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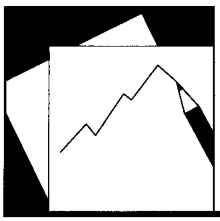

IMF Working Paper

Empirical Evidence on the New International Aid Architecture

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Empirical Evidence on the New International Aid Architecture

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Abstract

We study how 22 donors allocate their bilateral aid among 147 recipient countries over the 1970–2004 period to investigate whether changes in the international aid architecture—at the international and country level—have led to changes in behavior. We find that after the fall of the Berlin wall, and especially in the late nineties, bilateral aid responds more to economic need and the quality of a recipient country's policy and institutional environment and less to debt, size, and colonial linkages. Importantly, we find that when a country uses a PRSP and passes the HIPC decision point the perverse effect of large bilateral and multilateral debt shares on aid flows is reduced, suggesting less defensive lending. Overall, it appears international aid architecture changes have led to more selectivity in aid allocations. The specific factors causing these changes remain unclear, however. Furthermore, there remain large differences among donors in selectivity that appear to relate to donors' own institutional environments. Together this suggests that further reforms will have to be multifaceted.

JEL Classification Numbers: O11, O16, O19

Keywords: Development aid; aid allocation; selectivity; debt relief; HIPC; PRSP; aid architecture.

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I. INTRODUCTION

The so-called international financial architecture stands for the rules, institutional framework, and institutions covering both private and official flows. Following the financial crises of the 1990s, there have been many changes in the international financial architecture. These include, among others, new standards to which countries can adhere in their financial and other business dealings (such as the Basle Core Principles for Banking Supervision, the IMF Code of Good Practices on Transparency in Monetary and Financial Policies and corporate governance cores), the adoption of collective action clauses in sovereign bond issues covering events of liquidity and solvency problems, and changes in international financial institutions' lending policies. In addition, and especially since the fall of the Berlin wall, there have been many changes to the international aid architecture. The international aid architecture can be defined as the subset of international financial architecture rules and institutions affecting aid flows, including the way in which (bilateral and multilateral) aid is being allocated, the mix of official aid and debt flows, the use of official debt reduction and the accompanying policy requirements.

As part of a broader research program, we are interested in both how these changes have come about and how they are affecting behavior.[2] In this paper, we study the impact on behavior. In particular, we study the way in which aid is being provided by donor countries to individual recipient countries and how this has varied over time to investigate whether institutional changes have impacted donor behavior. Specifically, we investigate whether institutional, country-specific, and other changes to the international aid architecture have led to significantly different ways in which bilateral aid is being allocated over time. We also explore differences among donors to explore how the determinants of their aid flows relate to their own institutional environments.

Aid allocation lends itself well to a study of how changes in the international financial architecture may affect actual behavior. This is for at least two reasons. First, data on bilateral aid flows are relatively easily available for long periods of time for a large number of donors and a large set of recipient countries. This allows for combining longitude and cross-sectional empirical studies on the allocation of aid. Second, the aid system has been undergoing many changes in the last few years, with policy changes at both the bilateral and multilateral donor levels and actions at the individual recipient country level. As such, we can expect to document for a particular case how changes in the international financial architecture affect actual behavior.

Research on aid can also have significant policy influence, as shown in part by the effects of the academic work on aid effectiveness. Initiated as academic research (Burnside and

[2] For other papers under this research project, see www.esrc.org, www.worldeconomyandfinance.org, and www.garnet-eu.org.

Dollar, 2000) and rallied by the World Bank study on 'Assessing Aid' (1998) showing that aid works better in good policy and institutional environments, it has become accepted—at least among many policy makers—that targeting aid to those countries with an enabling environment can maximize overall aid effectiveness. Although some of this research has been questioned as to its empirical robustness,[3] it has nevertheless reinforced the view that aid ought to be considered only for the 'needy' and the 'deserving' (the terms used in Nunnenkamp and Thiele, 2006), notwithstanding the exact definition of these two concepts. At the same time, the overall consensus on aid allocation has been that, at least in the past, aid has not been allocated most effectively if 'needy' and 'deserving' were truly the (only) objectives.

The (research) insights on aid effectiveness and aid allocation and the various policy debates have resulted in major changes to the international aid architecture, such that aid scholars have started to refer to a "paradigm shift" (Renard, 2006).[4] Architectural changes range from specific actions, such as more debt relief for a larger number of poor countries (including bilateral and multilateral debt reduction), to 'institutional' changes, such as a greater move away from project lending towards programmatic lending, a greater emphasis on coordination among donors (the so-called 'alignment' including greater harmonization of lending terms and policies), and more ownership by the recipient country (not just including the government). It has been accompanied by changes in the development approach more generally, including a greater use of Poverty Reduction Strategy Papers (PRSPs), the explicit introduction of Millennium Development Goals (MDGs), and enumeration of the objective of scaling up aid.

These changes in the international aid architecture have largely aimed to increase the development efficiency and effectiveness of aid. This revised approach can also be expected to affect the allocation of aid among countries through several channels. Recipient countries that abide by the new paradigm should see themselves rewarded with more aid, also at more concessional terms. The debt reduction should reduce the pattern of "defensive" lending where more indebted countries were receiving more aid flows to keep up payments to (multilateral) creditors (Birdsall and others, 2003). Institutional and policy changes should lead to fewer coordination problems, resulting in better aid allocation. And there should be less influence of historical, (geo-) political and other non-

[3] Easterly, Levine and Roodman (2004), for example, find that the Burnside and Dollar (2000) results do not stand up to a longer time period when using exactly the same specifications. Others have also questioned these results (Easterly, 2006 and Radelet, 2006 take a critical look at this research). Rajan and Subramanian (2005) argue that it is hard to find a robust effect of aid on the long-term growth of poor countries, even those with good policies, because aid inflows have systematic adverse effects on a country's competitiveness, as reflected in a decline in the share of labor intensive and tradable industries in the manufacturing sector, stemming in part from real exchange rate appreciation triggered by aid inflows.

[4] This is also reflected in the frequent policy seminars in the last few years on the "new international aid architecture," for example, two such seminars during the 2007 Annual Meetings of the World Bank and IMF.

economic or developmental factors in aid allocations. As a corollary, of course, although we do not investigate this, one would expect these better allocations of aid to achieve a greater impact, for example, in terms of meeting the MDGs.

Whether these effects of international aid architecture changes on actual aid allocation actually exist, however, has not yet been studied much. The first and foremost question this paper therefore tries to address is whether there have been any significant changes in the *actual behavior* of donors in recent years compared to earlier periods. The key empirical approach the paper will use to tackle this question is to investigate whether changes have led donors to provide aid money in a more rational manner, that is, do donors allocate aid now more to "poorer" and "better" countries, i.e., is there greater selectivity today compared to in the past. Specifically, we investigate whether donors allocated in recent periods aid with greater sensitivity to the income level and the quality of countries' policies and institutional environment. Besides selectively with regards to income and policies, we also investigate changes over time in sensitivities of aid allocation with respect to country size, level of debt burden, and colonial linkages. In terms of country-specific changes, we investigate whether the adoption of the 'Heavily Indebted Poor Countries' (HIPC) debt reduction initiative and the granting of bilateral and multilateral debt reduction, and the introduction of the PRSP for specific countries have led to any changes in the allocation of bilateral aid flows.

In terms of methodology, we use data for the whole matrix of bilateral aid flows and explore the time variation in donor and recipient country behavior. Using this panel approach provides more power and allows for better estimations compared to cross-section regressions. Policy changes may occur in gradual fashion, for example, and can vary by donor and recipient country. Some countries may have received debt reduction early on, for example, some late. Furthermore, we can better control for other factors, such as the degree of trade between the donor and the recipient country, which has been found to be important for aid allocation.

Our general finding is one of significant changes in the international aid architecture since the characteristics that drive aid respond over time in "better" ways, especially to income level and recipient country policies. Actions at the individual country level also seem to have improved aid allocation, with the adoption of PRSP and actual debt (HIPC) relief resulting not only in greater aid flows to the specific country, but also in lesser importance of the share of official (bi- and multilateral) debt in determining aid flows across countries, suggesting reduced defensive lending. Although there remain large differences, we find evidence of an improvement in selectivity for most donors.

These results are robust to various econometric specifications, reducing outliers, and alternative data samples. Specifically fixed effects, random effects and Hausman-Taylor models lead to very similar coefficients and statistically significance levels. Other tests

show the robustness of our main results in terms of statistically significance and size of coefficients.

While this is very encouraging evidence of an overall improved international aid architecture, we can not pinpoint exactly what specific institutional changes at the international or donor level may have brought about these changes in behavior. We can most confidently point to actions, such as the HIPC Initiative and the PRSP process, as having led to less reduced defensive lending and greater selectivity in donor flows, but for the numerous other changes that also have occurred over the same period, we do not have specific evidence of their impacts. This is largely because we lack good measures of changes in, say, financial policies, transparency, coordination, etc. at the donor country or international level. Further work on documenting over time these institutional changes in a rigorous and quantitative way will help identify what changes have been the most influential. We do observe, however, that the large, remaining differences among donors in revealed selectivity appear to relate to donors' own 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. Further research is needed, however, to identify specific institutional and other changes in donor countries, and how they may (or may not) translate in improved selectivity.

The remainder of the paper is structured as follows. Section 2 describes the related literature. Section 3 describes the data and the methodology used. Section 4 provides a discussion of the results and the robustness checks. Section 5 concludes.

II. RELATED LITERATURE

The allocation of aid by (individual) donors among recipient countries has been a much analyzed topic (Radelet, 2006 and Easterly, 2007 provide general reviews that also cover the aid allocation literature). There are many empirical studies on the allocation of aid among countries, starting at least as far back as the 1960s.[5] The general finding of this research is that, at least until the early 1990s, political and strategic interests dominated concerns for growth, poverty reduction or other economic objectives in aid allocations. In other words, the general sense of these investigations is that donors allocated their own money with too little concern to development impact. Yet, little impetus for change existed until the end of communism, the increasing forces of globalization, and the revitalization of the academic literature on the topic.

