MAGKS *Göttingen*
Kassel
Aachen
Siegen *Marburg*
Gießen

No. 30-2012

Katharina Stepping

Do poor health conditions lead to higher allocation of development assistance?

Do poor health conditions lead to higher allocation of development assistance?

Katharina Stepping[a,b]

Abstract

This paper analyzes the targeting of development assistance for health across countries in a multivariate regression framework, based on data from 22 bilateral donors to 160 recipients between 1990 and 2007. Donor characteristics, recipient characteristics and the donor-recipient-relationship are argued to be important determinants. The results show that health indicators influence the average allocation decision, but not to the same degree. HIV prevalence significantly increases aid receipts, while under-five mortality and maternal mortality are insignificant. The quality of the institutional environment in the recipient country, programmatic preferences of the donor and the relationship between donor and recipient also affect the average allocation pattern.

JEL classification: F35; O15; O19

Keywords: Foreign aid; Assistance; Health; Aid policy; MDGs

[a] Collegio Carlo Alberto, Via Real Collegio, 30, 10024 Moncalieri (Torino), Italy; Email: katharina.stepping@iel.carloalberto.org.
[b] Department of Economics, Philipps-University Marburg, Universitätsstr. 25, 35032 Marburg, Germany.

1. Introduction

The reduction of child mortality, the improvement of maternal health and the fight of HIV/Aids and other diseases were declared major objectives on the international development agenda known as Millennium Development Goals. Health has emerged as an important international issue, partly reflected in the volume of health-related assistance which quadrupled over two decades to $21.8 billion in 2007 (IHME (2009)). Unprecedented amounts have been made available for both foreign aid and health-related assistance, partly motivated by the rise of the HIV/Aids epidemic in sub-Saharan Africa. The share of aid for the social sector rose from about 20 percent at the beginning of the 1990s, to about 35 percent in the mid-2000s, including higher spending on health (Thiele et al. (2007), 600). Resources were devoted to new objectives such as stemming pandemics in the developing world (Adelman (2003), 9). It seems that more attention has been paid to health circumstances in developing countries in terms of foreign aid resources.

In the aid literature, political, strategic, economic and humanitarian motives are widely accepted as important variables for explaining aid allocation patterns across donors. Dollar and Levin (2006) provides a survey of studies analyzing the determinants of foreign aid. More recent empirical analyses focus on whether recipient nations' imports have an impact on the flow of bilateral aid (Younas (2008)), whether donor characteristics represent possible determinants (Chong and Gradstein (2008)), whether the criteria for aid allocation have become more selective (Claessens et al. (2009)) or whether need, merit and self-interest are possible determinants of bilateral aid allocation (Hoeffler and Outram (2011)).

This paper contributes to the existing literature in several ways. First, we answer the principal question in how far the knowledge about poor health conditions in a recipient country influences the allocation decision taken as regards health assistance. Second, to the best of our knowledge, no prior empirical evidence on the provision of health assistance is available. Third, three analytical perspectives are taken – the importance of donor characteristics, recipient characteristics and donor-recipient-relationship – which permit to examine an elevated number of possible determinants. Our specific focus is to study which factors influence the allocation decision of the average bilateral donor. We use

data on dyadic aid flows between 22 bilateral donors and 160 recipient countries between 1990 and 2007.

The paper is structured in the following way. The hypotheses are developed in section 2. Section 3 describes the dataset, the variables and the estimation method employed. Section 4 presents the estimation results and robustness checks. The paper concludes with a discussion of the findings.

2. Hypotheses

The MDGs have been described as "a major motivational device to increase development efforts in and on behalf of poor countries" (Easterly (2009b), 26). In specific, the donor community has committed itself to the improvement of child health, maternal health and the fight against HIV/Aids. In addition to the publicly visible commitment, media coverage of health problems like HIV/Aids can raise the awareness of the public in Western countries about these issues. The increased sensitivity for the topic can create expectations among the public, specifically, the voters, which can translate into public pressure on politicians. Facing public pressure, politicians would have a strong incentive to consider the global health concerns on the international development agenda. Given the international commitment and the potential public pressure, it is hypothesized:

Hypothesis 1: The greater a recipient's need, as expressed by poor health indicators, the more aid is to be allocated.

Institutions, understood as commonly known rules, endowed with a sanctioning mechanism, that are used to structure recurrent interactions (Voigt (2009), 8), help to reduce uncertainty. The institutional setting in the recipient country is important for two reasons. On the one hand, donors might reward institutional quality because it increases the likelihood that the later aid allocation will be effective. Aid allocated for an intervention in a recipient country with, for instance, a lower corruption level is likely to produce a better outcome, all other things equal. On the other hand, donors might refrain from allocating aid when the institutional environment lacks quality. Aid allocation to a recipient with, for

example, a high corruption level is likely to result in diverted aid flows which will lower the possible impact of the intervention, all other things equal. Since poor institutional settings may increase the absolute need for assistance, but at the same time also lower the potential impact of financial flows from a donor perspective, it is unclear to what extent a favorable institutional environment attracts more health assistance. The consequential hypothesis is:

Hypothesis 2: The more stable the environment is, as evidenced by relatively strong institutions, the more aid is allocated.

In the literature, it has been argued that "(g)overnment spending on health from domestic sources is an important indicator of a government's commitment to the health of its people" (Lu et al. (2010): 1376). Since the domestically financed health spending reflects the importance of health on the domestic political agenda of recipient countries, donors might consider the ability (or willingness) of a recipient to finance the health system in their selection respectively allocation decision. On the one hand, donors might complement the recipients' financing efforts. On the other hand, a donor might allocate aid funds precisely because the public health system of the receiving country is considered to be underfinanced. It is unclear if the recipient government spending for health has an impact on the allocation decision for health assistance. It is thus hypothesized:

Hypothesis 3: The more the receiving country invests in good health, as evidenced by public health expenditures, the more aid is allocated.

Donors are argued in the aid allocation literature to not decide independently from other donors (e.g. Berthélemy and Tichit (2004), Berthélemy (2006), Younas (2008), Claessens et al. (2009), Hoeffler and Outram (2011)). The United States is an important donor in terms of their volume of health assistance. The decisions of this donor with the largest financial contribution are likely to have a signaling effect on the decisions taken by other donors and to cause two distinct reactions. On the one hand, another bilateral donor is likely to choose those recipients that were *not* selected by the United States. Avoiding the direct competition with the US funds ensures that the financial contribution of the

4

donor is relatively important for the recipient. On the other hand, the US selection decision could fuel the decision to select the same recipient; either in order to demonstrate importance on the stage of international relations or simply because the decision is taken as a signal of merit of the recipient. For instance, other US donors and multilateral organizations appear to have interpreted the Millennium Challenge Corporation's (MCC) decisions as signaling merit of receiving countries for more aid; other bilateral donors did not necessarily increase their aid granted but neither did they reduce their aid (Dreher et al. (2010), 12). Consequently, it is hypothesized:

Hypothesis 4.1: The more aid a recipient country received from the United States, the more aid is being allocated by other donors.

Bilateral donors may view their aid as a complement of multilateral aid, with bilateral flows topping up multilateral aid flows or vice versa, as first identified by Dudley and Montmarquette (1976). Evidence from time series data suggests that bilateral aid can be a substitute for aid from multilateral organizations in some cases and a complement in others. While bilateral donors provided more aid to recipients like Egypt, Israel, and Thailand, which received more aid from multilateral donors, the amount for Indonesia, Kenya, Morocco, and the Philippines was reduced in response to increased multilateral aid to these countries (Feeny and McGillivray (2008), 525). A priori, it is unclear what effect multilateral aid has on bilateral allocation decisions. Hence, it is hypothesized:

Hypothesis 4.2: The more aid a recipient country received from multilateral donors, the more aid is being allocated by other donors.

Similar to the argument made for recipient countries, it can be argued that the domestic health expenditures of the donor government reflect the importance of health as topic on the political agenda of the donor country. As a consequence, the health expenditures of the donor country are likely to be correlated with the spending policies for health concerns in recipient countries. Also, higher levels of political transparency, understood as the degree to which the public is able to monitor the activities of the government, are broadly agreed to reduce the possibilities that policy-making is driven by special interests. Since aid agencies and related ministries are part of the donor's political system, the level of

political transparency is assumed to affect their ability to follow politics driven by other interests than the neediness of the recipients (Faust (2010), 12). Measures of corruption reflect the extent to which parties involved in illegal transactions are able to divert resources from their original purpose. A higher corruption level is hence an indication of a less transparent political system. In our context, this means that we would expect greater political transparency, thus less opportunities to follow other interests, approximated by a low corruption level, to be positively correlated with the donor's spending policies for health assistance. It is hypothesized:

Hypothesis 5: The more the donor invests in health at home, the more aid is allocated to the selected recipient.

