Evidence on Changes in Aid Allocation Criteria

Stijn Claessens, Danny Cassimon, and Bjorn Van Campenhout

Have donors changed their aid-allocation criteria over the past three decades toward greater selectivity, a frequently stated goal of the international development community? Using data on how 22 donors allocated their bilateral aid among 147 countries over 1970–2004, the article finds that after the fall of the Berlin wall in 1989 and especially in the late 1990s, bilateral aid responded more to poverty and the quality of the policy and institutional environment in the recipient countries. Furthermore, the sensitivity of aid allocation to the country's size and its debt burden has declined over time. These results are robust to different samples and model specifications, various econometric techniques, and alternative measures of institutional quality. While the specific factors causing these changes cannot be identified—these presumably include geopolitical and economic concerns and the many changes in the international aid architecture—donors still differ greatly in their selectivity. This suggests that further, multifaceted reforms are needed to ensure even greater selectivity of aid. JEL codes: O11, O16, O19

Public Disclosure Authorized

This article explores how country characteristics affect the way aid is provided by donor countries and how this has varied over time. Data on bilateral aid flows are relatively easily available for long periods of time for a large number of donors and recipient countries, allowing a combination of longitudinal and

Stijn Claessens (corresponding author), International Monetary Fund (USA) and University of Amsterdam; his email address is sclaessens@imf.org. Danny Cassimon, Institute of Development Policy and Management (IOB), University of Antwerp; his email address is danny.cassimon@ua.ac.be. Bjorn Van Campenhout, Institute of Development Policy and Management (IOB), University of Antwerp; his email address is bjorn.vancampenhout@ua.ac.be. The article was written in part while Claessens was at the World Bank. Earlier versions were presented at the GARNET conference, September 27–29, 2006, Amsterdam; two Economic and Social Research Council (ESRC) workshops (October 5/6, 2006 and May 2/3, 2007); the Oxford-Cornell conference New Directions in Development Assistance, Oxford, United Kingdom, June 11–12, 2007; and the ESRC/World Economy and Finance Research Programme (WEF) conference Finance and Development, London, June 27–29, 2007. The authors thank conference participants, especially Badi Baltagi, and discussant Adeel Malik, as well as Oya Celasun, Rodney Ramcharan, and Antonio Spilimbergo for their comments. They also thank the journal editor and three anonymous referees for their useful suggestions and Ying Lin for help in preparing the data. The work was supported by the ESRC/WEF program National and International Aspects of Financial Development (Award RES-156-25-0009). Additional results are available in the working paper version online at http://ssrn.com/abstract=997833 and at the journal website: http://wber.oxfordjournals.org/.

THE WORLD BANK ECONOMIC REVIEW, VOL. 23, NO. 2, pp. 185–208 doi:10.1093/wber/lhp003
Advance Access Publication June 3, 2009

cross-sectional approaches and making sound research easier. The general view is that aid is being allocated better recently, with greater emphasis on "deserving" countries in "need," because of a combination of geopolitical and global economic trends, as well as international policy- and country-specific institutional and other changes that have brought greater transparency, better coordination, and greater alignment of policies and procedures. The article uses data on bilateral aid by 22 donors to 147 recipient countries over 1970–2004 to investigate how factors deemed to reflect need and merit affect aid allocation.[1] The results indicate that after the fall of the Berlin wall in 1989 and especially in the late 1990s, bilateral aid responded more to recipient countries' economic needs and the quality of their policy and institutional environment and less to their size and external debt.

These findings are important for several reasons. Aid flows are large, often more than 10 percent of a country's GDP and more than $100 per capita per year in some countries. Which countries received aid—poor or rich, deserving or less deserving—thus has important economic and social relevance. Studies on aid effectiveness such as the World Bank study *Assessing Aid* (1998) and the work of Burnside and Dollar (2000) showing that aid works better in good policy and institutional environments has led many policymakers to conclude that targeting aid to countries with more enabling environments maximizes overall aid effectiveness.

Although the robustness of some of this research has been questioned,[2] the findings have nevertheless reinforced the view that aid ought to be considered only for countries that are "deserving" and in "need." The consensus has been that much aid has not been allocated in this way, particularly in the recent past. With empirical studies as far back as the 1960s, research has shown that political and strategic interests rivaled concerns for growth, poverty reduction, and other economic objectives in aid allocation, at least until the early 1990s (Radelet 2006 and Easterly 2003 provide general literature reviews that also cover aid allocation). Notably, Alesina and Dollar (2000), confirmed by others, show that noneconomic factors, including geopolitical factors, greatly influence aid allocation, in addition to economic and development considerations.

Since the mid-1990s, however, geopolitical and global economic changes and new research insights have altered the way official aid is provided—aid

1. Recipient countries' merit is proxied by their score on the World Bank's CPIA index. Three factors are used to reflect need for aid: poverty, proxied by GDP per capita; size, proxied by population; and inability to attract external financing relative to need, proxied by external debt burden.

2. Easterly, Levine, and Roodman (2004), using the same specifications, find that the Burnside and Dollar (2000) results do not stand up over a longer time period. Rajan and Subramanian (2008), correcting for the bias that aid typically goes to poorer countries or to countries after poor performance, find little robust evidence of a positive (or negative) relationship between aid inflows into a country and its economic growth. And Roodman (2007) highlights the general problems with econometric robustness in this area.

scholars even speak of a paradigm shift.[3] Geopolitical changes such as the fall of the Berlin Wall in 1989 and the end of major Communist governments removed many of the geopolitical motivations for aid. Important economic changes include the end of central planning and the increase in private capital flows and globalization more generally, which have led to new development models and allowed for different forms of external financing.

Partly in response to these forces, the forms and rules under which aid is being provided have changed at the multilateral and bilateral donor levels and at the individual recipient country level. Multilateral changes include a greater emphasis on coordination among donors and with recipient country priorities (the harmonization and alignment agenda put forward in the 2005 Paris Declaration), greater transparency, and the growing importance of alternative aid providers, such as private philanthropists engaged in health and environmental issues. Individual donors have been changing their aid composition (the mix between project and program aid, for example), and many donors have been providing grants instead of loans. A greater openness in aid allocation is common, along with an aim for more selectivity and greater use of benchmarks and results-based allocations.

These changes have been accompanied by changes in development approach, including stronger recipient country ownership of development programs (and not just by the government), greater use of Poverty Reduction Strategy Papers, the explicit incorporation of the Millennium Development Goals, and the enumeration of the objective of scaling up. Country-specific actions have included more debt relief, with almost all donors engaging in bilateral (official) debt reduction, in the latest round through the heavily indebted poor countries (HIPC) enhanced initiative. Additionally, the multilateral debt reduction initiative (MDRI) is under way.