[5] Seminal early studies include Little & Clifford (1965), OECD (1969), Bhagwati (1972), and Dudley and Montmarquette (1976). McKinlay and Little (1977) introduced econometrics; Trumbull and Wall (1994) and Wall (1995) introduced panel data econometric techniques.

The breakdown of communism changed much in global relations, with consequences for international aid. The end of the global power race reduced much of the political motivations for aid. Another, somewhat related development has been the progress in reform in many countries and the improved growth outcomes. Many countries have made much progress in reducing overall poverty, reducing the need for concessional aid. Related have been the increased globalization and the rise in private capital flows that in turn have reduced the need for and the nature of official aid. Some countries, even though still poor, have reduced their dependency on aid as they have been able to attract private external capital flows. Many of these changes have driven by changes in the overall development model triggered in part by the breakdown of communism.

Another force has been academic research. The topic of aid allocation received much renewed attention from academics in recent years starting with the work of Alesina and Dollar (2000). This analysis, and confirmed by now through several papers, provided solid evidence that, while aid is affected by economic considerations pertaining to the countries' growth and poverty situation and prospects, non-economic factors also play a large role, with the role of global political economy factors particularly highlighted. France, Great Britain and Japan, for example, were found by Alesina and Dollar (2000) to favor their former colonies in the allocation of aid, and they, together with the U.S. and Germany, allocate more aid to recipients that vote in unison with them in the UN. Also the quality of the political regime in recipient countries did not seem to matter much: Alesina and Weder (2002) for example find no evidence that less corrupt governments receive more aid. Other papers have confirmed these relationships, also in cases of some specific donors.[6]

In part due the changes in geopolitical and global economic circumstances, and perhaps due to these new insights from research, donors have since the mid-1990s been adapting their aid programs and altering many of their policies. This may have affected the patterns of their bilateral aid allocations. Some newer empirical studies already reveal (indirectly) how changes have altered the way (some) donor countries provide aid to countries. Dollar and Levin (2006) examine the aid allocation by 41 donor agencies, bilateral as well as multilateral, computing poverty- and policy-selectivity indices for these individual donors for different sub-periods in the 1984–2002 period. They conclude that while "in the second half of the 1980s, aid was allocated indiscriminately to well governed and poorly governed countries alike, at the same level of per capita income, today there is a clear tendency to allocate more assistance to poor countries that have

[6] Kuziemko and Werker (2006) find that U.S. aid increases by 59 percent and its UN aid by 8 percent when a country rotates onto the UN security council, suggesting bribery. Eisensee and Strömberg (2007) find that U.S. relief is less likely when the disaster occurs at the same time as other newsworthy events, for example, the Olympic Games, suggesting that relief decisions are driven by news coverage of disasters and less by need.

reasonably good economic governance."[7] Berthélemy and Tichit (2004), Roodman (2005), and Sundberg and Gelb (2006) also find that donors' selectivity improves over time.[8]

While many studies find that the sensitivity of aid flows with respect to income levels and policy of the recipient has increased, a contrarian view comes from Easterly (2007). He does not find consistent evidence of increased selectivity with respect to economic policies, such as trade openness, and only temporarily increased selectivity in the late 1990s with respect to corruption. The issue is thus not fully settled. And, importantly, it is not known what specific institutional changes may (or may not) have been driving these changes in actual behavior.

As a corollary to the analysis of aid allocation, more policy-oriented research has considered the (more) optimal allocation of aid from the point of view of reducing poverty and better achieving (some of) the MDGs. White and McGillivray (1995) was perhaps the first attempt and the Collier and Dollar (2002) is the best known and most influential recent paper.[9] These and other papers try to analyze what allocation of aid across countries achieves the highest impact in term of global poverty reduction or other, MDG-related objectives.[10] Relevant for the (changes in) aid allocation question is that this literature in turn compares the actual allocation with the (more) "optimal" one. These comparisons make clear that the aid allocation of many donors has been "suboptimal," since, for a given amount of aid, the allocation does not achieve its maximum impact. This suboptimal allocation in turn suggests that international economic and geopolitical factors (or other, unknown factors) are important in bilateral aid allocations. Although there remains a debate on what to consider optimal (see, for example, McGillivray 2004; and Wood, 2006),[11] the studies nevertheless also support the view that the behavior of some of the donors in the nineties has improved.[12]

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[7] Dollar and Levin (2006) also find consistent sensitivity for democracy.

[8] Berthélemy and Tichit (2004) investigate aid flows over 20 years (1980–1999) for 22 donors and 137 recipients. Comparing aid allocation policies in the 1980s with the 1990s, they find that the bias towards former colonial links has declined and instead donors tend to favor trade partners. Moreover, donors reward good economic policy outcomes more since 1990. Roodman (2005) finds donors' selectivity standings by the 2005 Commitment to Development Index methodology to be relatively stable since 1995, but this refers more to the ranking of countries and not to their absolute degree of selectivity. Sundberg and Gelb (2006) show that poverty and policy selectivity of aid to Sub-Sahara Africa has improved over time, both for bilateral and multilateral donors. Other recent research (Amprou, 2007) confirms.

[9] Note that we do not try to review the very large literature on the impact of aid: see rather Easterly (2003), McGillivray and others (2006), and Rajan and Subramanian (2005); an earlier review is Mark McGillivray (2004). See also Anderson and Waddington (2006), Radelet (2006) and Easterly (2007).

[10] Collier and Dollar (2002), for example, ask how to allocate a given amount of aid according to countries' policies that create a better environment for effective aid so as to reduce as much as possible world poverty.

[11] The literature now considers among those potentially driving optimal aid factors such as sound institutions and human rights record (these factors may in part be motivated by their indirect impacts on the MDGs, especially those other than poverty). Gates and Hoeffler (2006), for example, find that the Nordic

(continued…)

While the existing research has highlighted the role of changes in global economic and geopolitical circumstances, there have also been many changes in the forms and rules under which official aid is being provided, that is, the international aid architecture more narrowly defined. Many donors have moved to substitute debt-type flows by concessional aid (that is providing grants instead of loans); in some cases, donors have altered their mix of balance-of-payments/budget support and project financing; and (almost) all donors have engaged in bilateral (official) debt reduction, in the latest round through the (enhanced) HIPC initiative with 100 percent write-offs. Additionally, multilateral debt reduction is underway through the MDRI (Multilateral Debt Reduction Initiative). Common across donors has also been a greater openness in aid allocation, an aim for more selectivity, and greater use of benchmarks and results-based allocations (such as in the U.S. Millennium Challenge Account).

Of these changes, debt restructuring can most specifically be expected to affect aid allocations. Earlier work showed aid flows to be a function of the level and structure of a country's debt obligations, including its debt stock outstanding to bilateral and multilateral financial institutions (Birdsall and others, 2003). That evidence suggested that HIPCs kept receiving large amounts of resources just because of their high indebtedness or large size, supporting the hypotheses of defensive lending and defensive granting, that is, situations in which donors continue to give loans and/or grants to prevent default on past loans and to avoid admitting "mistakes".[13] These perverse effects of high debt stocks and certain debt compositions provide an argument in favor of debt relief, and the HIPC and MDRI Initiative in particular, in that debt relief can help 'restore policy selectivity'. Conversely, since debt relief has now been implemented in a number of countries, we can

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countries differ significantly from other donors as they give more to democracies and do not give to political allies. See also Amprou, Guillaumont, and Guillaumont-Jeanneney (2007).

[12] This may be in part because donors like the U.K. DFID and the Netherlands development ministry have been using these models since the mid-1990s to help allocate their aid. For longer time, multilateral institutions have used such models to drive their aid programs (see Easterly, 2003 and Wood, 2006). This may have improved the patterns of aid allocations. Obviously, results remain dependent on the criteria used for optimal behavior—for example, growth, poverty, the flow of foreign direct investment received, gross primary school enrolment, infant mortality rate—and on the specific estimation methods regarding the impact of aid. For example, one can optimize with respect to aid impact on current poverty, given policy choices in the country. Or one can optimize with respect to aid impact on policy, given policies' impact on future poverty in the country. The first, say, may lead donors to give more aid to countries where there is more poverty and where the impact of aid on poverty is larger (because the policy environment is better). The second may lead donors to take a longer-term view and try, through their aid-policies, to induce better policies, such as better governance and greater accountability that lead to lower poverty in the longer term.

[13] Another study is Marchesi and Missale (2004). They examine grants and net loans made to a panel of 55 both HIPC-and non-HIPC countries during the last two decades and find that the total amount of net transfers to HIPCs, as compared to non-HIPCs, has been increasing with their debt level as greater net transfers in the form of net loans from multilaterals and grants more than offset lower bilateral loans.

investigate to what extent debt relief has affected the amounts and relative destinations of bilateral aid flows and if indeed it has been successful in eliminating defensive lending.[14]

In addition, a significant share of aid is allocated multilaterally, as in the case of the International Development Agency (IDA), managed by the World Bank, the Poverty Reduction and Growth Facility (PRGF) of the IMF, and programs of other multilateral financial institutions.[15] While we do not study multilateral aid allocations, multilateral aspects can affect bilateral aid flows. For example, much of bilateral official debt reschedulings and debt reductions occur through multilateral forums (e.g., the IMF and Paris Club). This introduces potential conflict of interests, such as IDA-disbursements that can get influenced by the World Bank/IBRD financial positions, as in the case of defensive lending. Or the heavy World Bank and IMF inputs into the Paris Club process, in turn often reflecting G7 and geopolitical inputs, may bias the outcomes of bilateral aid allocations (e.g., a bilateral donor may be willing to support a specific country in "exchange" for some broader multilateral or geopolitical objectives). The strategic behavior among donors themselves can be affected by multilateral financial institutions' actions, such as aid disbursements (see Mavrotas and Villanger 2006 for a theoretical model). As such, the framework for multilateral aid affects not only multilateral flows, but also bilateral flows. This is important since there have been some changes in terms of the multilateral framework over the last few years. These have included changes in institutional arrangements, e.g., more openness regarding finances, decisions and procedures, increased degrees of concessionality of multilateral flows, and more coordination in lending and disbursement policies.