It has been argued that a donor may pursue economic interests in the receiving country as (potential) trading partner, either as market for its exports or as source of its imports. Long-term commercial relationships can make aid transfers to be of "mutual advantage" (Cassen (1994), 209). Under such circumstances, aid would be given to try to promote growth or alleviate economic difficulties, to ensure the supply of imports or the continuation of exports (Maizels and Nissanke (1984), 884). Particularly bilateral aid is often at least partly tied by the condition to purchase certain goods and services in the donor country (Radelet (2006), 6); such imports could be medical supplies, for instance. Consequently, it is hypothesized:

Hypothesis 6.1: A recipient country with an established economic relation to the donor country receives more aid.

In the age of globalization, where complex relations of mutual interdependence are created among actors at multicontinental distances (Dreher (2006), 1092), political integration may increase and political isolation may decrease the probability of being selected as recipient country. For instance, high-level diplomatic representation between the countries reflects the political importance of the receiving country. The evidence on the importance of the political relationship between donor and recipient for aid allocation is mixed. A priori, it is unclear to what extent these factors are important for health assistance. It is hence hypothesized:

Hypothesis 6.2: A recipient country with relatively strong political ties to the donor country receives more aid.

Cultural similarities can overlap with a long history of economic or political interaction. Institutional structures of the donor country and the recipient country are often derived from one another and long-standing relationships can result in "linguistic and personal affinities" (Cassen (1994), 209). Linguistic ties as influence of the direction of aid flows have been hardly recognized in the literature. On the one hand, a former colony shares a common language with its past colonial master. This coincidence between language and historic ties makes it difficult to isolate the effect of language. On the other hand, there are circumstances in which the common language between donor and recipient seem to be a driving force for aid allocation. For instance, Canada and other European donors (excluding France) favor French-speaking African countries (Round and Odedokun (2004), 297). A priori, the importance of cultural links between donor and recipient for the allocation of health assistance is unknown. Consequently, it is hypothesized:

Hypothesis 6.3: A recipient country with characteristics similar to the culture of the donor country receives more aid.

Previous studies suggest colonial past to be an important determinant for allocation decisions (e.g. Alesina and Dollar (2000)). It has been argued that aid to former colonies is essentially done in order to maintain or expand a sphere of interest (Maizels and Nissanke (1984), 884). A common colonial past can create such a strong link that donor countries may even overlook or ignore potential problems, related to a high level of corruption, in their decision-making process (e.g. Alesina and Weder (2002): 1126-1127). It is unknown in how far the historic relationship influences the allocation decision for health aid. It is hypothesized:

Hypothesis 6.4: A recipient country with particular historic ties, visible in the colonial experience, is allocated more aid.

The distance between the donor's country and the recipient country has been argued to be important in the decision-making process. For instance, it has been shown that geographical proximity renders countries more likely to be eligible for food aid (Neumayer (2005), 403): the closer a country, the more salient is the issue in the public perception and for policy-makers. The relative closeness of a

country, in terms of geographical proximity, is related to public attention in another way: Following the "if it bleeds, it leads" rule of journalism (Easterly (2009a), 381), problems only exist if they are reported on. Consequently, one would expect the United States to care more about happenings in Latin America, while European donors focus more on issues on the African continent. However, it has also been argued that a significantly negative effect of the distance variable can only be expected for those countries "that want to promote a regional sphere of influence in giving more aid to proximate countries" (Neumayer (2003), 654). Round and Odedokun (2004) finds a geographical pattern of bilateral aid allocation with a remarkable tendency to grant aid to neighboring recipients: Australia and New Zealand give much aid to Oceania; Japan to the Asian region; Canada and the United States to the American region; Europe favors Europe but allocates a much larger share to African countries. The importance of distance respectively the geographic location for the allocation of health assistance is unclear. It is thus hypothesized:

Hypothesis 6.5: The smaller the geodesic distance between donor and recipient, the more aid is allocated.

3. Data and method

3.1. Data

The sample consists of balanced panel data with dyadic data on flows of development assistance for health from donor to recipient. The dataset comes from the Institute for Health Metrics and Evaluation, but the data is compiled based on the aid statistics on official development assistance for the health sector, provided by the Development Assistance Committee of the Organization for Economic Co-operation and Development. DAH is defined as "financial and in-kind contributions made by channels of development assistance to improve health in developing countries. It includes all disease-specific contributions as well as general health sector support, and excludes support for allied sectors." (IHME (2009), 13). The data covers a maximum of 160 recipient countries and 22 donors between 1990 and 2007. The database includes recipient countries that are classified as de facto dependent areas (see Appendix A). The donors included are Australia, Austria, Belgium, Canada, Denmark, Finland,

France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

In an attempt to model the donors' decision-making process in the most accurate way possible, missing observations have been replaced by the last available observation of the variables Economic Freedom, Government Effectiveness, Corruption Perception Index and DTP3. A donor can only use available data in the decision-making process. For instance, in the selection decision in 1993, only data on economic freedom from 1990 could be used. This is a clear argument against extrapolation to fill missing observations. For some countries, the official data reported for the prevalence of HIV starts with missing values but reports a HIV prevalence of 0.1 percent in the following years. In these cases, the missing values were replaced by zeros.

3.2. Variables

Three indicators are employed to measure the health conditions in the recipient countries (Hypothesis 1). *Under-five mortality rate* measures child survival and also reflects the socioeconomic and environmental conditions in which children live (WHO (2010), 112, 229). The improvement of maternal health is assessed by the *maternal mortality ratio* which monitors deaths related to pregnancy and childbirth, reflecting the capacity of the health systems to provide effective health care during pregnancy and childbirth (WHO (2010), 119). *Prevalence of HIV* is a direct indicator of the burden related to HIV and reflects the prevalence of HIV among the population ages 15 till 49. In addition, we measure need on a broader basis and employ logged *GDP per capita*. The indicator of need is commonly used to assess whether poor countries, as recipients in need of aid, are specifically targeted (e.g. Nunnenkamp and Thiele (2006), 1182). Health achievements vary considerably across countries with the same income, particularly among poorer countries (WHO (2008), 4). Therefore, the *Human Development Index (HDI)*, as a summary composite index is used as alternative. Finally, the variable logged *population* controls for the heterogeneous nature of recipients.

Several indicators are used to approximate the structural differences as regards the quality of the institutional environment in the receiving country (Hypothesis 2). The variable *democracy* is measured

on a unified polity scale ranging from -10 (strongly autocratic) to +10 (strongly democratic) (Marshall et al. (2010), 16) and is frequently used as proxy for the stability in the recipient country. The indicator *rights and liberties* is the non-weighted sum of the annual evaluation of the state of global freedom of individuals with respect to political rights like the electoral process and civil liberties like freedom of expression and belief; the variable was re-coded such that the scale ranges from 1 (least free) to 7 (most free) (Freedom House (2009)). *Economic freedom* measures the extent to which the policies and institutions of countries are supportive of economic freedom (Gwartney and Lawson (2009), xxi), on a 0 to 10 scale with 10 representing the greatest degree of freedom. *Government effectiveness* captures perceptions of the quality of public services, the quality of policy formulation and implementation, and the credibility of the government's self-commitment, among others (Kaufmann et al. (2010), 4). The indicator ranges from -2.5 to 2.5, with higher values corresponding to higher degrees of government effectiveness. The *Corruption Perceptions Index (CPI)* measures the perceived level of public-sector corruption; the variable has been re-coded such that it ranges from 1 (low corruption) to 10 (high corruption). The extent of rent-seeking activities is a proxy for a bad institutional environment in the receiving country.

Government health expenditures (Hypothesis 3) are measured by *public expenditure on health* in order to account for differences among recipients with respect to the financing of the national health system. The coverage rate of immunizations is used as a proxy for the general attention that is being paid to public health issues in a recipient country. Hence, the *coverage of the third dose* of diphtheria toxoid, tetanus toxoid and pertussis vaccine is used as indicator for the quality of the health system.

The relative importance of a donor is approximated by the variable *donor size*, which controls for the relative budget share of a donor. It is coded one if the donor's annual budget has a share greater than 5% compared to the pooled annual budgets of all donors and zero otherwise. The variable *US aid* controls for the volume of allocation decisions by the United States (Hypothesis 4.1). Allocation decisions of the largest donor are assumed to have a different effect on other donors' decisions, depending on their relative importance. While big donors are expected to complement US allocation

decisions with their own aid provision, small donors are expected to show a substitutive reaction, in the sense that they avoid allocating aid to the same recipients. Hence, an interaction term between donor size and US aid controls for possible differences. Due to bureaucratic inertia, it seems reasonable to expect the current year's decision to be based on the previous year's selection. The variable *previous allocation* controls for possible path dependency and represents the aid allocation in the previous year.

The variable *multilateral aid* controls for the aid activities of multilateral donors (Hypothesis 4.2) and serves as proxy for a possible bandwagon effect on bilateral aid. It measures the total sum of health assistance that a recipient received from multilateral donors in the previous year. We assume that multilateral allocation decisions have a different effect on other donors' decisions according to their relative importance, with effects similar to the bilateral competition. Hence, an interaction term between donor size and multilateral aid controls for possible differences.