The goal of all these changes has been to increase the development efficiency and effectiveness of aid. The changes can also be expected to affect the amounts and distribution of bilateral aid flows. Several channels could be at work. Recipient countries that abide by the new paradigm should see themselves rewarded with more aid, and on more concessional terms. Institutional and policy changes should lead to fewer coordination problems among donors, resulting in better aid allocation. There should be less influence of historical, geopolitical, and other noneconomic or developmental factors in aid allocations. Furthermore, official debt reduction may alter the effect of debt on aid allocation. Even with good polices in place, debt can deter aid flows. Overindebted but deserving countries may be less able to attract external

3. This development paradigm shift has been gradual, of course, and reality has often differed from the measures countries claimed to have taken or donors claimed to have supported (see Thomas and others 1991 for a review of the problems uncovered when structural adjustment loans were first evaluated in the late 1980s). Nevertheless, some real changes did occur.

financing and thus end up growing slower. And interactions between the quality of a country's policy and the composition of its debt burden can affect aid flows. Earlier research showed, for example, that donors continued to give new loans and grants to countries with poor policies and that were relatively more indebted to bilateral and multilateral financial institutions to prevent defaults on past loans and avoid having to admit to "mistakes" (Birdsall, Claessens, and Diwan 2003).[4] These various effects might have changed over time, especially considering the large official debt reductions recently.

Some recent studies on aid flows reveal (indirectly) that donors' selectivity toward country need and policies has improved over time (Berthélemy and Tichit 2004; Roodman 2005; Dollar and Levin 2006; Sundberg and Gelb 2006). Easterly (2007) expresses a contrarian view, finding no consistent evidence of increased selectivity with respect to policies and only temporarily increased selectivity in the late 1990s with respect to corruption. The issue is thus unsettled, in part because few researchers have studied the effects of changes in aid architecture using disaggregated bilateral data.

The main question this article addresses is whether changes have led over time to donors providing aid in a more rational manner. Specifically, it investigates whether in recent periods donors have allocated aid with greater sensitivity to recipient country income level and the quality of countries' policies and institutional environment. It examines the changes in sensitivities of aid allocation to country size and level of debt burden. The general finding is one of significant changes, with the characteristics that drive aid responding over time in "better" ways, especially to income level (poorer countries receive more aid) and country policies (better policies are rewarded with more aid). The small country bias seems to have declined, and debt burden seems to play a smaller role in determining aid flows. Although there is evidence of improvements in selectivity for most donors, large differences among donors remain. This suggests a future research agenda on what drives some donors to reform their aid policies while others do not seem to be affected.

The article is structured as follows. Section I describes the data and the methodology. Section II discusses the results and robustness checks. Section III considers some implications for further research.

I. Data and Methodology

This section describes the data sources, variables, and methodology used in the study.

4. A study by Marchesi and Missale (2004), examining grants and net loans to a panel of 55 HIPCs and non-HIPCs during the 1980s and 1990s, finds that total net transfers to HIPCs has been increasing with their debt level, as higher net loans from multilaterals and grants more than offset lower bilateral loans. Geginat and Kraay (2007) study whether IDA flows exhibited defensive lending (whether disbursements deviate from the CPIA-related formula for allocation, with higher allocation to countries with high IDA debt service). They conclude against defensive lending.

Data Sources and Variables

Data on official development assistance (including debt reduction) for each reporting donor to each recipient country in a specific year come from the Organisation for Economic Co-operation and Development/Development Assistance Committee (OECD/DAC) Aid Statistics database (www.oecd.org/dac/stats). While the database does not include all bilateral donors (China, a recent donor, is not a reporting member, for example), it covers the bulk of international aid flows for 1970–2004. Recipient countries are restricted to developing countries (a few high-income countries also receive aid). The data are a three-dimensional panel of aid flows to 147 countries from 22 bilateral donors over the period. There are caveats, however. For example, classification of loans as official aid is based on a somewhat arbitrary cutoff as to their grant element (at least 25 percent), which is itself difficult to calculate. Also, despite adjustments, the quality of data on debt relief is poor. Table 1 provides more details on the variables used and their sources.

The analysis uses actual disbursements (actual resources transferred) rather than commitments. The DAC statistics generally focus on the concept of *net aid*, which is total resources provided by donors as grants (including technical cooperation grants), loans, and debt relief, net of any loan principal repayments. Unlike many earlier studies that use the net aid data directly, this study transforms the data into net aid transfers by also taking into account interest payments, thus deriving total net resource transfers. This concept of net transfers, used in some other aid studies (Chang, Fernández-Arias, and Servén 1999; Roodman 2005), is close to the economic concept of actual resources transferred, rather than being some accounting concept. It avoids treating interest payments differently from principal payments and receipts—important considering the many official debt restructurings that rescheduled interest payments and converted them into principal obligations. Thus, the total net aid transfer concept is defined as:

> Net aid transfer = total (bilateral) official development assistance grants + total (bilateral) official development assistance loans extended to recipients – official development assistance loan amortization by recipients – interest paid by recipient

Since the unit of interest for aid is the poor person, as in most studies, net aid transfer is scaled by the recipient population to get the annual bilateral net aid transfer per person (called "aid" for short). This dependent variable is then related to several independent variables. The main variable of interest, the need (or poverty) selectivity dimension of aid, is proxied by the recipient country's per capita income (in constant U.S. dollars) lagged one period (to limit the risk that aid flows are driving GDP per capita). Countries with poorer people are expected to receive more aid. The policy selectivity dimension of aid is investigated using the World Bank Country Policy and Institutional Assessment (CPIA) score for the recipient country. This index, produced by World Bank

TABLE 1. Variables, Sources, and Descriptive Statistics (U.S. dollars, unless otherwise indicated)

Variable	Description	Source	Number of observations	Mean	Median	Standard deviation	Minimum	Maximum
Dependent variable								
Net aid transfer per capita	Net aid transfer per capita—observations used in analysis	OECD/DAC Aid Statistics database	95,921	2.36	0.008	42.5	−137.6	9,052
	Nonzero observations	OECD/DAC Aid Statistics database	56,684	4.00	0.21	55.3	−137.6	9,052
	All observations	OECD/DAC Aid Statistics database	105,512	2.15	0.001	40.5	−137.6	9,052
Independent variables								
Lagged GDP per capita	GDP per capita at purchasing power parity rates in 2000 prices, lagged 1 year	World Bank, World Development Indicators database	67,694	3,764	2,830	3,192	466	23,266
Population	Log (population)	World Bank, World Development Indicators database	105,512	2.8 million	5.0 million	11.7 million	19,700	1.3 billion
CPIA	Country Policy and Institutional Assessment score of International Development Association-eligible countries	World Bank, Country Performance Rating	66,154	3.46	3.57	0.88	0.72	6
Burnside-Dollar	Policy Index created as in Burnside and Dollar (2000)	World Bank, World Development Indicators database	48,740	0.31	−0.18	1.27	−5.47	3.08