More generally, the international development and aid architecture has been undergoing many changes in the last few years. This includes specific actions such as the Paris Declaration on Harmonization and Alignment of aid flows and other, broader new 'institutional' mechanisms such as the greater use of PRSPs, the explicit introduction of

[14] With the increase in official debt reduction in the 1990s, some have investigated the motivations for debt relief. Chauvin and Kraay (2006) find that debt relief, particularly from multilateral creditors, has been allocated to countries with better policies in recent years. Somewhat surprisingly, however, conditional on per capita income and policy, more indebted countries are not much more likely to receive debt relief. However, countries that are large debtors, especially vis-à-vis multilateral creditors, are more likely to receive debt relief. Persistence in debt relief is also driven by slowly-changing country characteristics, indicating that it may difficult for countries to "exit" from cycles of repeated debt relief Although we focus only on the determinants of aid, including debt relief, not on its impact, it is worth noting some papers. Chauvin and Kraay (2005) find little evidence that debt relief affects the level and composition of public spending, or that debt relief raises growth, investment rates or the quality of policies and institutions. This suggests some skepticism regarding the likely benefits of large-scale debt relief. See also Cassimon and Van Campenhout (2007) who analyze the long-term fiscal response of HIPC debt relief compared to that of donor grants or loans. Aid disaggregation approaches have become more common in general, especially in fiscal response studies (of aid). See Mavrotas (2005) for a recent review of this literature.

[15] There are some 20 multilateral financial agencies, providing about 30 percent of total net aid transfers in 2005.

MDGs and the broader objective of scaling up aid. There have also been changes in aid composition (e.g., changes in the mix between project and program aid), other institutional environment changes (e.g., greater transparency) and a growing importance of alternative aid providers, such as private philanthropies engaged on health and environmental issues (Collier, 2006). All of these changes and actions can be expected to affect aid allocation. Few, however, have studied the effects of changes in the aid architecture, and debt reduction and PRSP in particular, using disaggregated data.

The effects of these and other changes in the framework for allocating aid on actual allocation can be multiple, although not clear a priori. Do these changes really lead donors to provide aid money in a more rational manner? Is there less influence of historical and (geo-) political factors today, is there more selectivity today, does this differ by donor and is there a relationship with institutional changes? Do debt reduction and the substitution of grants for loans by specific donors lead to better allocation as there are fewer conflicts between the collection on past loans and the extension of new support? Or does the provision of grants lead to a moral hazard on the part of the specific donors as they are less concerned about the long-term prospects and viability of countries? These are some of the questions we will directly or indirectly investigate.

III. DATA AND METHODOLOGY

We want to investigate whether institutional and other changes at the bilateral and multilateral levels have led to significantly different ways in which (bilateral) aid is being allocated. We specifically want to study whether there have been changes in the process of allocation of bilateral aid over time, whether the granting of debt reduction (HIPC) and the adoption of PRSP for specific countries affects aid flows, whether the aid allocation is less affected by defensive lending over time, and whether there are (changing) differences among donors in the aid allocation process. In this section, we describe the data sources, data and the methodology we use to investigate these questions.

A. Data Sources and Variables

Data on official development assistance (ODA, including debt reduction) for each of the reporting donors to each recipient country in a specific year come from the OECD/DAC (Development Assistance Committee) database. While the OECD/DAC database does not include all bilateral donors (China is not a reporting member, for example), it does cover the bulk of international aid flows over the period. In terms of recipient countries, we restrict our analysis to developing countries, i.e., those countries on what was known until recently as the Part I list of countries of the DAC (as of January 1, 2001). Countries included on the Part II list of the DAC, receiving what is traditionally called Official Aid (OA), are either transition countries or more advanced countries (such as Israel or South Korea) and are excluded from our analysis. Data are obtained from the On-line CRS system of OECD/DAC, with bilateral donor-recipient transactions captured through

the so-called DAC Table 2a data, which also allow for some disaggregation by type of aid flow (grants, loans and debt relief). Altogether the aid data are a three-dimensional panel of ODA flows to 147 recipient countries from 22 bilateral donors for the period 1970-2004. Table 1 provides a detailed list of variables used, their description and their sources.

The DAC statistics generally focus on the concept of *net aid*, which is total resources provided by donors in the form of grants, loans and debt relief, net of any loan principal repayments the country makes to the donor. In our analysis, we will use actual disbursements rather than commitments. Contrary to many earlier studies, we do not use the net ODA data, but transform the net aid figures into *net aid transfers*, by taking into account interest payments on the loans, to account for total net resource transfers. The total net aid transfer concept we use is thus defined in the following way:

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

In our analysis, we use net aid transfer scaled by recipient population as the basic dependent variable. We relate this bilateral aid flow to a number of independent variables. We obtain the macroeconomic independent variables mainly from the World Bank's World Development Indicators (WDI). And we use the DAC aid data itself to create aid measures that are independent of the bilateral aid flows that we study. Data on policy and institutional environment, and specific linkages between donors and recipients come from various sources.

In terms of our main variable of interest, the "need" or 'poverty selectivity' element of aid is proxied by the recipient country's per capita income (in constant U.S. dollars) lagged one period (to limit the risk of endogeneity, that is, aid flows driving GDP), with poorer countries expected to receive more aid. The 'policy' selectivity dimension of aid is investigated using the World Bank Country Policy and Institutional Assessment (CPIA) index of the recipient country. This index is available for a large number of developing countries and for a long period of time.[16] We also explore (changes in) the small country effect found in the aid literature, where we proxy recipient country size by population. To check for defensive lending practices, we include the countries' debt stocks relative to exports and its debt composition to investigate whether they affect new aid flows, as has

[16] We also used other institutional environment indexes, such as the governance and corruption indexes of Kaufmann, and others (2004, 2005) and the law and order indexes of Freedom House, and found these to have similar relationships with aid flows, but less consistent so. We did not use alternative proxies for aid effectiveness suggested in the recent aid literature (Amprou and others, 2007), such as compliance with MDG targets, vulnerability to external shocks, quality of governance and accountability, or degree of democracy.

been found in the past (Birdsall and others, 2003; Marchesi and Missale, 2004).[17] For debt stocks, since nominal debt stocks can be quite misleading as a measure of debt burden given the highly concessional interest rates, we use the present value of debt using a new, comprehensive time series of present value of debt calculated at the World Bank for a large number of countries, and also used in Chauvin and Kraay (2005, 2006).[18] For debt composition, we calculate the shares of bilateral and multilateral claims in total claims at each point in time. These debt data come from the World Bank's Global Development Finance database.

We also want to investigate the role of colonial and geopolitical links since these have been found to affect aid flows. As noted, colonizers have been found to give more aid to their former colonies, and political motivations can drive aid flows, e.g., aid is being given to induce favorable votes in the UN. We therefore include in all regressions dummies for former colonial linkages (e.g., U.K. with Nigeria). Since we include in our regressions pair-wise donor-recipient dummies (see next section), we already account for the degree to which a recipient country can be considered geopolitical linked to a donor as long as that link is time-invariant. This thus covers specific, strategic donor-recipient links, such as the well-known cases of U.S.-Egypt and U.S.-Pakistan bilateral relations.[19]

To check whether structural changes in the nineties have affected aid allocations and their relationships to our need and selectivity measures, we split the sample into three sub-samples, 1970–89, 1990–98 and 1999–2004, and use dummies for each period. This first period is similar to earlier studies and coincides with the period before the fall of the Berlin wall. The second and third periods reflect the post-Berlin wall era; this period is split into two sub-periods to check whether indeed a new aid architecture has emerged in recent years. The break point, 1998, coincides roughly with the start of the new literature on aid effectiveness and the changes in the institutional aid set-up (for example, the World Bank Aid study in 1998, and the launch of the HIPC/PRSP framework). We also consider an additional break in the last period where we consider separately the post 9/11 period, i.e., 2002–04. We interact these three (four) period dummies with four variables—poverty (per capita income), policy (CPIA), small country effect (population) and defensive aiding (debt)—to check for structural breaks in the relevant aid effectiveness dimensions. Additionally, we interact dummies for every year with these four variables to provide a picture of the year-by-year evolution over time of these

[17] While not our focus, one can also analyze whether intra-bilateral debt composition affects flows, for example, when a bilateral engages in defensive lending to a country when it has relatively large debt claims.

[18] See also Dikhanov (2004) for the technical background document.

[19] The influence of 'friends of the donor' is analyzed by Alesina and Weder (2002), which define friends by the number of times the recipient has voted in the same manner as the specific donor in the UN. The data on friends do not cover all donors, however (only Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Portugal, U.K., and USA) and are time-invariant. We thank though Beatrice Weder for providing us the data.

sensitivities. We also do such year-by-year interactions for the colonial linkages variables.

To investigate recipient-country specific aid architecture changes, we use post-PRSP-dummies at the date of full PRSP by the recipient country (using the dates as published by the IMF/World Bank as breaks) and post-HIPC-dummies at the individual country level (using the enhanced HIPC decision point as the break years). We use these PRSP and HIPC dummies to see whether aid flows change. We also interact these two dummies with the poverty, policy, size, and debt burden variables, to see whether there have been changes in selectivity following these actions. Finally, to investigate whether there are differences in aid allocation processes among donors and whether the aid architecture has involved changes at the donor level over time, we explore the variation among donors in their sensitivities with respect to the most important dimensions—poverty, policy, size and debt burden. We do so within the panel regression, where in addition we allow for some time variation.