To control for the programmatic preferences of the donors (Hypothesis 5), we include the share of *government health expenditure* in relation to the donor country's GDP. In addition, the Corruption Perception Index controls for the *political transparency* in the donor country, ranging on a scale from 1 (low transparency) to 10 (high transparency). Since more egalitarian donor countries seem to provide more foreign aid than unequal donor societies (Chong and Gradstein (2008), 10), we also control for the level of inequality in the donor country. The *Gini* coefficient is the most widely used single measure of inequality which refers to relative levels of poverty. It ranges from 0 (perfect equality) to 100 (absolute inequality). In addition, the *donors' per capita income* is controlled for.

Several indicators are used to proxy the relation ties between donor and recipient. The proportion of a donor's *exports* to a given recipient represents the economic interest in the recipient country as potential market (Hypothesis 6.1). The share of a donor's *imports* from a given recipient approximates the economic interest in the recipient as source of imports. The trade relations as proxy for the intensity of the economic ties between donor and recipient are measured by *trade volume*, the total trade as sum of exports and imports between donor and recipient.

The Index on Political Globalization accounts for strong political ties (Hypothesis 6.2). It measures the intensity of political collaboration between countries on a scale of 1 (low) to 100 (high) and is used to approximate the *political integration* of a country on the international level (Dreher (2006)). The *political proximity* between donor and recipient is approximated by the chief executive's party orientation of the respective government. The dummy variable is coded one if the two governments have the same political color (right, left, center) and zero otherwise.

Several variables are used as proxies for cultural similarities between donor and recipient (Hypothesis 6.3). The dummy variable *language* controls for linguistic similarities with respect to the common dominant language. It denotes one if the donor country and the recipient country share the same dominant language and zero otherwise. The dummy *religion* checks religious similarities in terms of the common dominant religion. It is coded one if donor and recipient share the same dominant religion and zero otherwise. In order to control for cultural links, the Index on Social Globalization is used as proxy for *social integration* of a country on the international level and is measured on a scale of 1 (low) to 100 (high) (Dreher (2006)).

The variable *colonial history* serves as indicator for a particular historic relationship between donor and recipient (Hypothesis 6.4). It controls for the logged number of years since 1900 in which the recipient was a colony. In order to allow for a distinction between a country's own colonies and colonies of others, the variable *own colony* captures the logged number of years since 1900 in which the country was an own colony. The variable *other colony* measures the logged number of years since 1900 in which the country was the colony of another donor.

Geodesic *distance* between donor's and recipient's capitals is used as proxy for salience and political importance (Hypothesis 6.5). The dummy variable *continent* accounts for the respective continental link. It is coded one for the continent (Africa, Asia, America, Europe and Oceania) that a recipient country belongs to and zero otherwise.

3.3. Method

The basic equation of the panel model used to test the hypotheses takes the following form:

$$\ln\left(DAH_{ijt}\right) = \left[\alpha_i + v_t + \beta_d X_{j,t-1}^{DC} + \beta_r X_{i,t-1}^{RC} + \beta_m X_{ij,t-1}^{BR} + \mu_{ij,t-1}\right], DAH_{ijt} > 0$$

$$i = 1, \dots, 160; j = 1, \dots, 22; \ t = 1, \dots, 18$$

where i refers to the recipient, j refers to the donor and t refers to time. The dependent variable $\ln\left(DAH_{ijt}\right)$ represents the logarithm of development assistance for health in constant 2007 dollars from donor j to recipient i in year t. α_i are recipient-random-effects, v_t are time-fixed-effects, $X_{j,t-1}^{DC}$ is a vector of donor characteristics, $X_{i,t-1}^{RC}$ is a vector of recipient characteristics, $X_{ij,t-1}^{BR}$ is a vector of bilateral relations between donor and recipient, and $\mu_{ij,t-1}$ is the disturbance term. The error term $\mu_{ij,t-1}$ is assumed to be independent over i, but it may be correlated over t for given i (hence, it is assumed to be independent across countries but not necessarily within countries over time). All explanatory variables are lagged by one year to model the decision-making process adequately. The recipient random effects control for unobserved country heterogeneity that is assumed to be independently distributed of the regressors. Time fixed effects control for changes over time that affect all recipients equally.

4. Results

The results of the base estimation (e.g. Table 1, column 1) show that more aid is allocated to poorer countries: a 10% decrease in per capita income is associated with a 4.5% increase in aid. For the average donor, the small country bias cannot be confirmed with respect to health assistance: a 10% increase in population size is associated with a 1% increase in allocated aid. Economic links to the donor, the democracy level of the recipient and a recipient's colonial history have a significantly positive impact on aid allocations for health on average. The geographic bias cannot be confirmed in terms of health aid: a 10% increase in the distance between donor and recipient is associated with a 6.3% increase in allocations by the average donor.

For dispositional purposes, we will focus on commenting the main results for each hypothesis. In Table 1, the estimation results for the first hypothesis are presented. When controlling for all three

health indicators simultaneously in column (5), only the prevalence of HIV has a significantly positive impact on aid. A one unit increase is associated with a 3.2% increase in allocated health aid. The hypothesis that donors allocate health assistance according to poor health indicators of recipient countries can thus only be partly confirmed. Contrary to public statements, under-five mortality and maternal mortality do not significantly influence these allocation decisions. However, the prevalence of HIV does have a significantly positive impact on the aid decisions.

Table 1.   Estimation results for need and development indicators

	Base	Hypothesis 1					All variables	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(ln) GDPpc°	-0.4515	-0.4504	-0.4002	-0.4081	-0.4077	-0.3539	-0.3615	
	(-9.59)***	(-6.26)***	(-6.09)***	(-6.15)***	(-5.05)***	(-4.93)***	(-4.34)***	
(ln) Population°	0.1000	0.1002	0.1212	0.1390	0.1394	0.1062	0.1248	0.1917
	(2.70)**	(2.60)**	(3.10)**	(3.14)**	(3.06)**	(2.74)**	(2.72)**	(4.32)***
(ln) Exports°	0.2156	0.2159	0.2231	0.2117	0.2129	0.2265	0.2297	0.1852
	(11.26)***	(9.06)***	(9.32)***	(7.96)***	(8.00)***	(9.29)***	(8.49)***	(7.12)***
Democracy°	0.0234	0.0235	0.0225	0.0112	0.0107	0.0236	0.0129	0.0124
	(4.92)***	(3.18)**	(3.08)**	(1.32)	(1.24)	(3.22)**	(1.52)	(1.46)
(ln) Colonial history	0.0641	0.0631	0.0307	0.0718	0.0730	0.0089	0.0469	0.0390
	(2.12)*	(1.77)	(0.89)	(1.99)*	(1.80)	(0.25)	(1.11)	(0.91)
(ln) Distance	0.6279	0.6284	0.6114	0.5902	0.5911	0.6681	0.6179	0.6494
	(6.29)***	(6.00)***	(5.81)***	(4.63)***	(4.65)***	(6.32)***	(4.91)***	(5.03)***
Under-five mortality°		0.0001			-0.0008		-0.0038	-0.0029
		(0.05)			(-0.45)		(-1.84)	(-1.44)
Maternal mortality°			0.0473		0.0128		-0.0040	0.0106
			(2.65)**		(0.54)		(-0.16)	(0.43)
HIV prevalence°				0.0337	0.0318		0.0320	0.0220
				(3.44)***	(3.04)**		(3.10)**	(2.13)*
HDI°						-0.0158	-0.0207	-0.0255
						(-3.59)***	(-3.41)***	(-4.28)***
Observations	9,720	9,720	9,720	7,412	7,412	9,287	7,308	7,308
No. of groups	1,186	1,186	1,186	921	921	1,167	910	910
R-squared overall model	0.1593	0.1595	0.1612	0.1560	0.1548	0.1669	0.1663	0.1403
Chi-squared	536.4014	420.0252	424.7478	332.8533	334.3682	436.4538	349.1713	305.4131
Rho	0.5749	0.5743	0.5751	0.5912	0.5902	0.5839	0.5879	0.5928

Dependent variable is logged aid. OLS estimates of lognormal hurdle model. Robust standard errors clustered at country-pair level. All equations include year-specific time dummies. Coefficient of constant not reported. t-statistics are reported below the coefficient estimates. ° denotes a one-year lag. ***, **, and * denote significance at 0.1, 1, and 5 percent, respectively. Note also that the sample varies between columns because of data availability for some variables.

In column (7) we control for the general development level of a recipient country instead of specific health indicators. The coefficient for the HDI suggests a significantly negative impact on aid allocations: a one unit decrease in human development is associated with a 1.6% increase in health aid. The average donor allocates more aid to less developed countries. In column (8) all variables have been controlled for, while in column (9) per capita income was omitted. Population size, exports, distance and HIV prevalence have a significantly positive impact on health assistance allocated by the

average donor. Per capita income and human development have a significantly negative impact on aid allocation on average.

Table 2 presents the estimation results for hypotheses two and three. In column (6) we controlled for all variables that approximate the institutional environment in the recipient country.

