aid sectors. The manner in which this occurs again suggests that governance is a signal both of capacity and need, and that donors are acting on it as such.

It is interesting to examine the magnitude of the impact on aid, by sector and overall, of changes in various independent variables. As part of my analysis I calculated changes in the expected value of aid associated with specified changes in the explanatory variables. I use the software Clarify (King et al, 2000; Tomz et al 2003). I first set each explanatory variable to its median value to create a base country. The base country has a governance score of -0.63, a Freedom House (democracy) score of 4, per capita income equal to \$2,081 and a population of 9.4 million. There are 5,001 people affected by a natural disaster and 5,170 refugees in this country. It has \$1.4 billion in trade with industrialized countries, has sent 86,904 immigrants to OECD countries, and receives \$400,000 in military assistance from the United States. It also is not a US ally, does not have an ongoing civil war, has no measurable oil production, and is not located in Europe/Central Asia or the Middle East/North Africa. It is a former colony of a DAC country (about 77 percent of the observations are former colonies). This base country receives \$232 million in aid, including \$16.3 million for economic infrastructure, \$18.1 million for production sectors, \$114 million for social sectors and \$3 million for emergency relief. Simulations cannot be conducted for Budget Support or Food Aid, because of the truncated (at zero) nature of the data.<sup>22</sup>

Table 11 shows the change in the expected value of aid allocation, by sector and for total aid, for simulated changes in the explanatory variables. In each case all variables are held constant at their base (median) value except for the one being analyzed. That variable changes as noted, usually from its median value to its value for the observation at the 75th percentile (the exception is civil war, which changes from 0

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<sup>22</sup>Clarify does not support the Tobit model.

	Budget Support (1)	Economic Infrastr. (2)	Production Sectors (3)	Social Sectors (4)	Food Aid (5)	Emergency Assistance (6)	Total (7)
Governance(GM)	4.381* (2.303)	1.035 (0.646)	0.838** (0.422)	0.115 (0.203)	0.721 (1.188)	-2.039*** (0.716)	0.359* (0.195)
Democracy	1.107* (0.658)	0.350** (0.158)	0.138 (0.129)	0.166*** (0.056)	-0.121 (0.335)	0.148 (0.212)	0.107* (0.056)
Income	-1.864 (1.938)	0.512 (0.473)	0.371 (0.229)	0.004 (0.163)	-3.652*** (0.953)	-0.306 (0.550)	-0.130 (0.155)
Population	4.921*** (1.109)	1.127*** (0.262)	0.917*** (0.139)	0.512*** (0.081)	1.950*** (0.535)	0.414 (0.300)	0.470*** (0.086)
Disaster	0.003 (0.163)	0.039 (0.027)	0.018 (0.012)	0.009 (0.009)	0.016 (0.085)	0.233*** (0.049)	0.015* (0.008)
Refugees	0.687*** (0.217)	-0.034 (0.046)	0.015 (0.023)	0.019 (0.021)	0.063 (0.113)	0.214*** (0.062)	0.022 (0.021)
Civil War	-1.591 (1.921)	-0.218 (0.339)	-0.268 (0.187)	-0.188 (0.143)	-0.110 (0.992)	0.807 (0.511)	0.058 (0.125)
Oil	-0.505*** (0.144)	-0.014 (0.026)	-0.021 (0.018)	-0.008 (0.013)	-0.024 (0.073)	-0.121** (0.049)	-0.007 (0.012)
Trade	-4.173*** (1.147)	-0.501* (0.263)	-0.373** (0.160)	-0.126 (0.083)	-0.702 (0.561)	-0.075 (0.297)	-0.052 (0.084)
Immigrants	1.735** (0.676)	0.440*** (0.137)	0.248** (0.116)	0.237*** (0.056)	0.210 (0.339)	0.411** (0.201)	0.198*** (0.055)
Colony	8.130*** (2.833)	0.144 (0.622)	0.464 (0.380)	0.215 (0.240)	2.458* (1.396)	-0.729 (0.897)	0.146 (0.214)
US military	0.168 (0.124)	0.051*** (0.019)	0.033* (0.018)	0.019** (0.008)	0.242*** (0.063)	-0.019 (0.030)	0.021*** (0.008)
US ally	-5.926** (2.619)	-1.974*** (0.501)	-0.598 (0.363)	-0.353 (0.220)	1.983 (1.327)	-1.048 (0.900)	-0.269 (0.213)
Europe & Cent. Asia	8.986** (3.713)	1.493** (0.635)	-0.006 (0.498)	0.079 (0.297)	2.246 (1.901)	-0.128 (1.240)	0.300 (0.250)
Mid. East & N. Africa	0.540 (3.107)	-0.260 (0.561)	-0.876* (0.460)	0.153 (0.244)	-3.543** (1.560)	0.059 (0.877)	0.040 (0.264)
Observations	476	476	476	476	476	476	476
Countries	104	104	104	104	104	104	104
R-squared		0.492	0.472	0.677		0.419	0.718