Most other control variables we use are common in this literature: bilateral trade flows, to control for the role of non-aid economic relations between both countries; net aid provided by other donors, to control for aid coordination and possible complementarity or substitution among aid flows; and total aid provided by the specific donor to all countries, to control for the overall level of aid generosity of the donor country.

B. Methodology

We have panel data with donor, recipient and time dimensions. A natural candidate for an empirical model that explains bilateral aid flows at time *t* would be one using a matrix of explanatory variables, a fixed donor effect, a fixed recipient effect and time dummies (see Baltagi, 2001):

$$a_{ijt} = \alpha + \beta x_{ijt} + \phi_i + \gamma_j + \theta_t + \varepsilon_{ijt} \qquad (1)$$

This is essentially the three way fixed effects model proposed by Matyas (1997) in the context of gravity models for bilateral trade. It is an alternative to a simple, pooled OLS model that does not allow for unobserved heterogeneity. In general, using fixed effects is advantageous since it can account for any time invariant historical, geographical, political, cultural or other influence that will lead to deviations from the 'normal' aid (or trade) flows. However, specification (1) only takes into account such effects for the receiver (e.g., Tanzania receives more aid than other similar countries) and the donor (e.g., Denmark gives more aid than similar countries). It does not capture the fact that Denmark may in general give more aid to specific recipient countries than other donors do. Similarly, it does not allow for the fact that some recipient countries receive more (or

less) aid, from specific donors. Such effects could be captured by including bilateral interaction effects as well, which leads to equation (2):

$$a_{ijt} = \alpha + \beta x_{ijt} + \phi_i + \gamma_j + \mu_{ij} + \theta_t + \varepsilon_{ijt} \quad (2)$$

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:[20]

$$a_{ijt} = \alpha + \beta x_{ijt} + \mu_{ij} + \theta_t + \varepsilon_{ijt} \quad (3)$$

Equation (3) can best be estimated as a panel, either using fixed effects or random effects. Both methods have their own assumptions. Using a random effects model assumes that all explanatory variables are uncorrelated with the individual specific effects. This is less likely for the empirical problem at hand. The fixed effects model absorbs any individual specific effects, but it eliminates any time invariant effects from the model. This is a cost in the context of this study, because we are interested in the marginal effects of some time invariant factors. For instance, we like to know whether country pairs with colonial ties—a time invariant bilateral fixed factor—receive more or less aid and whether this relationship changes over time. Moreover, fixed effects would be inefficient if some of the variables are uncorrelated with the individual specific effects, since they are instrumented needlessly.

Hausman and Taylor (1981) derive an instrumental variables estimator that is between a fixed and a random effects approach. It allows some variables to be correlated with individual specific effects, yet still allows for the estimation of time invariant effects. In the Hausman and Taylor (HT) model, exogenous variables (both time-variant and time-invariant) serve as their own instruments, time-varying endogenous effects (in the sense that they are correlated with individual specific effects) are instrumented by their deviation from individual means (as in the fixed effects approach), and time-invariant endogenous effects are instrumented by individual averages of time-varying exogenous variables. As such, the HT-model allows the estimation of time-invariant effects, without imposing the strong assumption that all variables should be uncorrelated with the individual specific effects. An additional attractive feature of the HT-model is that instruments can be derived from within the model.

We therefore consider the HT-model the preferred model. The main challenge in the HT-model is deciding which of the variables are correlated with the individual specific

[20] They argue that the original Matyas model is likely mis-specified, since "it does not span the whole vector space of possible treatments of explaining variations in bilateral trade [aid] and ignoring such bilateral trade [aid] interactions may lead to biased estimation" (see further Baltagi, Egger, and Pfaffermayr, 2003).

effects and which are not. For this, Hausman and Taylor (1981) suggest mainly using economic intuition. To do so, it is useful to realize that the individual specific effects are the proportions of the errors that contain country pair specific elements not included in the model. In other words, if a variable is possibly correlated with other political, social, historical, cultural or economic aspects not included in the model, it is probably endogenous. In our specification, lagged GDP per capita, net aid per capita provided by other donors, lagged trade as a share of GDP and the CPIA can on this basis be considered to be endogenous. Obviously, the colonial ties indicator can be considered a time invariant exogenous variable.

Besides economic intuition, formal tests can help decide what model to use and which variables to consider as exogenous. Specifically, Baltagi, Bresson, and Pirotte (2003) provide a pretest estimator based on Hausman (1978) to choose between the fixed effects, random effects and HT estimator. Using this pretest estimator, we find that the HT model is preferred to the fixed effects model, which in turn is preferred to the random effects model. Nevertheless, to show robustness, we did conduct besides the HT-model fixed and random effects panel regression results and we compare the regression results of the three models.

As mentioned above, apart from allowing for the estimation of time invariant effects, the HT model is also more efficient than the fixed effects model because exogenous variables are not needlessly instrumented. This gain in efficiency is dependent on which variables are treated as exogenous/endogenous in the HT model. Furthermore, the decision on which variables are exogenous/endogenous will also affect the outcome of the second step of the pre-test estimator, where a choice is made between the fixed effects and HT estimators. Using the insight of Baltagi, Bresson, and Pirotte (2003), the Hausman specification tests (1978) can also be used to decide on what variables are to be treated as endogenous in the Hausman-Taylor model. To apply this test, we rank on the basis of economic intuition variables from least to most exogenous. We next, following this list, instrument one variable at the time, up to the point where the Hausman test (and the pre-test estimator[21]) suggests that the HT-model is no longer the most suited model (i.e., where the estimator becomes no longer statistically significant). Using this method, we find that lagged GDP, the share of bilaterals and multilaterals in total debt, the aid of other donors to the same country, and lagged trade as a share of GDP can be considered endogenous, and the remaining variables exogenous.

One other issue facing all aid studies is that for many donor-recipient country combinations aid flows are zero (in our sample about 2/3). This can introduce two types of selection bias: on the donor side: for example, as little is known about a recipient

[21] The pre-test estimator is based on a sequence of Hausman specification tests.

country and therefore it gets no aid; and on the recipient side: for example, as there is no interest on the part of the government in engaging with that particular donor country. In either case, no aid is being extended. Treating this observation as "zero aid" could bias our regression results. A Tobit analysis can account for this fact. Two other methods are first estimating a probit model to predict the chance of observing non-zero aid flows and then including the Heckman inverse Mill's ratio obtained from the first step in a second regression; or just using only non-zero observations in a simple OLS regression framework. Berthélemy and Tichit (2004) and Berthélemy (2006) show, however, that for aid flows and using a three-dimensional panel, the differences between fixed effects using non-zero observations only, Heckman, Heckman two stage using all observations, random effects or OLS are small.

This discussion would suggest that using either all observations, including zeros, or only non-zero observations is fine. We take an intermediate approach, however, since we consider a case where a donor never provides aid to a recipient different from the case where a donor did provide aid, but not every year. Specifically, we do not include those zero observations when bilateral flows are zero for the whole period, since then it is more likely that a selection was made by the donor or recipient. We do not drop, however, zero observations for country pairs that at any other point in time record non-zero aid flows. For these pairs, there is no, or at least less of, a selection issue. Rather, these donors do not disburse in every year aid to the particular donor simply due to, say, the lumpiness of projects or the peculiarities of decision processes. We make this choice on the basis of the grant component of aid flows since the net debt components can have non-zero flows due to repayments, even when there was no active engagement by the donor with the specific recipient country in a certain year.

IV. Empirical Results

This section discusses the empirical results of our aid allocation analysis. We first provide some descriptive statistics and stylized facts, followed by a detailed discussion of the results for the main specifications used.

A. Descriptive Statistics

Figure 1 shows the development of the bilateral net ODA transfers over time, measured in U.S. dollars in year 2000 constant prices, including the total as well as the disaggregation into its grant, loan and debt relief components.[22] Figure 2 presents the

[22] Grants are total bilateral grants, netted 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" is the amortization part of debt forgiveness and has to be deducted to avoid counting amortization forgiveness in ODA in future years. See further, Global

(continued…)

same data, but now on a recipient country per capita basis. Both figures show the evolution of our dependent variable: an increase of aid in constant prices in the eighties, followed by a drop from the mid nineties on, and a recovery after about 1998, with total aid volume reaching close to the early nineties peak in 2004. When disaggregating the total aid volume, it is clear that over time, 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, as well as for most of the increase in volume in the most recent years. Figure 2 shows that in per capita terms, net aid transfer remains within a fairly limited bound for the whole period, ranging between 6 and 8 (constant) dollar per person over the full period, with again an outlier in the mid-1990s. It thus shows that changes in the absolute volume of aid over time largely match the increases in recipient population over time, although in most recent years, aid per capita has not recovered to its mid-1990s level. Also, as a larger share of aid in recent years consist of debt relief granted, net transfers are even lower.

Table 2 provides the raw statistics for the dependent and independent variables used in the analysis. We find that the average net aid transfer provided by a donor to each recipient was $2.4 per capita per year, but with a large variation, the minimum being -$138 and the maximum being $9,052 per capita per year, a small country that received large aid from a single donor in a single year.[23] If we exclude zero observations, average aid per capita per donor stands at $3.80 ($4 excluding also negative entries). Of the total net aid transfer including zeros, grants was the largest component, on average per donor some $2.20 per capita per year, while net loans per donor were some $0.16 per capita per year, and debt relief being granted per donor was $0.04 per capita per year (not reported).

In terms of the other, explanatory variables, the basic statistics are as expected and indicate the large variations among countries. Recipients' GDP per capita (in 2000 prices) averages some $3,900, but varies from less than $500 to $23,266, with the latter surely not a country in need of aid. The average population size is some 2.8 million, but its standard deviation is high, 11.8 million, and in the smallest country live some 20,000 people and in the largest (China) some 1.3 billion, with no countries in the middle segment between 300 million and 1 billion people. For this reason, population is used in log terms in the regressions.