Table 2.   Estimation results for institutional and recipient effort indicators

	Base	Hypothesis 2						Hypothesis 3	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(ln) GDPpc°	-0.4515	-0.4484	-0.6514	-0.497	-0.5792	-0.6686	-0.6706	-0.4592	-0.4758
	(-7.39)***	(-7.35)***	(-8.83)***	(-7.57)***	(-8.24)***	(-7.48)***	(-7.51)***	(-7.23)***	(-7.58)***
(ln) Population°	0.1000	0.0977	0.0336	0.0587	-0.0630	-0.1305	-0.1286	0.0875	0.0881
	(2.65)**	(2.59)**	(0.74)	(1.43)	(-1.33)	(-2.52)*	(-2.47)*	(2.12)*	(2.13)*
(ln) Exports°	0.2156	0.2161	0.2451	0.2393	0.3023	0.3110	0.3117	0.2292	0.2278
	(9.07)***	(9.10)***	(8.42)***	(9.28)***	(9.95)***	(9.29)***	(9.32)***	(8.99)***	(8.92)***
(ln) Democracy°	0.0234	0.0228	0.0173	0.0157	0.0170		0.0053	0.0100	0.0101
	(3.19)**	(3.10)**	(2.05)*	(1.93)	(1.86)		(0.54)	(1.24)	(1.26)
(ln) Colonial history	0.0641	0.0639	0.0542	0.0575	0.0752	0.0450	0.0440	0.0743	
	(2.00)*	(2.00)*	(1.34)	(1.68)	(1.99)*	(1.00)	(0.97)	(2.12)*	
(ln) Distance	0.6279	0.6300	0.5481	0.7506	0.8112	0.8155	0.8118	0.7886	0.8405
	(5.99)***	(6.02)***	(4.66)***	(6.85)***	(6.92)***	(6.33)***	(6.29)***	(6.13)***	(6.66)***
Rights and liberties°		-0.0143				-0.0449	-0.0441		
		(-1.02)				(-2.07)*	(-2.03)*		
Economic freedom°			0.1684			0.2509	0.2426		
			(2.78)**			(2.71)**	(2.56)*		
Government effectiveness°				0.0325		-0.2905	-0.2883		
				(0.33)		(-1.92)	(-1.91)		
CPI°					-0.0259	-0.0355	-0.0355		
					(-2.05)*	(-2.61)**	(-2.61)**		
Public health expenditures°								0.0047	-0.0028
								(0.10)	(-0.06)
Immunization rates°								0.0020	0.0016
								(1.15)	(0.90)
Observations	9,720	9,720	7,218	6,966	4,962	4,034	4,034	7,320	7,320
No. of groups	1,186	1,186	923	1,152	1,027	853	853	1,090	1,090
R-squared overall model	0.1593	0.1597	0.1691	0.1689	0.1885	0.2017	0.2017	0.1628	0.1635
Chi-squared	419.7562	421.0941	350.4164	389.8956	364.0349	317.1649	319.4716	371.8798	363.1679
Rho	0.5749	0.5749	0.6028	0.6408	0.6596	0.6833	0.6831	0.6376	0.6386

Dependent variable is logged aid. OLS estimates of lognormal hurdle model. Robust standard errors clustered at country-pair level. All equations include year-specific time dummies. Coefficient of constant not reported. t-statistics are reported below the coefficient estimates. ° denotes a one-year lag. ***, **, and * denote significance at 0.1, 1, and 5 percent, respectively. Note also that the sample varies between columns because of data availability for some variables.

In column (7) we added the democracy variable; the results remain largely the same. The general level of freedom, expressed in rights and liberties, has a significantly negative impact on aid allocation: a one unit increase in freedom is associated with around about 4.5% less health aid. Economic freedom in a recipient country has a significantly positive impact on health aid on average: a one unit increase is associated with around about 25% more aid. Government effectiveness has no significant impact on the average allocation decision; the coefficient is negative. The perceived level of corruption has a significantly negative impact on health assistance: the average donor allocates 3.6% less aid to more corrupt countries. When controlling for the perceived corruption level, the coefficient on population

size switches signs, suggesting that smaller countries and more corrupt countries receive more aid. The importance of the colonial history vanishes if the institutional environment is controlled for. This suggests that the circumstances of a recipient country today are more important than historic ties between donor and recipient, at least for the average hypothetical donor.

The last two columns contain the estimation results for hypothesis three. In column (8) we add public health expenditures and immunization rates of the recipient country. In column (9) colonial history was omitted. In both cases, the coefficients for both variables are insignificant and smaller than 1%. These results suggest that donors do not consider recipients' efforts with respect to the national health system in their decisions on health aid. Thus, hypothesis three is rejected.

Table 3 provides the estimation results for hypothesis 4. In column (2) the interaction between US aid and the respective budget size of other donors is controlled for. The results show that, on average, the allocation decisions by the United States have a different impact on the health aid provision by other donors depending on their size: a one percent increase in US aid has no significant impact on allocation decisions by small donors, while it is associated with a 0.1% increase in bilateral aid by big donors. However, despite the statistical significance of the US aid allocations, the economic significance for health aid is only marginal.

In column (4) the interaction term and lagged aid are included. The results suggest that US aid allocation decisions have a significantly positive influence on decisions taken by big donors. However, when lagged aid is controlled for, the effect is only marginal with 0.04% more on average. Column (5) controls for allocation decisions of multilateral donors interacted with the relative donor importance. On average, multilateral aid has no significant effect on provision decisions by small donors. With respect to big donors, a one percent increase in multilateral aid is associated with a 0.09% increase in bilateral aid. Despite the statistical significance, the economic significance of multilateral aid for bilateral donors is only marginal. In column (6) the interaction term on multilateral aid and lagged aid are included. Here, the economic significance of multilateral aid decisions for allocation by big donors reduces to 0.05%.

Table 3. Estimation results for rivalry indicators

	Base	Hypothesis 4				
		4.1			**4.2**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(ln) GDPpc°	-0.4515	-0.4116	-0.2090	-0.1811	-0.3329	-0.1913
	(-7.39)***	(-6.23)***	(-8.68)***	(-5.78)***	(-5.50)***	(-6.93)***
(ln) Population°	0.1000	0.1310	-0.0408	-0.0168	0.1331	-0.0216
	(2.65)**	(2.70)**	(-3.06)**	(-0.79)	(3.36)***	(-1.13)
(ln) Exports°	0.2156	0.1361	0.1064	0.0728	0.1629	0.0900
	(9.07)***	(4.94)***	(9.29)***	(4.83)***	(6.67)***	(6.64)***
(ln) Democracy°	0.0234	0.0207	0.0079	0.0042	0.0242	0.0081
	(3.19)**	(2.49)*	(2.72)**	(1.08)	(3.22)**	(2.46)*
(ln) Colonial history	0.0641	0.1216	0.0005	0.0247	0.0715	-0.0030
	(2.00)*	(3.33)***	(0.04)	(1.51)	(2.18)*	(-0.22)
(ln) Distance	0.6279	0.3942	0.2581	0.2240	0.6092	0.2608
	(5.99)***	(3.08)**	(6.54)***	(3.74)***	(5.72)***	(5.37)***
Donor size°ᵘ		-0.1828		-0.1510		
		(-0.40)		(-0.50)		
Small donor*(ln) US aid°ᵘ		0.0330		0.0130		
		(1.33)		(0.94)		
Big donor*(ln) US aid°ᵘ		0.0964		0.0396		
		(3.43)***		(2.40)*		
(ln) Aid°			0.7636	0.6804		0.6933
			(58.59)***	(40.75)***		(44.95)***
Donor size°					-0.1981	-0.3211
					(-0.48)	(-1.30)
Small donor*(ln) Multilateral aid°					0.0250	0.0138
					(1.10)	(0.88)
Big donor*(ln) Multilateral aid°					0.0901	0.0528
					(3.78)***	(3.46)***
Observations	9,720	6,415	7,843	5,352	8,455	7,103
No. of groups	1,186	938	1,030	816	1,144	991
R-squared overall model	0.1593	0.1601	0.6673	0.6076	0.2156	0.6667
Chi-squared	419.7562	430.6662	7120.9168	4002.4360	553.2306	5662.7516
Rho	0.5749	0.5695	0.0375	0.0732	0.6031	0.0947

Dependent variable is logged aid. OLS estimates of lognormal hurdle model. Robust standard errors clustered at country-pair level. All equations include year-specific time dummies. Coefficient of constant not reported. t-statistics are reported below the coefficient estimates. ° denotes a one-year lag. μ denotes that the donor USA is excluded. ***, **, and * denote significance at 0.1, 1, and 5 percent, respectively. Note also that the sample varies between columns because of data availability for some variables.

The hypotheses that US aid and multilateral aid affect the allocation process of bilateral donors have been confirmed, but with limitations. We could not find any evidence for completely opposing effects for small and big donors. Both US aid and multilateral aid decisions are statistically insignificant for the allocation decisions of small donors. We could find a statistical significantly positive effect for the decisions taken by big bilateral donors, suggesting that other large donors complement the allocation pattern of the United States, as well as that all donors complement the multilateral allocations. Yet, the economic significance is only marginal in both cases.