Present value of external debt	The present value of debt as a ratio to exports of goods and services (percent)	World Bank, *Global Development Finance*	75,768	182	103	328	0.0	6,510
Net aid others	Net aid transfer per capita provided by all other donors	OECD/DAC Aid Statistics database	95,921	35.5	13.4	134	−129.2	9,567
Donor sum of net aid transfers	The sum of net aid transfers provided to all countries by the specific donor	OECD/DAC Aid Statistics database	90,516	313	85.1	704	−17.0	11,189
Lagged bilateral trade	The sum of bilateral donor-recipient country exports and imports (percent), scaled by recipient country GDP, lagged 1 year	IMF Direction of Trade database	70,621	2.1	0.26	13.8	0.0	15.43

Note: Data for all variables are available for 1970–2004, except for the CPIA data, which are available only for 1977–2004 for most countries. The values are simple averages of individual bilateral average per capita flows. They differ from those in figure 1, which are weighted by population.

staff, is a composite rating of 16–20 aspects of countries' policies and institutions.[5] It is available for most countries in the sample and over a long period, from 1977 on. Another index of countries' policies (that of Burnside and Dollar 2000) is also used, for robustness.

Studies have found that small countries get more aid per capita (for example, Alesina and Dollar 2000). This could happen for a variety of reasons. Small countries tend to be more open, and thus more vulnerable to external shocks, motivating more aid flows. Also, poor but large economies may have more opportunity to borrow in private capital markets, due to some economies of scale, making them less reliant on aid. Small countries may receive aid for political economy reasons, say because they have disproportional representation in international organizations (for example, aid may be used to buy a favorable vote in the United Nations; see Kuziemko and Werker 2006). More generally, small countries are more easily swayed for a given amount of aid. A reduction in the sensitivity of aid to size thus suggests a move away from political economy reasons for aid flows. This small country effect is investigated using (the log of) recipient country population, as is generally done in the literature.

To investigate whether debt burden affects new aid, countries' debt stocks relative to exports are included. As in Chauvin and Kraay (2005, 2007), the present value of debt stocks is used, instead of the nominal value, since nominal debt stocks can be misleading under the highly concessional interest rates of official loans.[6]

To check whether aid allocations have changed over time relative to need and policy selectivity measures, the sample is divided into three subsamples, 1970–89, 1990–98, and 1999–2004. The first period is similar to that examined in earlier studies and coincides with the period before the fall of the Berlin wall. The post-Berlin wall era is split into two periods to check whether relationships have changed more recently. The break point, 1998, coincides roughly with the start of the new literature on aid effectiveness and major changes in the international aid architecture (for example, the World Bank aid study of 1998 and the launch of the HIPC Debt Initiative and the Poverty Reduction Strategy Papers framework).

Most of the other control variables are also commonly used in this literature: bilateral trade flows, to control for non-aid-related economic relations between countries; net aid transfers provided by all other donors (in the sample) to the same country, to control for aid coordination and possible complementarity or substitution among aid donors and flows; and total net aid transfers provided by a donor to all recipient countries, to control for the donor country's overall level of aid generosity. Some of these controls are extensive and create a bias toward finding no significant results for the main variables. For example,

5. More details are at: http//siteresources.worldbank.org/IDA/Resources/CPIA2006Questionnaire.pdf.

6. For technical background, see Dikhanov (2004).

including the net aid provided by other donors to the same country may already capture policy selectivity if better countries receive more aid in general, not just from the donor examined.

Methodology

The panel data have three dimensions: donor, recipient, and time. A fixed effects model is a natural candidate for an empirical model that tries to explain bilateral aid flows between donor i and recipient j at time t, using a matrix of explanatory variables, a fixed donor effect, a fixed recipient effect, and time dummy variables (Baltagi 2001). Including fixed effects for both donor and recipient accounts for any time-invariant historical, geographical, political, cultural, or other influence that will lead to deviations from average aid flows. It thus takes into account that, say, Tanzania receives more aid than other similar countries or that Denmark gives more aid than similar donors. The year dummy variables are included to control for general changes over time unrelated to policy selectivity, need, size, and debt burden (for example, differences in global economic or financial conditions that increase or reduce the need for aid). Last, all regressions are estimated with standard errors adjusted for clustering on the bilateral relationships.

This three-way fixed effects model does not capture bilateral interactions, however. For example, if Denmark gives more aid to specific countries than other donors do or if some recipient countries receive less aid from specific donors, this would not be controlled for. For this reason pair-wise donor–recipient dummy variables are also included.[7] This also controls for former colonial linkages, which is important since former colonial powers have been found to give more aid to their former colonies (Alesina and Dollar 2000). These dummy variables also control for the degree to which a recipient country can be considered geopolitically linked to a donor. Geopolitical links and other political motivations can drive aid flows, as when aid is given to induce favorable votes in the United Nations. As long as links are time-invariant, these dummy variables also cover specific strategic donor–recipient links, such as the United States and Egypt or Pakistan.

Eliminating time-invariant effects in the fixed effects model is costly, however, because of the interest in how some marginal effects change over time. For example, do countries with certain characteristics—such as low levels of income per capita, which can be a slow moving, almost time-invariant fixed factor—receive more or less aid over time? To investigate such changes, the coefficients on the four variables of interest are allowed to change over time. Specifically, the four aid-determining variables—poverty (per capita income),

7. This leads to a model with fixed effects for donors, recipients, and donor–recipient pairs (and the time effects). Egger and Pfaffermayr (2003) show that this generalization of the three-way model is identical to a two-way model with only time and bilateral effects, which is what is estimated in this article.

policy (CPIA), small country effect (population), and debt burden (present value of debt to exports)—are interacted with dummy variables for each of the three periods to capture structural breaks. This is done in one regression, thus keeping the coefficients for the other fixed effects (for donor, recipient, and bilateral) and for the other independent variables constant across the three periods.[8] This way, changes in each of the four relationships are analyzed concurrently over time (there may have been changes in several dimensions over the same period) while keeping other factors constant.[9]

A random effects model could be used instead of a fixed effects model. Rather than absorbing any time-invariant individual specific effects, the random effects model assumes that all explanatory variables are uncorrelated with the individual specific effects. This is unlikely to be the case in the current application, making the fixed effects methods preferred from an economic intuition perspective. However, Hausman tests were also conducted to help decide what model to use. The test chose the fixed effects over the random effects model. Nevertheless, the random effects panel regressions are also reported for robustness.