Total aid provided by donors other than the specific donor for the specific recipient country was on average some $32 per capita per year, with a high of some $9,567 per

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Monitoring Report 2007 (IMF and World Bank2007, Box 4.1, p.153) for details on DAC debt relief accounting.

[23] Figure 2 sums all aid flows and divides that by the sum of all recipient countries' populations, which means it is a weighted average of the individual countries' per capita aid flows. It differs from the number in Table 2, since that is the simple average of the individual countries' average per capita aid flows.

capita in a single year, again the small country. Since donors on average provided some $309 in net aid transfer per capita (using the population of the recipient country) to all other countries in the same year, it means that the average country received about 9 percent of an individual donor's total aid budget ($32/($309+$32)). It shows that donors are relatively fragmented in their aid allocation across countries, covering 11 countries on average.

Bilateral donor-recipient country trade as a percentage was on average 2.2 percent of recipient country GDP, but again with large variation. The average CPIA index was 3.46, but shows large variation as the index goes from a low of 0.72 to the CPIA maximum of 6, with a standard deviation of 0.88. The debt burden, measured in present value terms, was on average 181 percent of exports, but varied from less than 1 percent to a high of 6,500 percent of exports. The multilateral share of total debt was on average 33 percent and the bilateral share 38 percent, showing the importance of these two forms of official financing in total external financing for these countries. About 27 percent of countries had a PSRP at end 2004 and 18 percent of countries had passed the HIPC decision point by end 2004.

B. Regression Results

In discussing the results of our various analyses, we proceed as follows. In Table 3, we present the basic aid allocation model, including the conventional 'poverty' and 'policy' selectivity-related explanatory variables and other control variables (including the small country effect), but also adding explanatory variables related to the defensive lending (and granting) hypothesis. In this Table, we present the random effects, fixed effects and Hausman-Taylor model using the same specification to show the robustness of our main results. All next regression results presented in Tables 4–7 use the Hausman-Taylor model. In all regressions we use dependent variable observations for which we also have all independent variables, leaving us with some 48,000 observations.

In Table 4, we report the results using the period dummies that split the sample in three sub-periods to check for structural breaks, and interact these period dummies with the four effectiveness proxies. We also use annual interaction dummies and graphically present these as trends. In Table 5, we report the effects of recent changes in the aid architecture at the country level (HIPC and PRSP dummies), including interactions between the country changes (HIPC and PRSP dummies) and the policy and lending variables. We then present summaries of the regression results for the changes in sensitivities over time among donors (Tables 6 and 7). Lastly, we discuss the robustness of our regression results.

We use every time the total net aid transfer per capita provided by each donor to each recipient as the dependent variable, where the net aid measure captures the net amount of resources provided to a country, i.e., the flows of grants, net loans, debt relief (including

items such as technical assistance, emergency and food aid), incorporating also, where appropriate, interest payments paid by the recipient to the donor.

The basic aid allocation model

Table 3 shows the regression results for the random effects, fixed effects and Hausman-Taylor model using the same specification (of course, under fixed effects, we can not study the impact of time-invariant factors such as colonial linkages). While the pre-test and economic intuition suggest the HT-model to be the preferred specification, we see that there are actually very few differences. All variables have the same sign under all three specifications and are always similarly statistically significant, almost always at the same levels. The only main difference is that sometimes the sizes of the coefficients are different depending on the specific model used. Overall, however, these results confirm that the regressions are not very sensitive to the specific estimation technique, which is reassuring in terms of statistical robustness.

Focusing on the regression results for the preferred HT-model, Table 3, column 3, we find that the income level of the recipient country matters, with poorer countries receiving more aid, statistically significant at the 1 percent level. This suggests donors do care about poverty. We confirm the finding that the size of the recipient country matters, with larger countries receiving less aid. Next, very importantly, we find that on aggregate and over the whole period donors are providing aid taking into account the quality of the policy and institutional environment in the recipient country since CPIA is statistically significant positive at a 5 percent level.

In terms whether debt stocks and debt compositions affect bilateral aid flows, we find that the present value of the debt owed by the country to all creditors combined relative to a country's exports does not significantly affect the flow of net aid transfers to the country, nor do the shares of bilateral and multilateral debt in total debt. These results do not seem to indicate a phenomenon of defensive lending driving aid flows over the whole period. There may, however, been defensive lending in sub-periods and these results do not need to contradict earlier findings of defensive lending practices.[24]

As expected, we find that the more aid a donor gives in general, the less it gives to any specific country. And we see that aid by one donor is positively affected by the aid behavior of other donors, hinting at complementarity among donors, possibly due to signaling of the quality of the recipient country policies or due to better coordination. We confirm the results of others that the openness of the country to (bilateral) trade matters,

[24] Furthermore, earlier results used a log dependent variable, which means only observations with positive aid flows were used. When using that specification, we also find evidence of defensive lending in our data over the whole period.

with countries with whom the donor trades more intensely receiving more aid. This may both reflect that bilateral relationships are closer in general when trade is high as well as that donors tend to support (indirectly) their own exports to the recipient country. We confirm that colonial linkages can also drive bilateral aid flows. All these variables are statistically significant under all three specifications (except for the colonial dummy which is not included in the fixed effects regression).

We next investigate the changes over time in the key relationships to identify whether changes in the international aid architecture have led to changes in actual aid allocation behavior. As explained, we do this by using dummies for three subperiods, before 1990, 1990–98, and 1999–2004, and interacting these with the key variables—GDP per capita, policy (CPIA), population, and defensive lending (debt stock)—to see to what extent the relations of aid with these key determinants change over the periods. We do this one relationship at a time to be able to study changes in the specific relationship while keeping other factors constant as there may have been changes in several dimensions over the same period. Table 4, column 2 to 4 provide the results for the changes in sensitivities while column 1 repeats the base, Hausman-Taylor regression results (Table 3, column 3).

In terms of income, the result (Table 4, column 2) clearly shows that over time the responsiveness of aid to recipient country income has increased (in absolute terms): the coefficient evolves from an -0.434 to an -0.604 (all are highly statistically significant). This is strong evidence that donors have over time become more focused on providing aid to the poorest countries rather than to say their political allies or to countries with which they trade much.

Next we find that the small country bias becomes less over time as the coefficient for population becomes less negative, becoming two-third in size, from -1.394 to -0.733 (all are statistically significant). This decline may be because donors with the end of the cold war became less interested to support small countries to, say, buy political favors like votes in the UN. A trend that could have been offsetting the reduced small country bias is that some of the very largest countries have been able to tap into private external financial markets or otherwise were restricted in their aid flows (e.g., as they hit portfolio limits at donors). This would mean that larger countries would have been receiving even less aid funds over time, thus making the coefficient more negative. The fact that there is no offset, but rather a decline in the absolute size of the coefficient suggests that there has been an even sharper decline in the small country bias among donors.

Very importantly, aid becomes much more responsive to policy (Table 4, column 4): from being insignificant in the first period, the coefficient becomes 0.228 and statistically significant in the second period, and then increases further to 0.954 in the most recent period. This increased sensitivity confirms the growing consensus in the aid community

that donors in recent years determine their aid allocation much more on the basis of the policy and institutional environment of countries. It confirms studies by others that donors consider more and more the policy and institutional environment of the recipient in their aid allocations, with the stronger effects found for the more recent period.[25] It also explains why over the whole period we find the coefficient for CPIA to be only statistically significant at the 5 percent level, compared to 1percent for the last two periods.

The coefficients on the present value of debt stock to GDP for the subperiods provide information on the evolution of the defensive lending hypothesis. They suggest strongly that the concerns among donors about countries' debt burdens have declined over the periods. While in the early period, high debt was a reason behind lower levels of aid, as the coefficient was statistically significant negative, in the later periods aid flows were no longer significantly affected by the level of debt of the countries. This change does not, however, suggest a change in defensive lending per se, for which we also need to consider as well the composition of debt.

Additional regression results (reported in Appendix Table 1) show clear evidence that the multilateral debt share was statistically significant positive (at the 10 percent level) in the first period and became negative (but not significant) thereafter. The bilateral debt share was statistically significant positive (at the 5 percent level) as well in the first period, became negative but not statistically significant in the second period, and then became statistically significant negative in the third period. These changes in signs over the three periods suggest that, whereas donors engaged early on in defensive lending to protect multilateral and bilateral creditors, over time this bias disappeared and rather debt became a detriment to new aid flows.

For both types of creditors, defensive lending may have diminished in the later period because official debt reduction was introduced (note that these regressions, as all other regressions, still include the present value of debt, so the effects refers specially to a reduction in the shares of official debt). The more pronounced switch for the bilateral debt share may be because bilateral donors could easier substitute loans by grants. Consequently, they became more quickly less concerned about protecting their debt claims and acted faster in the standard way of reducing flows in light of high debt burdens. For multilateral creditors, the option of substituting grants for loans was much more limited. This meant their defensive lending incentives remained in effect and suppressed longer the deterrent effect of high debt burdens, leading to the statistically insignificant, although still negative sign even in the third period.

[25] A notable exception to this view is Easterly (2007) who argues that in his review of the evidence there is little or no sign of increased selectivity with respect to policy and institutions.

We complement the three sub-period analysis by considering a further split of the last period, where we split it into a pre- and post-9/11, 2001 (i.e., we consider two subperiods: 1999–2001 and 2002–04). We do this additional split in part since 9/11 may have been another event that changed the international and geopolitical paradigm and affected the nature of aid flows. Here we find (regression results are reported in Appendix Table 2) that the general progress already found appears to have further accelerated in the last period since the coefficients for income and CPIA further increase (in absolute magnitudes). The coefficient for the population variable becomes slightly more negative in the last two subperiods, whereas the debt variable remains statistically insignificant in both of the last subperiods. This suggests that the progress in the international aid architecture has indeed accelerated in the last few years.