Table 4 reports the estimation results for hypothesis five on the programmatic preferences of the donor. In column (5) all variables of interest are controlled for. In comparison, the coefficient of health expenditures is no longer significant but remains positive. Political transparency, social inequality and donors' per capita income have a significant effect on aid allocation decisions. Since the variable health expenditures causes the number of observations to be remarkably lower, in column (6) we control for all other variables. More corrupt donor countries provide, on average, 5% less health assistance; however, the coefficient is statistically insignificant. Thus, the available evidence for the importance of political transparency is inconsistent. Other than expected, donor countries with greater social inequality provide almost 6% more aid. In addition, donor countries with greater per capita income provide 1.2% more health aid on average.

Table 4.   Estimation results for indicators of programmatic preferences

	Base	Hypothesis 5				
	(1)	(2)	(3)	(4)	(5)	(6)
(ln) GDPpc°	-0.4515	-0.5048	-0.4728	-0.5227	-0.5576	-0.5276
	(-7.39)***	(-6.21)***	(-7.98)***	(-8.93)***	(-6.45)***	(-8.93)***
(ln) Population°	0.1000	0.0351	0.0762	0.0592	0.0526	0.0541
	(2.65)**	(0.60)	(1.90)	(1.57)	(0.83)	(1.33)
(ln) Exports°	0.2156	0.1944	0.2285	0.2565	0.1948	0.2552
	(9.07)***	(4.90)***	(9.07)***	(11.12)***	(4.31)***	(10.16)***
(ln) Democracy°	0.0234	0.0192	0.0130	0.0250	0.0187	0.0155
	(3.19)**	(1.76)	(1.61)	(3.46)***	(1.56)	(1.88)
(ln) Colonial history	0.0641	0.0780	0.0479	0.0747	0.0455	0.0576
	(2.00)*	(1.79)	(1.40)	(2.43)*	(0.93)	(1.73)
(ln) Distance	0.6279	0.5751	0.7913	0.4438	0.6113	0.5920
	(5.99)***	(3.78)***	(6.95)***	(4.36)***	(3.64)***	(5.37)***
Expenditures for health, donor°		0.2225			0.0913	
		(5.23)***			(1.75)	
Political transparency, donor°			-0.0700		-0.6590	-0.0457
			(-1.91)		(-6.54)***	(-1.16)
Social inequality, donor°				0.0467	0.0264	0.0556
				(5.71)***	(2.13)*	(6.31)***
(ln) GDPpc, donor°				1.3766	1.6406	1.1688
				(7.75)***	(5.94)***	(6.23)***
Observations	9,720	2,389	7,595	8,338	1,798	6,533
No. of groups	1,186	803	1,160	1,148	667	1,095
R-squared overall model	0.1593	0.1949	0.1552	0.2283	0.1970	0.2214
Chi-squared	419.7562	237.0334	394.6846	556.0133	358.9945	490.9489
Rho	0.5749	0.7489	0.6320	0.5496	0.7110	0.6028

Dependent variable is logged aid. OLS estimates of lognormal hurdle model. Robust standard errors clustered at country-pair level. All equations include year-specific time dummies. Coefficient of constant not reported. t-statistics are reported below the coefficient estimates. ° denotes a one-year lag. ***, **, and * denote significance at 0.1, 1, and 5 percent, respectively. Note also that the sample varies between columns because of data availability for some variables.

The results for the hypothesis that a donor's preference for health on the national political agenda is reflected in the allocation decision for health assistance are mixed. On the one hand, donor countries with greater health expenditures provide more aid, but, on the other hand, the result is not consistently significant. The same is true for the effect of corruption in the donor country, which, on the one hand, lowers the provision of health assistance, but, on the other hand, is not consistently significant. The effect of own preferences respectively political transparency is ambiguous because the number of observations in the regressions including these variables drops dramatically due to data availability and, therefore, valid conclusions seem to be difficult. Contrary to common expectations, more unequal societies provide consistently more assistance. As expected, richer donor countries provide consistently greater aid shares.

Table 5 provides the estimation results for the hypotheses on relational ties between donors and recipients. In column (3) trade is substituted for exports. Trade links have a similar significantly positive effect on aid allocation as export links: a one percent increase in either leads to a 0.2% increase in allocated aid. Columns (4) and (5) control for the political integration of the recipient and the political proximity between donor and recipient. Contrary to our expectations, political links have no statistical significance, regardless if colonial history is excluded. In columns (6) and (7) the importance of cultural links is tested for. The results suggest that, if donor and recipient have the same dominant language, the allocation of health aid is increased by almost 80%. Colonial history seems to capture the cultural link between donor and recipient visible in the same language. The inclusion of dominant language renders colonial history insignificant but the variable own colony remains significant. The same dominant religion has a similar significantly positive effect of almost 25% more aid. The coefficient of cultural integration is significant but negative, suggesting that culturally integrated recipients receive less aid. However, the economic significance is relatively small, compared to the other explanatory variables. Column (8) tests for the importance of a common colonial experience versus a colonial link between another donor and the recipient. The coefficient of own colony suggests that a longer common colonial history increases aid allocation by 0.4%. The common past increases aid but the existence of such link between another donor and the recipient does

not have a negative effect. In column (9) distance is replaced by continent dummies for America, Asia, Europe and Oceania. Africa is the base level, in order to control for the geographic location of recipients. The dummy variables for Asia and Europe have a significantly negative effect on the provision of health assistance. In column (10) all variables that were previously significant are controlled for. When other relational ties are included, the geographic location becomes insignificant. The other findings remain largely the same as in the separate analysis.

Relational ties between donor and recipient are an important factor for aid allocation decisions, but their relative importance varies. The available evidence for economic, cultural and historic links is consistent, while political links seem to be insignificant for health assistance and the results for geographic ties are inconsistent. Overall, the hypothesis that the relationships between donor and recipient largely explain allocations of health assistance could be confirmed. This is particularly the case for economic, cultural and historic ties.

Sensitivity analysis

We employed several robustness tests in order to check if the results are sensitive to any changes in the specification. First, we used a time lag of two years to consider a different time horizon for the allocation process. Second, a more homogeneous subsample of recipients was analyzed by dropping transition countries in order to, at least tentatively, assess whether the diversity of countries affects the results. Third, a more homogenous subsample was considered by excluding upper-middle income countries. Fourth, we analyzed whether the donor diversity affected the results. Since the United States and Canada account for almost fifteen percent of all allocation decisions in the sample, we re-estimated the hypotheses excluding them. However, in conclusion, the results hardly change when focusing on more homogenous groups or changing the time horizon.

Table 5.   Estimation results for relationship indicators

	Base	Economic		Political		Cultural		Historic	Geographic	All variables
					Hypothesis 6					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
(ln) GDPpc°	-0.4515	-0.4808	-0.4482	-0.4687	-0.4859	-0.3063	-0.3068	-0.4328	-0.4383	-0.3053
	(-7.39)***	(-7.50)***	(-7.04)***	(-7.20)***	(-7.68)***	(-4.31)***	(-4.31)***	(-7.14)***	(-6.83)***	(-4.12)***
(ln) Population°	0.1000	0.0647	0.1093	0.0940	0.0953	0.1287	0.1286	0.1277	0.1734	0.1939
	(2.65)**	(1.60)	(2.72)**	(1.99)*	(2.01)*	(3.28)**	(3.28)**	(3.39)***	(4.22)***	(4.52)***
(ln) Exports°	0.2156	0.2148		0.2194	0.2189	0.2227	0.2227	0.1926	0.1925	
	(9.07)***	(8.12)***		(8.90)***	(8.87)***	(9.38)***	(9.38)***	(7.93)***	(8.25)***	
Democracy°	0.0234	0.0241	0.0229	0.0223	0.0217	0.0207	0.0206	0.0233	0.0243	0.0204
	(3.19)**	(3.22)**	(3.09)**	(2.86)**	(2.80)**	(2.81)**	(2.81)**	(3.18)**	(3.19)**	(2.68)**
(ln) Colonial history	0.0641	0.0735	0.0624	0.0638		0.0070			0.0810	
	(2.00)*	(2.26)*	(1.93)	(1.80)		(0.21)			(2.22)*	
(ln) Distance	0.6279	0.6361	0.5623	0.6811	0.7461	0.5238	0.5296	0.6297		
	(5.99)***	(6.07)***	(5.36)***	(6.08)***	(7.16)***	(4.91)***	(5.11)***	(5.95)***		
(ln) Imports°		0.0257								
		(1.29)								
(ln) Trade°			0.1966							0.1679
			(7.70)***							(6.46)***
Political integration°				0.0027	0.0033					
				(0.83)	(1.03)					
Political proximity°				0.0202	0.0206					
				(0.30)	(0.31)					
Dominant language						0.7704	0.7760			0.6734
						(5.50)***	(5.61)***			(4.43)***
Dominant religion						0.2318	0.2302			0.2767
						(2.07)*	(2.05)*			(2.23)*
Cultural integration°						-0.0210	-0.0212			-0.0196
						(-3.56)***	(-3.72)***			(-3.20)**
(ln) Own Colony								0.4227		0.3283
								(8.22)***		(6.45)***
(ln) Other Colony								0.0307		
								(0.94)		
America									0.5588	0.6037
									(1.57)	(1.71)
Asia									-0.2922	-0.0375
									(-1.99)*	(-0.25)
Europe									-0.7004	-0.3205
									(-2.47)*	(-1.14)
Oceania									0.0141	-0.3996
									(0.04)	(-0.97)
Observations	9,720	9,366	9,716	9,078	9,078	9,720	9,720	9,720	9,720	9,716
No. of groups	1,186	1,155	1,186	1,106	1,106	1,186	1,186	1,186	1,186	1,186
R-squared overall mod	0.1593	0.1635	0.1457	0.1695	0.1721	0.1731	0.1733	0.1602	0.1373	0.1480
Chi-squared	419.7562	423.5592	392.3242	412.8226	401.0756	480.1644	478.9201	550.4539	384.1648	530.5032
Rho	0.5749	0.5766	0.5813	0.5767	0.5773	0.5669	0.5668	0.5711	0.5823	0.5741