One other issue facing all aid (as well as trade) studies is that for many donor–recipient country combinations aid flows are zero (in two-thirds of the current sample). This can introduce a selection bias,[10] which can be accounted for by conducting a Tobit analysis or by first estimating a probit model to predict the chance of observing nonzero aid flows and then by including in a second regression the Heckman inverse Mill's ratio thus obtained. Or one can use only nonzero (or only positive) observations in a simple ordinary least squares (OLS) regression.

Berthélemy and Tichit (2004) and Berthélemy (2006), using a three-dimensional panel, show that for aid flows the differences are small between

8. An alternative would have been estimating the regressions separately for each period, but this would mean that the coefficients for the recipient country dummy variables and other fixed effects would be allowed to vary by period as well. This has large costs since the changes allowed in the fixed effects on a recipient, donor, and bilateral country basis are likely to capture some of the change behavior of interest with respect to income, policy, debt, and population. For example, the relationship between India and the United States might have changed over time for geopolitical reasons and for reasons of improved policies in India, but because the bilateral dummy variables could capture these changes, it would not be possible to differentiate between the two reasons. Also, because there are no specific predictions as to changes over time in the other control variables, it would be undesirable to allow them to vary over time. Keeping the other fixed effects and the other independent variable constant across periods makes it easy to test directly for the significance of the differences in period coefficients using a simple F-test.

9. Additionally, the four variables were interacted with year-by-year dummy variables to analyze the year-by-year evolution in sensitivities, which provided qualitatively similar results (see working paper version available online at http://ssrn.com/abstract=997833 and http://wber.oxfordjournals.org/).

10. This can happen on the donor side if little is known about a recipient country and it therefore gets no aid and on the recipient side if there is no government interest in engaging with that particular donor. In either case, no aid is being extended, but treating these observations as zero aid could bias the results.

fixed effects using nonzero observations only and Heckman, Heckman two-stage using all observations, random effects, and OLS. Also, the trade literature has shown that zero flows do not have much impact on estimation results (Baldwin 1994; Frankel 1997). Testing explicitly for biases in trade flows using various techniques, Linders and de Groot (2006, abstract) conclude that "in the end, the results surprisingly suggest that the simplest solution, to omit zero flows from the sample, often leads to acceptable results, although the sample selection model is preferred theoretically and econometrically."

An intermediate approach is presented, however, that distinguishes a case where a donor never provided aid to a recipient from that where a donor provided aid, but not every year. Specifically, donor–recipient combinations with zero bilateral flows for the whole period are excluded, since it is more likely in these cases that a selection was made by the donor or recipient. Country pairs with zero observations that record nonzero aid flows at any time are retained, however, because for these pairs there is no (or less of a) selection issue. These donors might not have disbursed aid to the particular country every year due, perhaps, to the lumpiness of projects or the peculiarities of decision processes. This decision is based on the grant component of aid flows since the net debt components can have nonzero flows due to repayments, even when there is no active engagement by the donor in a specific year (debt repayment may continue long after a country graduates from aid dependency). This seems a more robust way of running the regressions. Nevertheless, all the regressions are run with all observations and with nonzero observations only, and the results are reported in the base regression in the robustness tests.

II. Empirical Results

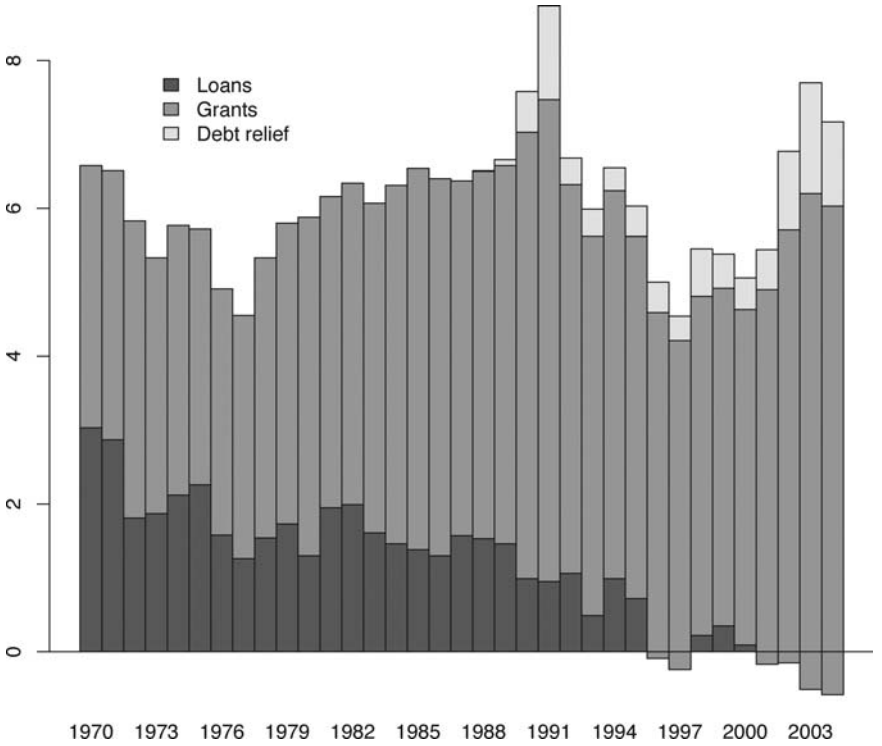
This section discusses the empirical results of the aid allocation analysis. It first provides some descriptive statistics and stylized facts and then presents a detailed discussion of the results for the main and robustness specifications.

Descriptive Statistics

Figure 1 shows the evolution of bilateral net aid transfers over time, measured in 2000 U.S. dollars, disaggregated by grant, loan, and debt relief components on a recipient country per capita basis.[11] Net aid transfer increased in the 1980s, dropped in the mid-1990s, and recovered somewhat after about 1998, although total aid per capita in 2004 was still below the early-1990s peak

11. Grants are total bilateral grants, net of debt forgiveness grants. Loans equal net loan transfers (corrected for offsetting entries on debt relief), including interest payments, but net of interest payments forgiven. Debt relief sums debt forgiveness grants (net of offsetting entries on debt relief) and interest payments forgiven. Offsetting entries on debt relief are the amortization part of debt forgiveness and must be deducted to avoid double counting of amortization forgiveness in official development assistance (now and in future years). See IMF and World Bank (2007, box 4.1, p. 153) for further details on DAC debt relief accounting.