We can also show this by running the basic set up including yearly time dummies interacted with our four key determinants, thus allowing for annual evolutions. Figures 3 to 7 provide the graphical representation of these trends. The figures include the 5 percent significance band of the various coefficients. The figures show very clearly the increase over time in the responsiveness of aid with respect to poverty and policy, and the decline in the role of country size and debt in determining aid flows. Specifically, the coefficient for income (Figure 3) decreases from -0.4 to -0.6, with the biggest drop in the early 1990s (note that the income sensitivity is always statistically significant different from zero). The coefficient for population (Figure 4) increases as well over time, with a sharper increase over the period from -1.5 to -0.7 (note that the population sensitivity is also always statistically significant different from zero). This means there is less of a small country bias during the latter part of the period.

Importantly, we see evidence of increased policy selectivity (Figure 5). The coefficient for CPIA increases from essentially 0 to 1.2, with the sharpest rise starting in the mid 1990 (note that the policy sensitivity was not statistically significant different from zero until the mid-1990s). And, finally, the coefficient for debt (Figure 6) increases from a low of -0.4 to about zero in the late 1980s/early 1990s, after which it remains stable (and statistically insignificant from zero). This confirms that debt is no longer a detriment to aid allocation, maybe due to the bilateral and multilateral debt reductions over this period. We can also consider the effects of changes in the role of colonial linkages in aid flows (Figure 7). Here we find that there is a decline as well over time, suggesting that aid is being allocated more according to economic criteria and less to historical and geopolitical concerns. Altogether, these results suggest that there have been large changes in the international aid architecture that have led to a more rational allocation of aid among countries depending more on needs and policy selectivity.

Specific international aid architecture changes

Tests so far clearly show the changes in the factors driving aid allocations and provide evidence for the impact of the new international aid architecture. We next want to analyze how (recipient) country specific policy actions related to changes in the international aid architecture affect the aid flow behavior. We use two events: when a country adopted a PRSP and when it became eligible for the HIPC-initiative (as proxied by a HIPC II decision point agreement). We create dummies for these country specific events and interact these dummies again with our standard country and policy variables. Table 5 summarizes the results, where the first regression repeats the results of Table 3, column 3.

We find that net aid flows to a country increases following adoption of a PRSP (Table 5, column 2) and when it becomes eligible for the HIPC (Table 5, column 8), since both dummy coefficients are statistically significant positive. The coefficients are actually of similar magnitudes and imply an increase in bilateral aid of about $0.40 - $0.50 per capita, a large increase since average bilateral aid is about $4 per capita. This confirms that donors consider a PRSP a sign of a good development program and "reward" a country when it adopts a PRSP. It also shows that the reduction of debt through the HIPC-initiative is a positive one for aid flows, which suggests that donors see the HIPC-debt reduction as an important means on which basis they are able and willing to reward countries.[26]

So far these results are as expected, since donors often explicitly link aid flows to PRSP and HIPC. More interesting are the effects of these actions on the willingness and ability of donors to be selective with respect to our four key determinants of effectiveness, poverty, policy, defensive lending and population. We investigate this by interacting the PRSP or HIPC dummies with these four variables, while including the PRSP or HIPC dummies, as well as the other standard determinants, independently in the regressions.

With respect to PRSP, the results show no statistically significant increased responsiveness to income levels nor does aid seem extra responsive to policy, debt or population following a PRSP. The same goes for HIPC, with the interactions generally not statistically significant or meaningful. The statistically significant and positive sign for the HIPC dummy interacted with CPIA could suggest that policy matters more for aid

[26] There are some caveats. Specifically, the increase in aid flows may come as debt relief, new debt flows, or grants. To the extent that aid flows are overestimated because debt relief is measured as net transfers, the HIPC debt reduction may led to a measured, but not real increase in aid flows. Furthermore, whether this benefits the country is a separate question. An increase in aid in the form of debt flows following debt reduction may be less beneficial when, as some have argued, the reduction in debt is just creating free headroom for other lenders. See the discussion around the latest debt sustainability analysis, for example, IDA and IMF (2006).

flows once countries have received HIPC debt reduction. But since the HIPC dummy itself becoming negative and significant, this is not obvious.[27]

The regression results do, however, show effects of reduced defensive lending. The interactive dummies for the debt shares (Table 4, column 7 and 13) show clearly that the adoption of a PSRP and the eligibility for HIPC (further) reduce the importance of debt composition in aid flows, with the effects of multilateral and bilateral debt shares statistically significant for both the PRSP and HIPC dummy. Donors give less aid to countries with large debt shares to both multilaterals and bilaterals when they have a PRSP (column 7) with the bilateral effect most pronounced. The evidence that HIPC debt reduction re-introduces or enhances selectivity in donors' behavior through reduced defensive lending is equally strong for multilateral and bilateral debt shares (column 13). This country-specific evidence supports the argument that the buildup of (multilateral) official debt in the earlier period made donors lose (part of) their selectivity, which seems to have been regained when the decision to reduce debts is taken at the individual country level.

Changes over time among donors

From the regression results so far, we have found that there is a clear pattern of increased selectivity of donors over time and reduced influence of colonial factors. We also found evidence that the countries' adoption of PRSP and eligibility for HIPC debt reduction affect aid flows. This is good news for the international aid architecture in that more selectivity can enhance the development impact of aid. It confirms analysis that finds that donors in general have improved their quality of aid.[28] The question is whether we can identify, besides the general improvement, particular changes at individual donors that may have contributed to this increased overall selectivity. Existing research (e.g., Berthélemy, 2006; Dollar and Levin, 2006) has already highlighted differences among donors, with some donors having more altruistic objectives while others having more geo-political interests. There is also some evidence that donors vary in the degree to which they have improved their selectivity and quality of aid. Dollar and Levin (2006), for example, show improvements among some but not all donors with respect to policy selectivity.

[27] The other exception is the income responsiveness. While statistically significant, the positive sign is counter intuitive.

[28] In a comprehensive assessment of donors' attitude towards aid, the Center for Global Development's *Commitment to Development Index* (see Roodman, 2005)—covering not only aid flows, but also investment, security and migration—shows for 21 major donor countries—the same countries as in our sample except Luxembourg—an average improvement between 2003 and 2007 in the index (which runs from 1 to 10) from 5.1 to 5.3. Over the same period, the *Index* suggests some convergence among donors, with the standard deviation going from 1.03 to 0.84 between 2003 and 2007.

The question is whether within our framework we also find evidence that these differences exist, whether they have changed over time and for which donors specifically. Analyzing these (changing) differences among donors within our empirical framework may help identify what institutional changes for which donor(s) have helped bring about the changes. We conduct such an exercise by deriving the elasticities of individual donors with respect to our four key selectivity measures, poverty, policy, defensive lending and population. We do this within our panel approach, keeping all other control variables the same for all donors, but allowing the coefficients for each donor to differ and to vary over the three time periods by using donor-specific and sub-period varying dummies interacted with the key measures.

Table 6 reports the averages of the coefficients for the three periods by donor, where the donors are sorted by the degree of sensitivity with respect to the CPIA variable. It shows the large differences among donors, with the sensitivity with respect to CPIA to vary between -0.278 for Italy to 0.969 for the United Kingdom, making the U.K. much more policy sensitive than Italy. In terms of GDP per capita, the average sensitivity varies from -2.357 for the United States to 0.863 for Japan, suggesting that the U.S. aid is much more geared towards the poorest countries than Japan's aid is. In terms of population, the average sensitivity varies from -3.157 for the United Kingdom to -1.481 for Canada, suggesting that aid from the United Kingdom is more geared towards smaller countries than Canada is. Finally, the average sensitivity with respect to debt burden varies from -0.307 for France to 0.171 for the United States, suggesting that for France debt is more a detriment to aid flows than it is for the United States. While not all these coefficients are statistically significant, these results show the large differences among donors.

The detailed results for the individual donors confirm the general improvement in selectivity over time. The average sensitivities across the 22 donors for the three periods, reported in Table 7, show an increase in sensitivity with respect to income, a sharp increase in sensitivity with respect to CPIA, a lowering of the bias towards smaller countries and a reduced concern over debt burdens. We also find (not reported) that there is less variability among donors over time in the CPIA dimension (as measured by a decline in the coefficient of variation in the sensitivities), suggesting that donors have become more homogeneous in their aid allocations and generally more focused on recipient countries' progress and prospects with development. The results thus suggest that the improvement in the selectivity of donors, although not uniform, has been quite general.

Figures 8a and 8b show this improvement and sense of convergence by plotting for each donor the coefficients for the four dimensions for the three periods. The clearest is the general improvement for the CPIA dimension (Figure 8b), where for all donors (except the U.S.) sensitivities were much higher in the late 1990s than before. This is followed by the population dimension (Figure 8c), where sensitivities are uniformly higher, i.e., less

negative, but the magnitude of change is somewhat less. This improvement is also the case for debt (Figure 8d) where generally, but not uniformly coefficients increase towards zero. It is the case in the dimension GDP per capita (Figure 8a) where progress is less obvious as the increase in coefficients (in absolute value) is less consistent across the donors and significant differences remain among donors. Overall, the figures suggest clear improvements and convergence in reducing the bias towards small countries, increasing policy selectivity, and lowering concerns over debt burdens, and somewhat increasing income sensitivities.

Robustness

In addition to these tests, we conduct a number of robustness tests. Our panel regression results are dependent—in terms of their statistical advantages over other regression techniques—on the degree of homogeneity in the data. With much heterogeneity, however, the panel approach offers little gains and possibly some costs. We thus need to consider whether we have homogeneity in all our three dimensions: over time, and across donors and recipients. We did investigate the time dimensions as well as some aspect of donor heterogeneity. It is somewhat easier to check whether we have homogeneity in the donor dimension, since we have fewer donor than recipient countries. We checked for heterogeneity in the sensitivity of bilateral aid flows to the most important variables — poverty, policy, size and debt burden—by running individual aid allocation regressions for each donor separately; and by running the aid allocation regressions by groups of similar-like donors. In terms of heterogeneity among recipient countries, we ran the aid allocation regressions by similar-like recipients, grouping them by income level, score on the CPIA index, and size of country. Most of these results confirmed the general panel regression results, although with generally reduced statistically significance. The most important exception is of course that the respective variables by which we group countries are not as statistically significant (e.g., when we group recipients by level of income, income is no longer as significant). For space reasons, we do not report these robustness results.