Dependent variable is logged aid. OLS estimates of lognormal hurdle model. Robust standard errors clustered at country-pair level. All equations include year-specific time dummies. Coefficient of constant not reported. t-statistics are reported below the coefficient estimates. ° denotes a one-year lag. ***, **, and * denote significance at 0.1, 1, and 5 percent, respectively. Note also that the sample varies between columns because of data availability for some variables.

5. Conclusions

In this paper we examine the effect or recipient characteristics, donor characteristics and the donor-recipient relationship on allocation decisions for health assistance made by the average bilateral donor. The data contains aid flows between 22 donors and 160 recipients from 1990 till 2007. In summary, the analysis shows that health indicators are less important for the average allocation of health assistance, than the policy statements of bilateral donors would suggest. More general indicators of development such as per capita income or the level of human development are at least as important. Institutional indicators like economic freedom and perceived corruption are decisive factors for the average hypothetical donor, but sometimes in different ways than expected. The indicators used to approximate the recipient's efforts for the national health system are insignificant. Although the allocation decision of the average donor with a relatively large budget is affected by the allocation pattern of the US as largest donor respectively multilateral donors, the effect of strategic interactions is only marginal. The analysis shows that indicators on donors' programmatic preferences are important for allocation decisions. Economic, cultural and historic links between donor and recipient determine the allocation pattern of the average donor.

The *first hypothesis* poses the question to what extent recipient countries with poor health indicators are targeted particularly for health assistance. The estimation results reveal the differences between the health indicators. In the general estimations, under-five mortality is not found to influence the allocation decision. Under-five mortality does neither increase nor decrease the attractiveness of a recipient country for a donor. Estimated separately, maternal mortality and HIV prevalence have a significantly positive effect on the allocation decision. On average, recipients with high maternal mortality or high HIV prevalence receive more health assistance. However, these effects change when all health indicators are included in the estimation simultaneously. Controlling for under-five mortality and maternal mortality, only HIV prevalence continues to have a positive effect on the allocation decision.

The *second hypothesis* analyzes the importance of the quality of the institutional environment in the recipient country for allocation decisions. Economic freedom increases the allocated health assistance, while rights and liberties, as measure of general freedom, lowers it. Government effectiveness has no

significant effect on the average allocation decision, but the perceived corruption in the recipient country decreases the allocated health assistance. Since these findings are robust to various sensitivity analyses, the conclusion is that the average bilateral donor allocates more health assistance to recipients with greater economic freedom, less rights and liberties, and less perceived corruption. The fact that recipients with less general freedom receive more health aid can be interpreted in two ways: The average donor either provides greater shares of health assistance in order to compensate for bad general conditions, which possibly imply poor health circumstances, or to 'buy' regimes.

Hypothesis three analyzes the importance of national expenditures for public health by the recipient for the average allocation decision. The findings illustrate that these efforts by the national government of the receiving country are insignificant, regardless of the specification. On the one hand, this result implies that allocation of health assistance is simply independent from the activities for the national health system by the government of the recipient. On the other hand, the finding can also imply that the proxies for reflecting the efforts extended by the recipient are inadequate.

The *fourth hypothesis* focuses on the possible effect of strategic interactions among bilateral donors respectively between bilateral and multilateral donors for the allocation decision. According to our estimation results, the average donor with a relatively large aid budget is inclined to complement allocations by the US and by multilateral donors. Despite the statistical significance, however, the effect is not substantial. Strategic interactions have no significant effect on allocation decisions taken by the average bilateral donor with a relatively small aid budget. Our findings also reveal allocation decisions as path dependent. In summary, the importance of strategic interactions for the allocation decision of the average donor could only be partly confirmed.

Hypothesis five questions the importance of programmatic preferences of the donor for the allocation decision. The findings show that, on average, the preference of the donor for health on the national political agenda increases the provision of health assistance, while more corruption in the donor country decreases the aid allocation. Unfortunately, these results are ambiguous due to a dramatic drop in the number of observations between different specifications, which makes valid conclusions difficult. The other results show that, different to expectations, more unequal donor societies provide consistently more assistance, controlling for per capita income of donor countries. In summary, it

seems important to control for donor characteristics to understand the average donor behavior in aid allocation.

Hypothesis six analyzes the importance of different bilateral ties between donor and recipient for the average allocation decision. According to the estimation results, economic, cultural and historic links are decisive determinants of the allocation decision by the average donor. Political and geographic proximity are insignificant for such decision; however, Asian and European countries receive less aid on average.

Appendix A Overview of the sample of recipients

Afghanistan	Eritrea	*Morocco*	*Thailand*
Albania°	*Ethiopia*	*Mozambique*	The Gambia
Algeria	*Fiji**	*Myanmar*	Timor-Leste*
Angola	*Gabon*	*Namibia*	*Togo*
Anguilla*	*Georgia*	Nauru*	Tokelau
Antigua & Barbuda*	*Ghana*	*Nepal*	Tonga*
Argentina	Grenada*	Netherlands Antilles*	*Trinidad & Tobago**
Armenia°	*Guatemala*	*Nicaragua*	*Tunisia*
Azerbaijan°	Guinea	*Niger*	*Turkey*
Bahrain	Guinea-Bissau*	*Nigeria*	Turkmenistan°
Bangladesh	*Guyana**	Niue*	Turks & Caicos Is.
Barbados*	*Haiti**	North Korea	Tuvalu*
Belarus°	*Honduras*	Northern Mariana Is.*	*Uganda*
Belize*	*India*	*Oman*	Ukraine°
Benin	*Indonesia*	*Pakistan*	*Uruguay*
Bhutan	*Iran*	Palau*	Uzbekistan°
Bolivia	Iraq	Palestinian Territory, Occupied	Vanuatu*
Bosnia & Herzegovina°	*Jamaica**	*Panama*	*Venezuela*
Botswana	*Jordan*	*Papua New Guinea**	*Vietnam*
Brazil	*Kazakhstan°*	*Paraguay*	Wallis & Futuna
Burkina Faso	*Kenya*	*Peru*	Yemen
Burundi	Kiribati*	*Philippines*	*Zambia*
Cambodia	*Kyrgyzstan°*	*Rwanda*	*Zimbabwe*
Cameroon	Laos	Samoa*	
Cape Verde*	Lebanon	Sao Tome & Principe*	
Central African Republic	Lesotho	Saudi Arabia	
Chad	Liberia	*Senegal*	
Chile	Libya	Serbia°	
China	*Macedonia°*	Seychelles*	
Colombia	*Madagascar*	*Sierra Leone*	
Comoros*	*Malawi*	Solomon Is.*	
Congo	*Malaysia*	Somalia	
Congo, DRC	Maldives*	*South Africa*	
Cook Is.*	*Mali*	*South Korea*	
Costa Rica	Malta	*Sri Lanka*	
Cote d'Ivoire	Marshall Is.*	St. Helena	
Croatia°	*Mauritania*	St. Kitts & Nevis*	
Cuba*	*Mauritius**	St. Lucia*	
Djibouti	Mayotte	St. Vincent & the Grenadines*	
Dominica*	*Mexico*	Sudan	
Dominican Republic*	Micronesia*	Suriname*	
Ecuador	*Moldova°*	Swaziland	
Egypt	*Mongolia*	*Syria*	
El Salvador	Montenegro°	Tajikistan°	
Equatorial Guinea	Montserrat*	*Tanzania*	

Notes: 1. Countries in italics are part of the core sample. 2. * denotes small island developing states following the UN definition (http://unstats.un.org/unsd/methods/m49/m49regin.htm). 3. ° denotes transitions countries following the UN definition. (http://unstats.un.org/unsd/methods/m49/m49regin.htm#transition). 4. Yugoslavia is excluded to avoid double entries; Gibraltar as high-income country is excluded. 5. De facto dependencies: *France*: Mayotte, New Caledonia, Wallis & Futuna; *Netherlands*: Netherlands Antilles; *New Zealand*: Cook Is., Niue, Tokelau; *UK*: Anguilla, Falkland Is., Montserrat, St. Helena, Turks & Caicos Is.; *USA*: Northern Mariana Is., Palau.