Figure 1. Recipient Country per Capita Bilateral Net Official Development Assistance Transfers, 1970–2004 (2000 U.S. dollars)



Note: The values are weighted averages. They are the sum of all aid flows divided by the sum of all recipient countries' populations.

Source: Authors' analysis based on Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee Aid Statistics database (www.oecd.org/dac/stats).

in real terms. Overall, aid per capita remains within a fairly limited bound of $6–$8 per person for the whole period, with an outlier in the mid-1990s. The disaggregated aid data show that grants have replaced loans, with net loan transfers becoming negative in recent years. Debt relief largely accounts for the short-lived peak in aid volume in 1991 and for the most recent increase.

Table 1 defines and provides some raw statistics for the variables. Data for all variables are available for 1970–2004, except for the CPIA data, which are available only from 1977 onward for most countries. Average net aid transfer was $2.40 per capita per year (in 2000 prices), but with large variations, from −$138 to $9,052 (aid to a small country that received a large amount of aid from a single donor in a single year). Excluding the cases with zero observations, average aid per capita per donor is $4. Of total net aid transfers, including the zero observations, grants per donor were the largest component, averaging $2.20 per capita per year, net loans per donor were $0.16 per capita

per year, and debt relief per donor was $0.04 per capita per year (not reported).

For the explanatory variables, statistics are as expected and indicate large variations among countries. Recipients' GDP per capita (in 2000 prices) averages $3,800, varying from less than $500 to $23,266. The average population size is some 2.8 million, but the standard deviation is high, at 11.7 million. The smallest country has 20,000 people and the largest (China) has 1.3 billion, and there are no countries in the segment between 300 million and 1 billion people. For this reason, population is used in log terms in the regressions.

The average CPIA index is 3.46, but the index ranges from 0.72 to the CPIA maximum of 6. The debt burden, in present value terms, averages 182 percent of exports, but varies greatly as well. Total aid provided by other donors averages $35 per capita (of the specific recipient country) per year. Donors provide an average of $313 in net aid transfers per capita (of the specific recipient country) to all other countries in the same year. Bilateral donor–recipient country trade averages 2.1 percent of recipient country GDP, but again with large variation.

Regression Results

Table 2 presents the basic results. The sample includes 50,000 observations representing 2,384 specific donor–recipient combinations. Columns 1 and 2 present the fixed and random effects estimates for the whole period, keeping the coefficients for the four main variables constant. Columns 3 and 4 allow the coefficients for the four main variables to change for each of the three subperiods, again with fixed and random effects.[12] The discussion focuses on the fixed effects model, preferred by the Hausman (1978) specification test results. The random effects results are qualitatively similar for both the full sample and the three subperiods.

The model with constant coefficients finds that the income level of the recipient country matters (significant at the 1 percent level), with poorer countries receiving more aid. This suggests that donors do care about poverty. The size of the recipient country also matters, with larger countries receiving less aid per capita. On aggregate and over the whole period, donors are not taking into account the quality of the policy and institutional environment in the recipient country, as the CPIA is not significant. The total debt burden does not significantly affect aid transfers, suggesting that neither concerns about debt overhang nor defensive lending drove aid flows over the whole period.

Control variables show that the more aid a donor gives in general, the less it gives to any specific country, likely because the donor faces an overall budget constraint. And aid flows by one donor are positively affected by the aid of other donors (although the relationship is not statistically significant), hinting at complementarity among donors, possibly due to the signaling effects for the

12. The coefficients for the bilateral fixed effects and time dummy variables are not reported to save space.

TABLE 2. Base Regression Results

	Base regression		Period interactions	
Variable	(1) Fixed effects	(2) Random effects	(3) Fixed effects	(4) Random effects
Lagged GDP per capita, 1970–2004	−0.615***	−0.346***		
	(0.165)	(0.0817)		
Lagged GDP per capita, 1970–89			−0.535***	−0.237***
			(0.136)	(0.0635)
Lagged GDP per capita, 1990–98			−0.651***	−0.328***
			(0.207)	(0.0991)
Lagged GDP per capita, 1999–2004			−0.720***	−0.409***
			(0.210)	(0.107)
Log (population), 1970–2004	−2.056	−0.815***		
	(1.345)	(0.113)		
Log (population), 1970–89			−3.544**	−1.194***
			(1.506)	(0.166)
Log (population), 1990–98			−3.237**	−0.893***
			(1.518)	(0.123)
Log (population), 1999–2004			−3.020**	−0.671***
			(1.535)	(0.122)
CPIA, 1970–2004	0.0758	0.108		
	(0.0774)	(0.0739)		
CPIA, 1970–89			−0.0344	0.0397
			(0.105)	(0.0927)
CPIA, 1990–98			0.215	0.175
			(0.135)	(0.120)
CPIA, 1999–2004			0.919**	0.772**
			(0.366)	(0.314)
Present value of debt, 1970–2004	−0.0141	0.0242		
	(0.132)	(0.133)		
Present value of debt, 1970–89			−0.475*	−0.436*
			(0.261)	(0.259)
Present value of debt, 1990–98			0.219	0.246
			(0.154)	(0.154)
Present value of debt, 1999–2004			0.374	0.497
			(0.376)	(0.350)
Net aid transfer other donors	5.197	7.830*	−2.427	1.167
	(4.001)	(4.376)	(3.559)	(3.760)
Donor sum of net aid transfers	−0.294*	−0.204	−0.290*	−0.201
	(0.164)	(0.156)	(0.163)	(0.154)
Lagged bilateral trade	12.07	20.57***	11.79	20.31***
	(8.881)	(7.046)	(8.826)	(6.979)
Constant	34.70*	14.39***	49.27**	15.93***
	(20.88)	(1.924)	(24.68)	(2.101)
Number of observations	49,804	49,804	49,804	49,804
Hausman test (stat and *p*-value)	0.000	98.97***	0.000	131.14***

*Significant at $p < 0.1$.

**Significant at $p < 0.05$.

***Significant at $p < 0.01$.

Note: Numbers in parentheses are robust standard errors. Hausman specification test compares the fixed effects and random effects. F-test results for differences in subperiod coefficients (fixed effects model, column 3): lagged GDP per capita (F-value: 1.85; $p = 0.16$); log population (F-value: 7.71; $p = 0.005$); CPIA (F-value: 3.13; $p = 0.04$); and present value of debt (F-value: 2.30; $p = 0.09$).