V. CONCLUSIONS

We study how the behavior of bilateral aid flows to individual countries has changed over time and in responses to institutional changes. We observe behavioral changes over time in actual aid flows towards what appears to be more optimal allocations of resources across countries. Specifically, over time the roles of poverty and the countries' policy and institutional environment increase, and the small country effect reduces. The role of debt burden in deterring aid flows also declines and we find no evidence of defensive lending in recent periods driving overall flows. At the individual country level, debt relief, especially through the HIPC Initiative, and the adoption of PRSPs, reduced the importance of the share of official (bilateral and multilateral) debt in determining aid flows. Almost all of these changes occur in the 1990s and are intensified more recently.

We conclude that these changes are related to reforms of the overall institutional environment, the "international aid architecture." While these are very encouraging signs, we are left unsure as to what specific institutional changes at the international or donor level may have been driving changes in behavior. There have been a number of changes in long-standing multilateral financial institutions—such as the IMF, World Bank, Paris Club, other consultative group meetings etc.—and we can suspect these changes have affected the behavior of bilateral aid flows. We also know that there has been more attention paid to aid allocation in the latter part of the 1990s, in part due to research started in the mid-1990s. But which of these changes specifically has had the beneficial impacts we find remains to be analyzed. Further precision in the institutional factors driving changes in behavior is important though since this could help make the international aid system work better for developing countries.

We did show that recipient country specific actions such as PRSP and HIPC can matter for the amount and quality of aid flows. We also confirmed that individual donors differ as to their degree of altruism and selectivity relative to their other—economic, geopolitical and historical—interests. This suggests that part of the reasons for the changes in behavior observed lie in changes in the institutional environment in the donor countries. We can get some more insights into this relationship when we correlate the donors' score on the CGD Commitment to Development Index (CDI; see further Roodman, 2005) with the various governance indexes of Kaufmann, Kraay, and Mastruzzi (KKM, 2004) of the donors' institutional environments. The KKM indexes cover Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. We do this for the year 2006 and for the 21 countries for which we have data for both set of indexes (the CDI is not available for Luxembourg).

We find strong positive correlations, i.e., those donor countries with better governance tend to be more committed to development and, among others, provide aid in a more development-friendly manner. Interestingly, the strongest correlation of the CDI is with the voice and accountability index (0.81), followed by strong correlations with the government effectiveness and control of corruption indexes (both 0.75). As also will be clear from Figure 9, these are quite high correlations. The lowest correlation is with political stability (0.26).[29] While this is admittedly a crude analysis, it nevertheless suggests that the quality of aid and its allocation is not independent of the institutional environments in the donor countries. The associations specifically suggest that the way

[29] The correlations are somewhat less strong for the specific quality of aid CDI index. The correlation with the KKM voice and accountability index, for example, is now 0.67. This somewhat lower correlation suggests that aid allocation is not just related to the donors' overall institutional environments but also to the institutional setup, and consequent behavior, of the specialized agencies involved in aid budgets.

preferences of citizens in the donor country are taking into account matters for how aid gets allocated; and a greater government effectiveness and a lower presence of corruption in the donor country seem to make selectively less likely. As such, it would be desirable if future analysis and research of the international aid architecture takes into account not just the policy and institutional environment in the recipient countries, but also that in donor countries. This may be the next research agenda.

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Table 1. List of Variables, Description, and Sources

Net aid transfer pc =	net aid transfer per capita	DAC
Lagged GDP/capita =	GDP per capita at PPP rates and in 2000 prices, lagged 1 year	WDI
Log (population) =	the log of population	WDI
CPIA =	Country Policy and Institutional Assessment score	World Bank
PV debt =	the present value of debt as a ratio to exports of goods and services	World Bank
Net aid others =	net aid per capita provided by all other donor	DAC
Donor net aid sum =	the sum of net aid provided by the specific donor	DAC
Lagged bilateral trade =	the sum of bilateral donor–recipient country exports and imports scaled by recipient country GDP, lagged 1 year	IMF DOT
Multilateral debt share =	the share of multilateral debt in total debt	GDF/WDI
Bilateral debt share =	the share of bilateral debt in total debt	GDF/WDI
HIPC =	a dummy if the country passed the HIPC decision point	Own
PRSP =	a dummy if the country adopted a PRSP	Own
Colony =	a dummy taking the value of 1 if the donor country pair has colonial history	Own

Table 2. Descriptive Statistics of Variables Used
(USD, unless indicated otherwise)

	Number of observations	Mean	Standard Deviation	Minimum	Maximum
Dependent variable					
Net aid transfer per capita					
All observations	90516	2.39	42.89	-137.56	9052
Non-zeros observations	56264	3.84	54.35	-137.56	9052
Positive observations	53649	4.08	55.64	0.00	9052
Independent variables					
Lagged GDP/capita ($)	67980	3900	3363	466	23266
Population	103972	2.8mn	11.8mn	19700	1.3 bn
CPIA	65252	3.46	0.88	0.72	6.00
PV debt (percent of goods and services exports)	75592	181.0	329.0	0.00	6510
Net aid others ($)	90516	32.5	108.0	-129.2	9567
Donor net aid sum ($)	90516	308.6	648.6	-18.6	10399
Lagged bilateral trade (percent of GDP)	70621	2.20	12.2	0.00	1543
Multilateral debt share (percent)	81114	32.6	23.6	0.00	100
Bilateral debt share (percent)	81114	38.3	23.1	0.00	100

Table 3. Fixed Effects, Random Effects, and Hausman-Taylor Estimations

	(1)	(2)	(3)
	Fixed effects	Random effects	Hausman Taylor
Lagged GDP/capita	-0.651**	-0.323**	-0.598**
	(0.046)	(0.035)	(0.043)
Log (population)	-2.055**	-0.808**	-1.013**
	(0.45)	(0.063)	(0.097)
CPIA	0.0795+	0.109*	0.0898*
	(0.045)	(0.044)	(0.044)
PV debt	-0.00331	0.00123	-0.00366
	(0.011)	(0.010)	(0.010)
Net aid others	6.080**	9.262**	6.602**
	(1.12)	(1.06)	(1.10)
Donor net aid sum	-0.297**	-0.205**	-0.252**
	(0.044)	(0.043)	(0.043)
Lagged bilateral trade	12.22**	19.83**	13.22**
	(1.11)	(1.02)	(1.09)
Multilateral debt share	-0.114	0.285	-0.161
	(0.35)	(0.31)	(0.33)
Bilateral debt share	0.231	0.347	0.171
	(0.27)	(0.26)	(0.27)
Colony	-	7.379**	7.543**
	(-)	(0.56)	(0.90)
Constant	34.86**	13.76**	18.13**
	(7.09)	(1.08)	(1.58)
Observations	47883	47883	47883
Number of bilateral effects	2349	2349	2349

Note: Robust standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1. Hausman specification test comparing fixed effects and random effects: $\chi^2(36)=496.89$ (p=0.000); Hausman specification test comparing fixed effects with Hausman-Taylor: $\chi^2(36)=46.55$, p=0.112. The variables Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt, and CPIA are endogenous in Hausman-Taylor.

Table 4. Basic Regression Results

	(1)	(2)	(3)	(4)	(5)
		Variables Interacted with Time-Period Dummies			
	Base regression (HT)	Lagged GDP/capita	Log (population)	CPIA	PV debt
Lagged GDP/capita	-0.598**		-0.527**	-0.739**	-0.588**
	(0.043)		(0.043)	(0.046)	(0.044)
Log (population)	-1.013**	-1.084**		-1.065**	-1.012**
	(0.097)	(0.11)		(0.097)	(0.097)
CPIA	0.0898*	0.102*	0.125**		0.0664
	(0.044)	(0.044)	(0.044)		(0.044)
PV debt	-0.00366	-0.00849	0.0141	0.00224	
	(0.010)	(0.010)	(0.010)	(0.011)	
Net aid others	6.602**	5.678**	0.887	4.811**	6.225**
	(1.10)	(1.11)	(1.15)	(1.12)	(1.10)
Donor net aid sum	-0.252**	-0.263**	-0.251**	-0.251**	-0.252**
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Lagged bilateral trade	13.22**	13.02**	12.90**	13.15**	13.18**
	(1.09)	(1.08)	(1.08)	(1.09)	(1.09)
Multilateral debt share	-0.161	-0.565+	0.406	0.0734	-0.156
	(0.33)	(0.34)	(0.34)	(0.33)	(0.33)
Bilateral debt share	0.171	0.322	0.226	0.253	0.225
	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Colony	7.543**	7.537**	7.495**	7.538**	7.544**
	(0.90)	(1.03)	(0.95)	(0.90)	(0.90)
*dummy1970-1989		-0.434**	-1.394**	-0.0539	-0.0765**
		(0.051)	(0.10)	(0.051)	(0.020)
*dummy1990-1998		-0.567**	-1.017**	0.228**	0.00883
		(0.048)	(0.10)	(0.067)	(0.011)
*dummy1999-2004		-0.604**	-0.733**	0.954**	-0.0150
		(0.044)	(0.10)	(0.11)	(0.030)
Constant	18.13**	18.76**	23.87**	19.78**	18.21**
	(1.58)	(1.76)	(1.67)	(1.64)	(1.59)
Observations	47883	47883	47883	47883	47883
Number of bilateral effects	2349	2349	2349	2349	2349

Note: Robust standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1. All regressions use the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt, and CPIA as endogenous.