Table 10: Sector Analysis of Bilateral Aid Commitments (including strategic variables), 2000-2005. Columns 2, 3, 4, 6 and 7 are OLS models with robust standard errors; Columns 1 and 5 are Tobit models. Standard errors in parentheses. For reasons of space the time trend variable and constant are not reported. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level. Based on panel data for low and lower-middle income countries.

to 1). I only report values where the coefficient in Table 10 is statistically significant at conventional levels, or nearly so (e.g.  $p=0.11$  on the governance coefficient in the economic infrastructure regression).

**Governance** There is a positive impact of better governance on aid for economic infrastructure and production sectors. As shown in Table 11, holding all other variables constant at their base (median) values, a country with a governance score at the 75th percentile receives \$6.97 million (43%) more in economic infrastructure aid and \$5.97 million (33%) more in production sector aid than the same country with a median governance score. The same change in governance decreases aid for emergency assistance by \$1.5 million (50%). The net effect of the governance change on total aid is positive. A country with a governance score at the 75th percentile receives, on average, \$28.8 million more in aid than the similar country with a median governance score. This amounts to more than a 12 percent increase in aid, compared to the base amount of \$232 million. In per capita terms, it would increase aid by approximately \$3.07: from \$24.67 to \$27.74. A decrease in the governance score, from its median value to its value at the 25th percentile (not shown), would decrease aid by about \$2.49 per person. Aggregated across sectors the capacity component of the governance signal appears stronger than the need signal. However, as hypothesized, this varies across sectors in ways that are statistically and substantively important. The cross sector variation supports the hypothesis that donors consider both capacity and need when allocating aid.

**Democracy** A higher degree of democracy has a positive impact on budget support, aid for economic infrastructure, and social sector aid. It also increases total aid. As can be seen in Table 11, the effect of democracy on total aid is similar to that of the broader governance measure. An increase in the democracy score from 4 to 5 is associated with \$26.5 million more in total aid, or \$2.82 per person. A decrease in democracy from the median to the value seen at the 25th percentile (not shown), would decrease aid by \$3.70 per person.

**Income and population** There is no evidence that per capita income has a significant effect on the total amount of aid received. To the extent that income indicates need, this finding fails to offer additional support of a needs based interpretation of aid allocation. Interestingly, the coefficients on income tend to follow the same pattern as those on governance (excluding the budget support regression). For production sectors

Variable	Start Value (Median)	End Value 75th Percentile	Change in Aid				Total
			Economic Infrast.	Production Sectors	Social Sector	Emergency Assistance	
Governance	-0.629866	-0.2969159	6,971,915	5,965,278		-1,498,070	28,830,660
Democracy	4	5	6,726,447		20,442,429		26,503,176
Population	9,394,641	26,225,952	35,339,069	28,036,191	78,232,375		143,259,761
Disaster	5,001	107,494				3,133,152	11,008,440
Refugees	5,170	46,974				1,834,955	
Civil War	0	1				3,928,813	
Immigrants	86,904	337,405	13,583,048	7,174,040	43,512,856	2,284,806	71,350,497
US military	400,000	3,199,996	1,849,823	1,300,620	4,646,074		10,245,658

**Table 11: Impact on Aid Flows of Changes in Independent Variables.** Expected value of the changes in aid to the category listed for the indicated change in the independent variable, holding other variables constant at their median value.

the positive relationship approaches statistical significance ( $p=.108$ ), although it is less significant in other sectors. This suggests a more nuanced interpretation may be in order. In very poor countries, the emphasis may not be on building up economic infrastructure and production capability, but on more immediate needs. The negative impact of income on food aid would support this idea.<sup>23</sup>

Size is also an indicator of need. Larger countries get more aid. In the literature, size is also used alternately as a measure of strategic importance (big being more important) or as representing susceptibility to outside interference (small being more susceptible). A lot of attention has been paid to what is called the “small country bias.” Previous studies have found either that aid did not increase with population, or that it increased but less than proportionately with the increase in population. The findings here suggest that there is less total aid per capita in larger countries. The base country receives an estimated \$24.67 per person in aid. A country otherwise the same but with a population at the 75th percentile (26.2 million), receives about \$14.30 per person.