Source: Authors' analysis based on data sources shown in table 1.

quality of the recipient country policies or to better coordination. Donors give more aid to important trade partners (although the relationship is not statistically significant), perhaps because bilateral relationships are closer when trade is high or because donors tend to support (indirectly) their own exports to the recipient country.[13]

Looking at changes over time in the key relationships for the three subperiods shows an increase in the responsiveness of aid to recipient country income (in absolute terms) over the three subperiods, from −0.535 to −0.720 (all are highly significant). Although the F-test can reject only at the 16 percent level that these coefficients are different from each other, this is evidence that donors have become more focused on providing aid to the poorest countries rather than, say, to their political allies. The small-country bias has diminished over time, with the coefficient for population falling from −3.544 to −3.020. All these results are significant, and the F-test rejects (at the 0.05 percent level) that these coefficients are not different from each other. This decline in the small-country effect may reflect less interest by donors after the cold war to support small countries in, say, buying political favors such as votes in the United Nations. In general, it confirms the improvement in the quality of aid allocations.

Aid becomes much more responsive to policy: the coefficient, negative and statistically insignificant in the first period, rises to 0.215 in the second period and to 0.919 and statistically significant in the most recent period. The F-test shows that the increase in sensitivity is statistically significant (at the 4 percent level). This confirms the growing sense that in recent years donors have determined their aid allocation much more on the basis of country policy and institutional environment. It also explains why the CPIA is not significant over the whole period, as aid becomes sensitive to policy and institutional environment only in the last period.

The results also support the hypothesis that concerns among donors about countries' debt burdens have declined. Whereas in the early period, high debt deterred aid (the coefficient was negative and significant), in the two later periods aid was no longer negatively affected by recipient countries' debt burden, and the change in coefficients is statistically significant at the 10 percent level. This change is good news, revealing that debt burdens are no longer an obstacle to aid flows. It does not, however, say much about changes in defensive lending, which requires consideration of the composition of debt as well.[14]

13. Bilateral trade can be scaled by donor GDP instead of recipient country GDP. A positive relation with aid could then be interpreted as evidence of strategic behavior and self-interest in aid allocation. Such relationships were commonly found for the 1970s and 1980s. When the regression is rerun with trade scaled by donor GDP and with changes over time, a positive and statistically significant association is found in the first period as well. In the other periods, however, the coefficients are not significant and trend toward negative.

14. Regressions including debt composition variables shed more light on changes in defensive lending behavior by multilateral and bilateral creditors over time (see the online working paper version of this report).

Robustness Tests

Several robustness tests were conducted. First, the models are run using the policy index developed by Burnside and Dollar (2000) instead of the CPIA. The CPIA index is produced by World Bank staff and potentially suffers from endogeneity if staff adjust the CPIA to affect International Development Association (IDA) lending patterns—which are by design closely related to the CPIA scores—when there has been no real change in policies or institutional environment. This would lead to a false conclusion of increased selectivity. This bias would affect IDA flows most directly (not studied here), but not necessarily bilateral flows. The CPIA scores could also have been affected by the prospective lending behavior of other donors, with World Bank staff raising the CPIA scores for countries for which they expect more aid flows. While it is not clear whether these biases exist, and if they do, whether they have increased over time, they could nevertheless affect the regression results. To address this possibility, another policy index is used.

The index developed by Burnside and Dollar (2000) and further described in Roodman (2007) uses three indicators of economic policy—the logarithm of 1 plus the inflation rate, budget balance as a percentage of GDP, and the Sachs-Warner (1995) trade openness variable (1, 0). The index is created using a linear combination of the three policy variables with weights of 6.85 for budget balance, −1.40 for inflation, and 2.16 for trade openness. The Burnside–Dollar index, while a more objective measure and less subject to biases, is not necessarily a better index than the CPIA. It does a poorer job of capturing the policy and institutional environment, since it is mostly outcome based. Thus inflation and the budget balance may change because of exogenous shocks even when the policy and institutional environments do not. To overcome some of this variability, three-year averages are used for the three constituent indicators of the policy variable. Another disadvantage is that the data needed to create this index are not available for all countries, which reduces the sample for the regressions by about one-third, to some 33,000 observations and 1,644 specific donor–recipient combinations.

When the regressions are run with the Burnside–Dollar indicator instead of the CPIA index and the coefficient is allowed to change by subperiod, the policy index is not statistically significant in the first period but becomes significant in the second and third periods (table 3, column 1). This is similar to what happens using the CPIA index in the original regression (see table 2, column 3). The results for the other variables are different than for the CPIA, but this is due to missing observations in the Burnside–Dollar index, which make the samples different. When the regression is rerun with the CPIA index for only the subset of observations available for the Burnside–Dollar index (table 3, column 2), results are similar to those with the Burnside–Dollar index. Thus the differences between the results for the Burnside–Dollar

TABLE 3. Robustness Tests

Variable	(1) Burnside–Dollar (2000)	(2) CPIA subset	(3) GMM	(4) Balanced	(5) Excluding zero observations	(6) All observations
Lagged GDP per capita, 1970–89	−0.331***	−0.357***	−0.462***	−0.361***	−0.849***	−0.480***
	(0.0935)	(0.101)	(0.111)	(0.105)	(0.208)	(0.123)
Lagged GDP per capita, 1990–98	−0.306***	−0.326***	−0.660***	−0.354***	−1.010***	−0.594***
	(0.0972)	(0.110)	(0.107)	(0.116)	(0.312)	(0.191)
Lagged GDP per capita, 1999–2004	−0.270***	−0.331***	−0.869***	−0.343***	−1.145***	−0.668***
	(0.0926)	(0.108)	(0.105)	(0.113)	(0.314)	(0.196)
Log (population), 1970–89	−0.581	−0.773	−9.767***	−1.799	−4.417*	−3.355**
	(1.047)	(1.107)	(1.179)	(1.392)	(2.363)	(1.370)
Log (population), 1990–98	−0.356	−0.585	−8.511***	−1.721	−3.869	−3.095**
	(1.059)	(1.113)	(1.176)	(1.432)	(2.408)	(1.378)
Log (population), 1999–2004	−0.213	−0.484	−7.860***	−1.576	−3.478	−2.919**
	(1.075)	(1.127)	(1.176)	(1.421)	(2.444)	(1.392)
Burnside–Dollar (2000), 1970–89	−0.0162					
	(0.0489)					
Burnside–Dollar (2000), 1990–98	0.150*					
	(0.0833)					
Burnside–Dollar (2000), 1999–2004	0.308*					
	(0.183)					
CPIA, 1970–89		−0.0301	0.0689	−0.0395	−0.0950	−0.0220
		(0.0928)	(0.0848)	(0.0936)	(0.155)	(0.0970)
CPIA, 1990–98		0.0860	0.122	0.100	0.267	0.198
		(0.0818)	(0.0999)	(0.0741)	(0.183)	(0.127)
CPIA, 1999–2004		0.471*	0.527**	0.294	1.324***	0.878**
		(0.263)	(0.208)	(0.237)	(0.498)	(0.349)
Present value of debt, 1970–89	−0.569	−0.640	−0.0819	−0.910	−0.463	−0.395
	(0.482)	(0.519)	(0.315)	(0.628)	(0.309)	(0.245)