Appendix B

B.1 Definition and sources of variables

Variable name	Definition	Source	Expected sign
DAH	(Logged) DAH for recipient i by donor j in year t (US$)	Ravishankar et al. (2009)	n/a
Under five mortality	Probability of dying by age 5 per 1,000 live births in country i in year $t-1$ (in ‰)	Rajaratnam et al. (2010)	+
Maternal mortality	Annual number of female deaths during pregnancy, childbirth or within 42 days after per 1,000 live births in country i in year $t-1$ (in ‰)	Hogan et al. (2010)	+
Prevalence of HIV	Prevalence of HIV (% of population ages 15-49) in country i in year $t-1$	World Bank (2010)	+
Population	(Logged) Population in country i in year $t-1$	UN Statistics Division (2010); World Bank (2010); CIA (2010)	-
GDP p.c.	(Logged) Income per capita in country i in year $t-1$	World Bank (2010)	-
HDI	Human Development Index in country i in year $t-1$ (in %)	UNDP (2010)	-
Democracy	An index on a scale of -10 (strongly autocratic) to +10 (strongly democratic) of country i in year $t-1$	Marshall et al. (2010)	+
Rights and liberties	Measured on a scale from 1 to 7, with 7 reflecting the highest degree of rights and liberties; of country i in year $t-1$	Freedom House (2009)	+
Economic freedom	Measured on a 0 to 10 scale, with 10 representing the greatest degree of freedom; of country i in year $t-1$	Gwartney and Lawson (2009)	+
Government effectiveness	Government Effectiveness ranges from -2.5 to 2.5, with higher values indicating higher government effectiveness; of country i in year $t-1$	Kaufmann et al. (2009)	+
CPI	Corruption Perceptions Index ranges from 1 to 10, with higher values indicating higher levels of corruption; of country i in year $t-1$	Transparency International (2010)	-
Public expenditure on health	Government health spending in country i in year $t-1$ (% of GDP)	Lu et al. (2010)	+
Immunization rates	Coverage of DTP3 (third dose of diphtheria toxoid, tetanus toxoid and pertussis vaccine) in country i in year $t-1$ (in %)	WHO (2011)	+
US aid	(Logged) US aid recipient i in year $t-1$ (US$)	Ravishankar et al. (2009)	?
Donor size	Dummy (0 = Budget share $\leq$ 5% of donor j of total DAH budget in year $t-1$, 1=> 5%)	Ravishankar et al. (2009)	?
Previous allocation	(Logged) DAH for recipient i by donor j in year $t-1$ (US$)	Ravishankar et al. (2009)	+

Variable name	Definition	Source	Expected sign
Multilateral aid	(Logged) Total DAH that recipient i received from multilateral donors $j*$ in year $t-1$ (in US$)	Ravishankar et al. (2009)	?
Public health expenditures	Government health spending by donor j in year $t-1$ (% of GDP)	Eurostat (2011)	+
Political transparency (CPI)	Corruption Perceptions Index ranges from 1 to 10, with higher values indicating more political transparency of donor j in year $t-1$	Transparency International (2010)	+
Political transparency (Corruption)	Corruption ranges from -2.5 to 2.5, with higher values representing more political transparency; of country i in year $t-1$	Kaufmann et al. (2009)	+
Gini index	Gini coefficient in country i in year $t-1$, with higher values indicating greater inequality	UNU-WIDER (2008)	-
Exports	(Logged) Total exports from donor j to recipient i in year $t-1$	Barbieri et al. (2008)	+
Imports	(Logged) Total imports of donor j from recipient i in year $t-1$	Barbieri et al. (2008)	+
Trade volume	(Logged) Total trade (sum of exports and imports) between donor j and recipient i in year $t-1$	Barbieri et al. (2008)	+
Political integration	Degree of political globalization of country i in year $t-1$ (in %)	Dreher (2006)	+
Political proximity	Dummy (0 = no, 1 = chief executive's party orientation (right, left, center) is the same in year $t-1$)	Beck et al. (2001)	+
Language	Dummy (0 = no, 1 = dominant language in donor and recipient country is the same)	CEPII (2010); CIA (2010); Haveman (2010)	+
Religion	Dummy (0 = no, 1 = dominant religion in donor and recipient country is the same)	CIA (2010)	+
Social integration	Degree of social globalization of country i in year $t-1$ (in %)	Dreher (2006)	+
Colonial history	(Logged) Number of years since 1900 in which country i was a colony	Correlates of War 2 Project (2006)	?
Own colony	(Logged) Number of years since 1900 in which country i was a colony of donor j	Correlates of War 2 Project (2006)	+
Other colony	(Logged) Number of years since 1900 in which country i was a colony of other $(j*\neq j)$	Correlates of War 2 Project (2006)	-
Distance	(Logged) Geodesic (great circle) distance between donor's and recipient's capitals	CEPII (2010); Byers (1997); CIA (2010)	-
Continent	Dummy (0 = no, 1 = country i part of Africa, America, Asia, Europe or Oceania)	CIA (2010)	?

Note: Standard control variables in bold.

B.2   Descriptive statistics

Variable	Observations	Mean	Median	Minimum	Maximum	Standard deviation
Year°	63,360	1998.5	1998.5	1990	2007	5.19
Health aid°	63,360	566,454	0	-495,467	411,000,000	3,961,667
(ln) Health assistance°	13,347	12.90	13.03	-1.85	19.83	2.26
Population	59,818	29,400,000	4,795,088	1,405	1,300,000,000	125,000,000
(ln) Population	59,818	14.84	15.38	7.25	20.99	2.64
GDPpc	50,798	2,068	1,019	69	18,800	2,620
(ln) GDPpc	50,798	6.98	6.93	4.24	9.84	1.17
Under5m	53,438	74.5	52.5	5.5	301.5	59.0
Maternal mortality	51,612	3.5	1.6	0.1	21.1	3.8
HIV prevalence	34,144	2.3	0.5	0.0	28.9	4.9
HDI	44,858	58.1	62.2	4.5	94.5	20.6
Democracy	43,362	0.6	1.0	-10.0	10.0	6.5
Rights and liberties	52,294	3.9	4.0	1.0	7.0	1.9
Economic freedom	30,206	5.7	5.8	2.3	8.0	1.0
Government effectiveness	30,096	-0.5	-0.5	-2.4	1.5	0.7
CPI	15,224	3.6	3.1	0.4	10.0	1.8
Health expenditure	27,346	1.97	1.79	0.00	6.40	1.08
Immunization	53,988	78	85	6	99	21
US aid	56,320	4,555,757	0	0	411,000,000	13,100,000
(ln) US aid	25,542	14.96	15.43	3.76	19.83	1.96
Donor size	56,320	0.25	0.00	0.00	1.00	0.43
Multilateral aid	53,108	10,200,000	868,168	-2,609	352,000,000	31,100,000
(ln) Multilateral aid	35,398	14.83	15.37	5.58	19.68	2.36
Health expenditures, donor	8,320	9	9	7	15	2
Political transparency (CPI)	38,400	7.82	8.35	2.99	10.00	1.51
Political transparency	24,640	2	2	0	2	0
Gini, donor	46,880	31.24	31.00	23.00	46.40	4.55
Exports	33,875	267,000,000	8,910,000	0	140,000,000,000	2,460,000,000
(ln) Exports	32,689	16.03	16.13	7.01	25.67	2.85
Imports	33,869	360,000,000	4,400,000	0	270,000,000,000	3,780,000,000
(ln) Imports	29,889	15.76	15.84	6.31	26.32	3.20
Trade	33,846	627,000,000	17,500,000	0	336,000,000,000	6,020,000,000
(ln) Trade	32,995	16.71	16.77	7.01	26.54	2.92
Political integration	55,638	47.66	45.33	1.00	93.64	22.39
Political proximity	43,974	0.21	0	0	1	0.41
Language	59,840	0.15	0	0	1	0.36
Religion	59,840	0.57	1	0	1	0.49
Social integration	54,142	34.54	33.14	2.83	75.60	15.59
Colonial history	63,360	33.59	38	0	93	31.03
(ln) Colonial history	63,360	2.40	3.63	0	4.53	1.93
Own colony	63,360	1.56	0	0	93	9.65
(ln) Own colony	63,360	0.11	0.00	0	4.53	0.66
Other colony	63,360	31.69	16	0	93	30.98
(ln) Other colony	63,360	2.27	2.77	0	4.53	1.95
Distance	63,360	8,128	7,741	271	18,953	4,082
(ln) Distance	63,360	8.84	8.95	5.60	9.85	0.62
Aid	59,840	526,203	0	-115,032	411,000,000	3,498,175
(ln) Aid	12,223	12.92	13.05	-1.85	19.83	2.22

Note: Data for regressors marked with ° are for the years 1990 till 2007. All other time-varying data is lagged by one year. The natural logarithm ln(x) is used for logged values.