There are a few important points to note about the relationship between population and aid. First, it is not at all clear that a less than proportionate increase in aid with respect to population is evidence of a small country bias. It is likely that there are economies of scale to aid provision. Doubling the amount of

<sup>23</sup>Measurement issues provide another reason why the impact of income on aid may be difficult to interpret. Income is measured in constant purchasing power parity terms. This is necessary to conduct meaningful cross-country comparisons of relative wealth. However, aid is measured in constant dollars, not adjusted for purchasing power parity. This is because much aid is in-kind, or valued at donor, rather than recipient, prices. Without recalculating every commodity and service at its value to recipients, we cannot know their value and so cannot adjust for differences in purchasing power. Yet in every case the cost of operating on the ground, which varies substantially across recipients, will impact the dollar value attached to aid provisions. It may simply cost more in some countries to provide the same net benefit on the ground. To the extent that prices are positively correlated with income (which we would expect) this would create an apparent bias toward wealthier countries. This is true even in cases where the value of aid to the recipients, if adjusted for purchasing power parity, would be equal.



service provision would be unlikely to require doubling the number of personnel in the field to implement and monitor projects. Building a water system for 20,000 people may cost less per person than building a similar system for 10,000 people. Second, in some categories the amount of aid increases more than proportionately with population. This can be seen for budget support, economic infrastructure, and food aid. The base country receives \$1.74 per person in economic infrastructure aid. Increase its population to the 75th percentile level and it will receive \$1.97. The impact would be even greater for budget support. It appears that budget support is given disproportionately to large, well-governed countries. It may be the case that as the size of the population rises it becomes increasingly inefficient to attempt change on a project-by-project basis. Therefore, if the government is well-run, the most efficient course of action might be to give it direct access to the cash.

**Emergency need** Emergency aid increases if the number of people affected by a natural disaster increases, the number of refugees increases, or there is a civil war ( $p=0.117$ ). When the number of people affected by a natural disaster increases from its base value of 5,001 to its value at the 75th percentile (107,494), the amount of emergency relief increases by \$3 million and total aid increases by \$11 million. This amounts to an increase of \$107 for each of the newly affected people. When the number of refugees increases from 5,170 to 46,974 an additional \$43.89 per additional refugee is received in emergency assistance. The base country with a civil war receives, on average, \$3.9 million more than its counterpart without a civil war. These variables are clearly important in explaining aid flows, particularly aid flows for emergency assistance.

**Economic considerations** There is absolutely no evidence to support the idea that, as a group, DAC countries reward oil producers or trade partners with increases in aid. The coefficients on oil and trade are negative across models, significantly so in some cases. Of course, this does not mean that individual donors don't favor oil producers or their own trading partners. It only means that these bilateral effects, if there, disappear when aid is aggregated across donors. Also, keep in mind that this analysis stops in 2005, before the recent increases in oil prices. However, for the period 2000-2005, it does not appear that countries which traded less with industrialized nations or did not produce oil were disadvantaged as aid recipients.

**Strategic ties** An alliance with the US has, if anything, a negative effect on aid. This is consistent with the finding of Stone (2006). However, the impact is not significant at the aggregate level. Receiving US military assistance, on the other hand, has a positive impact on aid flows. This effect is substantively important. If the base country's military assistance from the US increases from 400,000 to \$3.2 million, the country will receive an additional \$10.2 million, or approximately \$1.09 per person. Looked at another way, for this change each additional dollar of military assistance is met with \$3.66 more in official development assistance. The impact diminishes as military aid increases. A country at the 90th percentile receives \$12.2 million in military assistance. This is associated with an increase of \$17 million in aid over the base level, or \$1.45 per dollar of military assistance. Former colonies receive more budget support and more food aid, but this does not amount to significantly more total aid. As with trade, it is likely better to analyze the impact of the colonial variable in a dyadic setting.

**Immigration** To my knowledge, this is the first study that controls for immigration when explaining aid allocation. This has been an important omission in the literature. Recipients that have sent more immigrants to OECD countries receive more aid in almost every category, as well as overall. The impact is quite large. The median number of immigrants from a recipient country living in OECD countries is 86,904. When this is increased to its value at the 75th percentile, 337,405, total aid increases by \$71.4 million dollars, or about \$7.59 for each person in the recipient country with median population. Looked at another way, the average aid increase per additional immigrant is \$285. Immigration clearly affects aid allocation.