(Continued)

TABLE 3. Continued

Variable	(1) Burnside–Dollar (2000)	(2) CPIA subset	(3) GMM	(4) Balanced	(5) Excluding zero observations	(6) All observations
Present value of debt, 1990–1998	0.818**	0.598	0.0912	0.460	0.226	0.193
	(0.409)	(0.372)	(0.140)	(0.452)	(0.209)	(0.138)
Present value of debt, 1999–2004	1.052*	0.829*	−0.241	0.642*	0.353	0.308
	(0.595)	(0.454)	(0.515)	(0.383)	(0.464)	(0.360)
Net aid transfer other donors	6.124**	6.690**	3.422**	10.25***	−2.535	−2.030
	(2.997)	(2.891)	(1.477)	(2.956)	(6.045)	(3.190)
Donor sum of net aid transfer	−0.262	−0.263	−0.137**	−0.416**	−0.308*	−0.294*
	(0.163)	(0.163)	(0.0549)	(0.171)	(0.176)	(0.163)
Lagged bilateral trade	−24.61**	−24.40**	15.73***	−9.736	9.361	11.64
	(11.16)	(11.12)	(1.418)	(7.553)	(9.202)	(8.745)
Lagged net aid transfer per capita			0.495***			
			(0.00492)			
Constant	5.447	8.913	−1.053***	31.09	57.86	47.19**
	(18.16)	(19.01)	(0.0824)	(22.41)	(39.84)	(22.22)
Number of observations	33,401	33,401	47,219	28,672	37,510	53,090
Number of donor–country combinations	1,644	1,644	2,380	1,024	2,316	2,566

*Significant at $p < 0.1$.

**Significant at $p < 0.05$.

***Significant at $p < 0.01$.

Note: Numbers in parentheses are robust standard errors. F-test results for differences in subperiod coefficients (Burnside–Dollar model, column 1): lagged GDP per capita (F-value: 1.08; $p = 0.34$); log pop (F-value: 3.27; $p = 0.04$); Burnside–Dollar (F-value: 1.84; $p = 0.16$); and present value of debt (F-value: 2.26; $p = 0.10$).

Source: Authors' analysis based on data sources shown in table 1.

indicator (see table 3, column 1) and the CPIA index (see table 2, column 3) are likely attributable to the different samples.

Because there can be important dynamics in aid determination, the next regressions include a lagged dependent variable and estimate the coefficients as a dynamic panel using first-differenced general method of moments (GMM) (Baltagi 2001). For example, because of stickiness in the adjustment of aid policies, aid flows in this period may relate to those in previous periods, even though country policies and other circumstances have changed. Also, aid projects may involve lumpy disbursements, leading to autocorrelation.

The results are very similar to those in the basic regressions: the coefficient for the recipient country income level increases over the three periods, while those of population size decrease in both size and statistical importance (see table 3, column 3). However, the CPIA indicator is again statistically significant only in the third period. The other control variables—aid of all the other donors in the sample, total aid from the same donor, and bilateral trade—also have the same sign and significance. The main difference is that the debt burden is now insignificant for all three periods. This robustness test again supports the conclusion that donors have become more selective.

Another robustness test uses a balanced sample in the regressions, since the unbalanced sample used so far may have biases arising from its change in composition over time. For example, some poor transition economies in Eastern Europe entered the sample in the later periods; other countries "graduated" and received less aid as they became less poor. These factors may introduce some bias. Transition economies were relatively rich even while receiving aid, and graduating countries may have had better policies while receiving less aid over time for other reasons. Other countries could have data deficiencies, which could also bias the sample.

Running balanced samples for the base regressions lowers the statistical significance, in part because the sample size is much smaller (see table 3, column 4). However, most of the variables of interest (except sensitivity to income) have the same signs as in the base regression. Aid responsiveness to recipient GDP per capita is constant across periods, and while the coefficient on the policy variable becomes more positive over time, it is never significantly different from zero. The same holds for size. Although the country size bias seems to diminish over the three periods, the individual coefficients do not differ significantly from zero. Debt becomes statistically significant in the third period. The signs and statistical significance of the other control variables are similar to those in the base regression.

To check the robustness of the treatment of observations with zero aid flows (dropping the cases in which a donor provided no aid to a recipient but keeping those in which a donor provided aid only in some years), all the regressions were also run with only the nonzero observations (37,510) and with all observations (53,090). The results are consistent with those of the base case (49,804 observations). The importance of GDP per capita in aid allocation

rises in both regressions, while that of size declines (see table 3, columns 4 and 5). The CPIA index becomes statistically significant only in the third period, while the debt burden is not statistically significant in any period. Overall, and consistent with findings in the trade literature, these results make clear that the treatment of zero observations does not alter the main conclusions.

The model was also estimated with a lagged dependent variable, but using a fixed effects model instead of GMM. Again, the results are qualitatively similar. The results also remain qualitatively the same in other robustness regressions—in terms of specific samples and using Hausman–Taylor regressions. (For more details on these robustness tests, see the appendix and the working paper version available online.)

Finally, the panel regression results are dependent—in terms of their statistical advantages over other regression techniques—on a certain degree of data homogeneity. With much heterogeneity, the panel approach offers little gains and possibly some costs. Homogeneity can be considered in all three dimensions: over time, across donors, and across recipients. The base analysis investigated the time dimension, showing changes over time in how the key variables drive aid flows. It is easier to investigate donor homogeneity, since there are fewer donors than recipient countries. This was done by running the aid allocation regressions for groups of similar donors, such as the so-called like-minded donor group (including the Nordic countries, the Netherlands, and the United Kingdom) compared with the others. To test recipient heterogeneity, aid allocation regressions were run for groups of similar recipients, by income level and region (Sub-Saharan Africa and other countries). Each time, two groups of countries were created and the coefficients were compared.