References

Adelman, C.C. (2003): The Privatization of Foreign Aid: Reassessing National Largesse. *Foreign Affairs* 82(6), 9-14.

Alesina, A.; Dollar, D. (2000): Who Gives Foreign Aid to Whom and Why?. *Journal of Economic Growth* 5(1), 33-63.

Alesina, A.; Weder, B. (2002): Do Corrupt Governments Receive Less Foreign Aid?. *American Economic Review* 92(4), 1126-1137.

Barbieri, K.; Keshk, O.; Pollins, B. (2008): *Correlates of War Project Trade Data Set Codebook, Version 2.01*. http://correlatesofwar.org (accessed August 18, 2010).

Beck, T.; Clarke, G.; Groff, A.; Keefer, P.; Walsh, P. (2001): New tools in comparative political economy: The Database of Political Institutions. *World Bank Economic Review* 15(1), 165-176.

Berthélemy, J.-C. (2006): Bilateral Donors' Interest vs. Recipients' Development Motives in Aid Allocation: Do All Donors Behave the Same?. *Review of Development Economics* 10(2), 179-194.

Berthélemy, J.-C.; Tichit, A. (2004): Bilateral Donors' Aid Allocation Decisions - A Three-Dimensional Panel Analysis. *International Review of Economics & Finance* 13(3), 253-274.

Byers, J.A. (1997): *Great Circle Distances Between Capital Cities*. http://www.chemical-ecology.net/java/capitals.htm (accessed October 15, 2010).

Cassen, R. (1994): *Does Aid Work?*. 2nd ed. Oxford: Oxford University Press.

CEPII (2010): *Geodesic distances*. http://www.cepii.fr/anglaisgraph/bdd/distances.htm (accessed November 10, 2010).

Chong, A.; Gradstein, M. (2008): What Determines Foreign Aid? The Donors' Perspective. *Journal of Development Economics* 87(1), 1-13.

CIA (2010): *The World Factbook*. https://www.cia.gov/library/publications/the-world-factbook/ (accessed September 14, 2010).

Claessens, S.; Cassimon, D.; Van Campenhout, B. (2009): Evidence on Changes in Aid Allocation Criteria. *The World Bank Economic Review* 23(2), 185-208.

Correlates of War 2 Project (2006): *Colonial/Dependency Contiguity Data, 1816-2002. Version 3.0*. http://correlatesofwar.org (accessed August 13, 2010).

Dollar, D.; Levin, V. (2006): The Increasing Selectivity of Foreign Aid, 1984-2003. *World Development* 34(12), 2034-2046.

Dreher, A. (2006): Does Globalization Affect Growth? Evidence from a New Index of Globalization. *Applied Economics* 38(10), 1091-1110.

Dreher, A.; Nunnenkamp, P.; Öhler, H. (2010): Why it Pays for Aid Recipients to Take Note of the Millennium Challenge Corporation: Other Donors Do! *Kiel Working Papers* 1609), 1-22.

Dudley, L.; Montmarquette, C. (1976): A Model of the Supply of Bilateral Foreign Aid. *The American Economic Review* 66(1), 132-142.

Easterly, W. (2009a): Can the West Save Africa?. *Journal of Economic Literature* 47(2), 373-447.

Easterly, W. (2009b): How the Millennium Development Goals are Unfair to Africa. *World Development* 37(1), 26-35.

Eurostat (2011): *Public Health*. http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/data_public_health/database (accessed March 31, 2011).

Faust, J. (2010): Do Less Transparent Donor Countries Allocate Aid Differently?. *APSA 2010 Annual Meeting Paper*, 1-28.

Feeny, S.; McGillivray, M. (2008): What Determines Bilateral Aid Allocations? Evidence From Time Series Data. *Review of Development Economics* 12, 515-529.

Freedom House (2009): *Freedom in the World 2009*. http://www.freedomhouse.org/ (accessed September 6, 2010).

Gwartney, J.; Lawson, R. (2009): *2009 Economic Freedom Dataset, published in Economic Freedom of the World: 2009 Annual Report*. Economic Freedom Network. http://www.freetheworld.com/2009/2009Dataset.xls (accessed September 6, 2010).

Haveman, J. (2010): *Language*.
http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/Data/Gravity/language.txt (accessed October 15, 2010).

Hoeffler, A.; Outram, V. (2011): Need, Merit, or Self-Interest - What Determines the Allocation of Aid?. *Review of Development Economics* 15(2), 237-250.

Hogan, M.; Foreman, K.; Naghavi, M.; Ahn, S.; Wang, M.; Makela, S.; Lopez, A.; Lozano, R.; Murray, C. (2010): Maternal Mortality for 181 Countries, 1980-2008: A Systematic Analysis of Progress Towards Millennium Development Goal 5. *The Lancet* 375(9726), 1609-1623.

IHME (2009): *Financing Global Health 2009: Tracking Development Assistance for Health*. Seattle, WA: Institute for Health Metrics and Evaluation, University of Washington.

Kaufmann, D.; Kraay, A.; Mastruzzi, M. (2009): Governance Matters VIII. Aggregate and Individual Governance Indicators. 1996–2008. *Policy Research Working Paper 4978*, 1-103.

Kaufmann, D.; Kraay, A.; Mastruzzi, M. (2010): The Worldwide Governance Indicators. Methodology and Analytical Issues. *Policy Research Working Paper 5430*, 1-29.

Lu, C.; Schneider, M.; Gubbins, P.; Leach-Kemon, K.; Jamison, D.; Murray, C. (2010): Public Financing of Health in Developing Countries: A Cross-National Systematic Analysis. *The Lancet* 375(9723), 1375-1387.

Maizels, A.; Nissanke, M.K. (1984): Motivations for Aid to Developing Countries. *World Development* 12(9), 879-900.

Marshall, M.G.; Gurr, T.R.; Jaggers, K. (2010): *POLITY IV Project. Political Regime Characteristics and Transitions, 1800-2009. Dataset Users' Manual*. Center for Systematic Peace.

Neumayer, E. (2003): Do Human Rights Matter in Bilateral Aid Allocation? A Quantitative Analysis of 21 Donor Countries. *Social Science Quarterly* 84(3), 650-666.

Neumayer, E. (2005): Is the Allocation of Food Aid Free from Donor Interest Bias?. *Journal of Development Studies* 41(3), 394-411.

Nunnenkamp, P.; Thiele, R. (2006): Targeting Aid to the Needy and Deserving: Nothing But Promises? *World Economy* 29(9), 1177-1201.

Radelet, S. (2006): A Primer on Foreign Aid. *Working Paper Number 92*, 1-24.

Rajaratnam, J.; Marcus, J.; Flaxman, A.; Wang, H.; Levin-Rector, A.; Dwyer, L.; Costa, M.; Lopez, A.; Murray, C. (2010): Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. *The Lancet* 375(9730), 1988-2008.

Ravishankar, N.; Gubbins, P.; Cooley, R.; Leach-Kemon, K.; Michaud, C.M.; Jamison, D.T.; Murray, C.J.L. (2009): Financing of Global Health: Tracking Development Assistance for Health from 1990 to 2007. *Lancet* 373(9681), 2113-2124.

Round, J.I.; Odedokun, M. (2004): Aid Effort and its Determinants. *International Review of Economics & Finance* 13(3), 293-309.

Thiele, R.; Nunnenkamp, P.; Dreher, A. (2007): Do Donors Target Aid in Line with the Millennium Development Goals? A Sector Perspective of Aid Allocation. *Review of World Economics* 143(4), 596-630.

Transparency International (2010): *Corruption Perception Index*.
http://www.transparency.org/policy_research/surveys_indices/cpi (accessed November 2, 2010).

UN Statistics Division (2010): *Demographic Yearbook*.
http://unstats.un.org/unsd/demographic/products/dyb/dyb2.htm (accessed October 29, 2010).

UNDP (2010): *Human Development Report*. http://hdr.undp.org/en/ (accessed September 14, 2010).

UNU-WIDER (2008): *UNU-WIDER World Income Inequality Database, Version 2.0c, May 2008*. United Nations University - World Institute for Development Economics Research (accessed October 6, 2010).

Voigt, S. (2009): How (Not) to Measure Institutions. *MAGKS Joint Discussion Paper Series in Economics No. 37*, 1-26.

WHO (2008): *The World Health Report 2008: Primary Health Care Now more than Ever*. Geneva: WHO.

WHO (2010): *World Health Statistics 2010. Indicator compendium. Interim version*. Geneva: World Health Organization (WHO).

WHO (2011): *Immunization coverage*.
http://www.who.int/immunization_monitoring/routine/immunization_coverage/en/index4.html
(accessed February 1, 2011).

World Bank (2010): *World Development Indicators*. http://data.worldbank.org/indicator (accessed
October 22, 2010).

Younas, J. (2008): Motivation for Bilateral Aid Allocation: Altruism or Trade Benefits. *European
Journal of Political Economy* 24(3), 661-674.