It is interesting to compare the relative explanatory power of the regressions in Table 5 with those in Table 10. The R-squared statistics for the OLS regressions from both tables are reproduced in Table 12. While the donor interest variables add to the explanatory power in each sector, the influence of the governance and recipient need variables is certainly important on their own.

**Multilateral Aid** The impact of donor interest variables on multilateral aid allocation is controlled for in Table 13. The results again show that, after controlling for donor interest, the cross-sector pattern on the governance coefficient remains. Interestingly, there is no evidence that democracy significantly influences aid flows from multilateral donors.

Due to the number of zeros on the dependent variable, the models for individual sectors in Table 13 had

	Economic Infrast. (1)	Production Sectors (2)	Social Sectors (3)	Emergency Assistance (4)	Total (5)
Governance and Need	0.344	0.418	0.597	0.392	0.646
Governance, Need, and Donor Interest	0.492	0.472	0.677	0.419	0.718

Table 12: **Relative Explanatory Power, Models of Bilateral Assistance by Sector.** Reproduction of R-squared statistics from Table 5 and Table 10.

	Budget Support (1)	Economic Infrast. (2)	Production Sectors (3)	Social Sectors (4)	Food Aid (5)	Emergency Assistance (6)	Total (7)
Governance	6.34** (3.15)	6.70*** (2.43)	6.47*** (2.16)	0.35 (0.34)	-2.42 (4.61)	-8.00*** (2.20)	0.97*** (0.32)
Democracy	-0.21 (1.03)	-0.92 (0.59)	0.80 (0.59)	-0.02 (0.11)	-0.90 (1.17)	0.23 (0.65)	0.05 (0.09)
Income	-5.52** (2.72)	-4.87** (2.31)	-2.64 (1.69)	-0.63** (0.27)	-9.03*** (3.28)	2.84** (1.43)	-0.90*** (0.32)
Population	1.56 (1.58)	1.58 (1.24)	2.49*** (0.89)	0.41*** (0.13)	0.81 (1.99)	2.35*** (0.83)	0.44*** (0.15)
Disaster	-0.06 (0.22)	0.02 (0.13)	-0.06 (0.15)	0.04*** (0.02)	0.68*** (0.22)	0.43*** (0.14)	0.03 (0.02)
Refugees	0.68* (0.39)	0.28 (0.26)	0.24 (0.22)	0.07** (0.03)	-0.06 (0.39)	0.03 (0.19)	0.07** (0.04)
Civil War	2.54 (2.27)	-4.84*** (1.75)	-1.10 (1.70)	-0.23 (0.21)	-5.47 (3.57)	4.41*** (1.32)	-0.01 (0.27)
Oil	-0.26 (0.26)	-0.17 (0.16)	-0.17 (0.14)	-0.04** (0.02)	0.06 (0.28)	-0.35** (0.14)	-0.03 (0.02)
Trade	-3.81** (1.59)	-2.13* (1.17)	-1.34 (0.96)	0.03 (0.17)	-1.71 (2.13)	-1.59* (0.89)	-0.04 (0.18)
Immigrants	2.67** (1.04)	2.28*** (0.70)	1.13 (0.72)	0.22* (0.12)	0.63 (1.18)	0.74 (0.60)	0.12 (0.12)
Colony	19.70*** (5.12)	5.56* (3.35)	5.56*** (1.95)	0.91** (0.37)	2.31 (6.25)	-5.71** (2.45)	1.02** (0.43)
US military	0.33* (0.18)	0.33*** (0.11)	0.07 (0.10)	0.03* (0.02)	0.13 (0.17)	-0.02 (0.11)	-0.00 (0.02)
US ally	-5.33 (3.99)	-0.21 (3.11)	-1.89 (2.43)	-0.55 (0.42)	10.30** (5.21)	-0.08 (2.10)	0.25 (0.55)
Europe & Cent. Asia	18.83*** (6.06)	7.17 (4.61)	6.62** (2.79)	1.13** (0.53)	13.11* (7.31)	-7.52** (3.26)	1.88*** (0.65)
Mid. East & N. Africa	-14.85*** (5.38)	-0.07 (2.98)	-2.55 (3.44)	-0.00 (0.40)	4.34 (6.21)	1.13 (3.45)	0.51 (0.46)
Observations	476	476	476	476	476	476	476
Countries	104	104	104	104	104	104	104
R-squared							0.322