Most results confirmed the base panel results, although generally with reduced statistical significance. The important exception is that the variables used to group countries are not as significant, which is to be expected. For example, when recipients are grouped by income level, income becomes less significant. (These results are available online in the appendix.)

Changes over Time among Donors

This study has documented a general improvement in aid allocation. Can it identify changes for individual donors that have contributed to this improvement? Recent research (for example, Berthélemy 2006; Dollar and Levin 2006; Wood 2008) has highlighted differences among donors, with some donors behaving more altruistically and others focusing more on their geopolitical interests. The general impression is also that donors vary in how much they have improved the selectivity and quality of their aid. Whether these differences exist and whether they have changed over time—and if so, for which donors—can also be analyzed within the study framework by estimating the elasticities of individual donors with respect to the four key selectivity measures. This is done within the panel approach, keeping all control variables the same for all

TABLE 4. Donor-specific Sensitivities to Recipient Country Variables (average of three periods)

					Memo items	
Donor country	Lagged GDP per capita	Log (population)	CPIA	Present value of debt	Ratio of aid to GNI, 1977–2004 (average percent)	Share of total aid
Australia	−0.38	−4.19	0.79	0.79	0.37	0.750.79
Austria	−0.08	−1.51	0.22	0.24	0.21	0.590.24
Belgium	−0.19	−1.52	0.29	−0.13	0.45	0.62–0.13
Canada	−1.02	2.52	−0.32	−1.21	0.40	0.66–1.21
Denmark	−0.20	−1.00	0.30	0.13	0.89	0.570.13
Finland	−0.03	−0.89	0.18	0.18	0.38	0.580.18
France	−2.01	−12.53	1.57	−2.09	0.50	0.80–2.09
Germany	−0.92	−6.74	0.71	−1.16	0.36	0.64–1.16
Greece	0.00	−1.20	0.14	0.16	0.17	0.390.16
Ireland	−0.03	−1.05	0.13	0.46	0.25	0.480.46
Italy	0.39	1.91	−0.49	1.33	0.22	0.441.33
Japan	0.20	−1.22	1.22	2.03	0.27	0.722.03
Luxembourg	−0.11	−2.82	−0.13	0.11	0.38	0.500.11
Netherlands	−0.02	−1.68	−0.01	−0.17	0.88	0.70–0.17
New Zealand	−0.01	−0.78	0.18	0.12	0.27	0.780.12
Norway	−0.53	−2.39	0.21	0.50	0.97	0.640.50
Portugal	−0.05	0.65	0.42	−0.23	0.21	0.63–0.23
Spain	−0.36	−0.51	0.70	0.82	0.19	0.650.82
Sweden	−0.60	−4.88	0.10	0.61	0.86	0.690.61
Switzerland	−0.13	−1.08	0.23	0.28	0.31	0.710.28
United Kingdom	−2.24	−16.42	0.97	−1.60	0.33	0.58–1.60
United States	−3.08	−5.21	−0.38	0.03	0.18	0.740.03
1970–89	−0.44	−3.00	−0.03	0.44		
1990–98	−0.53	−2.83	0.17	0.20		
1999–2004	−0.59	−2.64	0.81	0.38		
Average of individual donor coefficients for all periods	−0.52	−2.82	0.32	0.05		

Note: Results of regressions using the base regression model specification, but with donor specific, time period varying interactions (table 2, column 3).

Source: Authors' analysis based on data sources shown in table 1.

donors, but allowing the coefficients for each donor to differ and to vary over the three time periods.

Large differences remain among donors (table 4). For GDP per capita, average sensitivity varies from −3.08 for the United States to 0.39 for Italy, suggesting that aid from the United States is much more geared toward the poorest countries than is aid from Italy. For population, the sensitivity varies from −16.4 for the United Kingdom to 2.52 for Canada, suggesting that aid

from the United Kingdom is more geared toward smaller countries than is aid from Canada. For the CPIA index, sensitivity varies between −0.49 for Italy and 1.57 for France, making France much more policy sensitive than Italy. Finally, for debt burden, average sensitivity varies from −2.09 for France to 2.03 for Japan, suggesting that debt is more detrimental to aid flows for France than it is for Japan.

While not all these coefficients are statistically significant and the results do not always correspond to general perceptions, the results do show large differences among donors. Table 4 also shows the relative importance of aid as a share of donor GNI and bilateral aid as a share of a specific donor's total aid, to determine whether donors who give more aid also tend to be more selective (which does not appear to be the case). The results also confirm the general improvement in selectivity, with average sensitivity for the 22 donors for the three periods showing an increase with respect to income and a sharp increase with respect to the CPIA index, less bias toward smaller countries, and less concern over debt burdens. (The magnitudes of the average of the individual donor coefficients are very similar to those in table 2, columns 3 and 4.[15])

III. Conclusions

This study observed behavioral changes over time in actual aid flows toward what appear to be more optimal allocations across countries. Specifically, the roles of poverty and countries' policy and institutional environment increased while the effects of small size and the debt burden diminished. Most of these changes occurred in the 1990s and intensified in the more recent period.

While these changes likely relate in part to reforms of the international aid architecture, it is unclear which institutional changes at the international or bilateral level have driven the changes in behavior. Long-standing multilateral financial institutions—such as the International Monetary Fund, World Bank, Paris Club, and consultative group meetings—have introduced many changes, which likely have affected the behavior of bilateral aid flows. More attention has also been paid to aid allocation beginning in the late 1990s, in part due to research begun in the mid-1990s. And changes such as the HIPC Debt Initiative and the Poverty Reduction Strategy Papers process diminished the influence of debt on donor flows and increased donor selectivity. While these and numerous other changes all likely influenced aid flows, studies, including this one, have not been able to document specific evidence of their impacts.

15. These regression results hold for most donors with respects to the CPIA index, with sensitivities higher in the late 1990s than before (results available in the working paper version). For the need dimension (GDP per capita), progress is less obvious as the increase in coefficients (in absolute value) is less consistent across donors, and significant differences remain.

Further precision in the institutional factors driving changes in behavior is important for understanding how to make the international aid system work better for developing countries. The constraint is the lack of good measures of changes in such factors as financial policies, transparency, and coordination at the donor country and international level. Work on documenting institutional changes in a rigorous and quantitative way may help identify the most influential changes. However, this study observes—as other have—large remaining differences among donors in revealed selectivity that appear to be related to donors' institutional environments. This suggests that reforms will have to be multifaceted and include further changes to the political economy and accountability in donor countries as well. It would be desirable for future research to take into account the policy and institutional environment not only in recipient countries, but also in donor countries, and to consider how this affects selectivity.

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