Table 13: **Sector Analysis of Multilateral Aid Commitments (including strategic variables), 2000-2005.** Sector regression use a Tobit Model; the total aid equation is estimated using OLS. Robust standard errors in parentheses. For reasons of space the time trend variable, constant, and sigma are not reported. \*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level. Based on panel data for low and lower-middle income countries.

to be estimated using a Tobit specification. For total aid, which is estimated using OLS, I can report the estimated effects of simulated changes. I use the same base country as I did when analyzing bilateral aid. For this country, increasing its governance score from the median value to the value at the 75th percentile changes the expected value of multilateral aid from \$76.6 million, for the base country, to \$106 million - an increase of about 39%. The percent change is higher here than for bilateral aid, but the impact on aid flows is similar, given the lower base value for multilateral aid. The results point to some interesting similarities and differences between bilateral and multilateral allocation decisions.

Multilateral donors favor poorer recipients, both at the aggregate level and in many sectors. A country with income at the 25th percentile receives, on average, 81 percent more aid than its richer counterpart with median income. This results in \$6.60 more per person in the base country (population 9.4 million). If we take the same base country and allow its income to fall from the median level of \$2,081 per capita to its value at the 10th percentile (\$654), the expected value of its multilateral aid increases by \$146 million, or \$15.58 per person. This suggests an important role for poverty concerns in determining multilateral aid commitments. As in the bilateral case, multilateral aid increases with population, but less than proportionately.

As is the case with bilateral aid, multilateral donors adjust aid flows in response to emergencies. Countries that experience a disaster receive more food aid and more aid for the social sector and emergency relief. Countries that host large numbers of refugees receive more budget support, more social sector aid, and more total aid. Increasing the number of refugees in a country from 5,170 to 46,974 raises the expected value of multilateral aid by \$13.7 million, or \$328 per additional refugee. Countries with an ongoing civil war receive less money for economic infrastructure, but more for emergency relief.

There is again no evidence that oil production or increased trade with industrialized countries is rewarded with more aid. Countries that send more immigrants to OECD members receive more budget support and more aid for economic infrastructure and social sectors. However, the impact of immigration appears to be less here than in bilateral aid. The coefficient on immigration in the model for total aid is smaller than its bilateral counterpart, and not statistically significant. Interestingly, there is no evidence that US military assistance influences multilateral aid flows. Status as a former colony, or location in Europe/Central Asia, have a positive impact on multilateral aid, whereas their impact on total bilateral aid was not significant.

## 5 Conclusion

This paper tested the hypothesis that donors consider the needs and capabilities of recipients when making aid allocation decisions. To do so, it offered an alternative interpretation of donor responses to the quality of recipient governance. In particular, it advanced the idea that donors may use sector allocation as a tool to target both the capacity and need signals imbedded in a recipient's level of governance. The evidence presented supports the hypothesis that for the period 2000-2005, donors use sector allocation to differentiate between recipients based on their level of governance. In sectors such as economic infrastructure or production sectors, where government involvement in aid is relatively high, better governance is associated with more aid. The opposite is true for emergency relief, which is almost completely channeled through non-governmental sources. For this category, more aid is given to countries with worse governance. The social sector falls somewhere in the middle. This sector has more government involvement than is seen in emergency relief, but less than economic infrastructure. The result here is a generally insignificant coefficient on governance for social sector aid. This could happen if donors respond in opposite directions to the need and capacity signals contained in the quality of governance, so that on net the impact of governance is canceled out.

Importantly, the cross-sector variation in the impact of governance holds both with and without controlling for strategic interests of donors. The pattern does not appear only after controlling for economic or security interests. It is not conditional on having first explained the non-development aspects of aid allocation. Yet it is robust to the inclusion of these non-development variables. It also appears to be a relatively recent development in donor behavior. There is no evidence that donors followed the same cross-sector strategy with regard to governance and aid flows in the 1980s.

This paper also introduced new variables into the aid debate. The evidence presented suggests that it is important to control for emergency needs when studying allocation. Both the number of people affected by a disaster and the number of refugees in a country has an impact on the level of emergency assistance and, in some cases, total aid. Immigration also has a substantively important effect on aid allocation decisions.

With the end of the Cold War rationale for aid, we would expect changes in aid allocation. The evidence presented here shows that these changes have materialized. Although some traditional measures of donor interest remain important, in recent years donors are more concerned about the capacity of recipients to use

aid effectively.

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