Table 5. Expanded Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Lagged GDP/capita	-0.598**	-0.570**	-0.573**	-0.569**	-0.566**	-0.569**	-0.568**	-0.587**	-0.589**	-0.591**	-0.591**	-0.591**	-0.585**
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
Log (population)	-1.013**	-1.031**	-1.025**	-1.025**	-1.024**	-1.025**	-1.031**	-1.034**	-1.029**	-1.041**	-1.043**	-1.049**	-1.034**
	(0.097)	(0.098)	(0.097)	(0.098)	(0.098)	(0.098)	(0.098)	(0.099)	(0.098)	(0.100)	(0.099)	(0.10)	(0.099)
CPIA	0.0898*	0.0914*	0.0915*	0.0888*	0.0905*	0.0910*	0.0922*	0.0859+	0.0852+	0.0804+	0.0865*	0.0835+	0.0868*
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
PV debt	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.000	-0.003	-0.001	-0.00134	0.00196
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
Net aid others	6.602**	6.628**	6.596**	6.620**	6.651**	6.651**	6.527**	6.437**	6.248**	6.307**	6.381**	6.321**	6.256**
	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)	(1.10)
Donor net aid sum	-0.252**	-0.254**	-0.253**	-0.254**	-0.254**	-0.254**	-0.254**	-0.255**	-0.253**	-0.255**	-0.255**	-0.256**	-0.255**
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Lagged bilateral trade	13.22**	13.17**	13.17**	13.16**	13.17**	13.16**	13.16**	13.18**	13.18**	13.14**	13.17**	13.15**	13.17**
	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)
Multilateral debt share	-0.161	-0.462	-0.462	-0.465	-0.454	-0.468	-0.447	-0.349	-0.330	-0.380	-0.363	-0.357	-0.341
	(0.33)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)
Bilateral debt share	0.171	0.161	0.143	0.154	0.164	0.162	0.215	0.188	0.178	0.214	0.192	0.205	0.274
	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Colony	7.543**	7.551**	7.554**	7.551**	7.550**	7.552**	7.549**	7.534**	7.533**	7.535**	7.533**	7.533**	7.532**
	(0.90)	(0.91)	(0.90)	(0.91)	(0.91)	(0.91)	(0.91)	(0.93)	(0.91)	(0.93)	(0.93)	(0.94)	(0.92)
PRSP		0.469**	0.196	-1.664	0.339	-0.339	3.097*						
		(0.16)	(0.26)	(1.68)	(0.26)	(2.08)	(1.46)						
HIPC								0.406**	-0.104	-2.906*	0.601*	-2.762	4.515**
					PRSP			(0.15)	(0.25)	(1.41)	(0.27)	(2.02)	(1.55)
*Lagged GDP/capita			0.155						0.368**				
			(0.12)						(0.14)				
*CPIA				0.614						0.980*			
				(0.48)						(0.41)			
*PV debt					0.065						-0.071		
					(0.10)						(0.083)		
*log (population)						0.050						0.197	
						(0.13)						(0.13)	
*multilateral debt share							-2.519+						-4.103*
							(1.52)						(1.61)
*bilateral debt share							-3.408*						-4.729**
							(1.73)						(1.75)
Constant	18.13**	18.70**	18.64**	18.29**	18.26**	18.28**	18.67**	18.48**	18.75**	18.62**	18.95**	19.06**	18.44**
	(1.58)	(1.61)	(1.60)	(1.60)	(1.61)	(1.61)	(1.61)	(1.63)	(1.61)	(1.63)	(1.63)	(1.65)	(1.62)
Observations	47883	47883	47883	47883	47883	47883	47883	47883	47883	47883	47883	47883	47883
Number of bilat effects	2349	2349	2349	2349	2349	2349	2349	2349	2349	2349	2349	2349	2349

Note: Robust standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1. All regressions use the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt, CPIA and HIPC as endogenous.

Table 6. Donor Specific Sensitivities With Respect to Country Variables
(Average three periods; data are sorted by the sensitivity w.r.t. CPIA)

	Lagged GDP/capita	CPIA	Log (population)	PV Debt
Italy	0.215	-0.278	-1.604	0.107
Luxembourg	-0.710	0.047	-1.885	-0.068
United States	-2.357	0.050	-1.657	0.171
Finland	-0.175	0.135	-1.952	0.006
Norway	-0.599	0.156	-2.033	0.022
New Zealand	0.017	0.189	-1.943	-0.036
Greece	-0.129	0.192	-2.023	-0.081
Ireland	-0.113	0.203	-1.964	-0.020
Switzerland	-0.167	0.239	-1.991	-0.013
Austria	-0.157	0.251	-2.051	-0.016
Sweden	-0.602	0.253	-2.263	0.033
Netherlands	0.003	0.287	-2.049	-0.049
Portugal	0.035	0.345	-1.915	-0.031
Denmark	-0.234	0.400	-1.986	-0.023
Belgium	-0.720	0.416	-1.945	-0.113
France	-1.072	0.475	-2.540	-0.307
Canada	-1.392	0.481	-1.481	-0.071
Australia	-0.226	0.700	-2.198	-0.040
Japan	0.863	0.702	-1.945	0.056
Spain	-0.390	0.705	-2.063	0.046
Germany	-0.747	0.737	-2.445	-0.201
United Kingdom	-2.100	0.969	-3.157	-0.160

Note: Results of regressions using the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt and CPIA as endogenous.

Table 7. Average Sensitivity

Period	Lagged GDP/capita	CPIA	Log (population)	PV Debt
1970-1989	-0.376	-0.067	-2.396	-0.089
1990-1998	-0.515	0.185	-2.031	-0.001
1999-2004	-0.545	0.899	-1.765	-0.017

Note: Results of regressions using the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt and CPIA as endogenous.

Figure 1. Bilateral Net ODA Transfers (1970–2004; millions of USD at year 2000 constant prices)

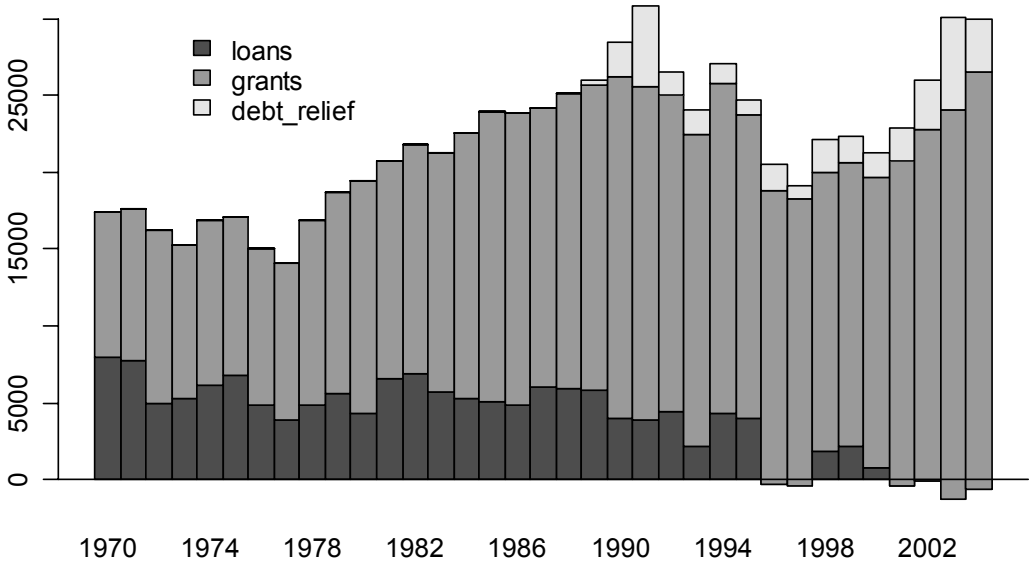


Figure 2. Recipient Country Per Capita Bilateral Net ODA Transfers (1970–2004; USD at year 2000 constant prices)

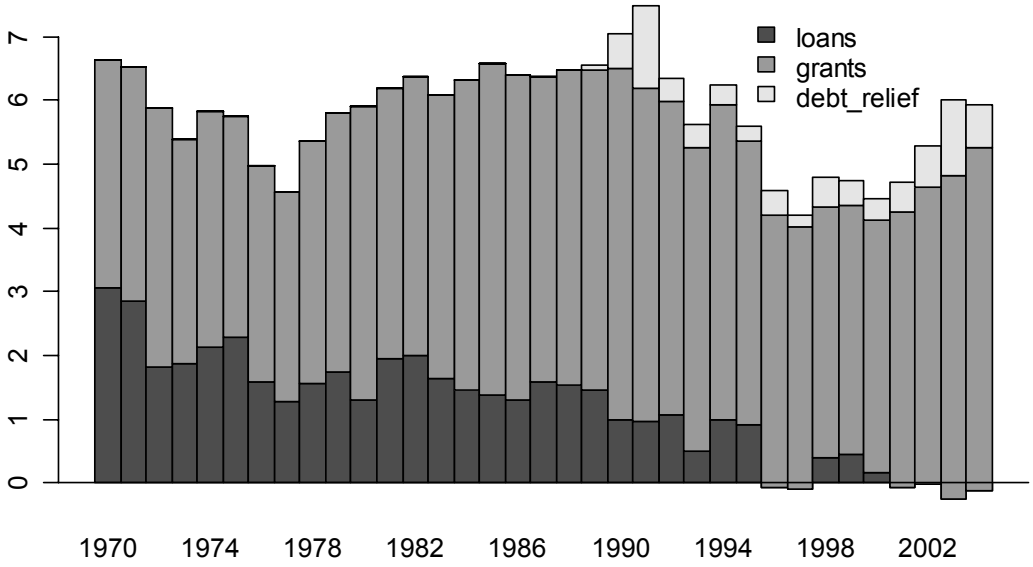


Figure 3. Evolution of Responsiveness of Aid to Countries' GDP per Capita

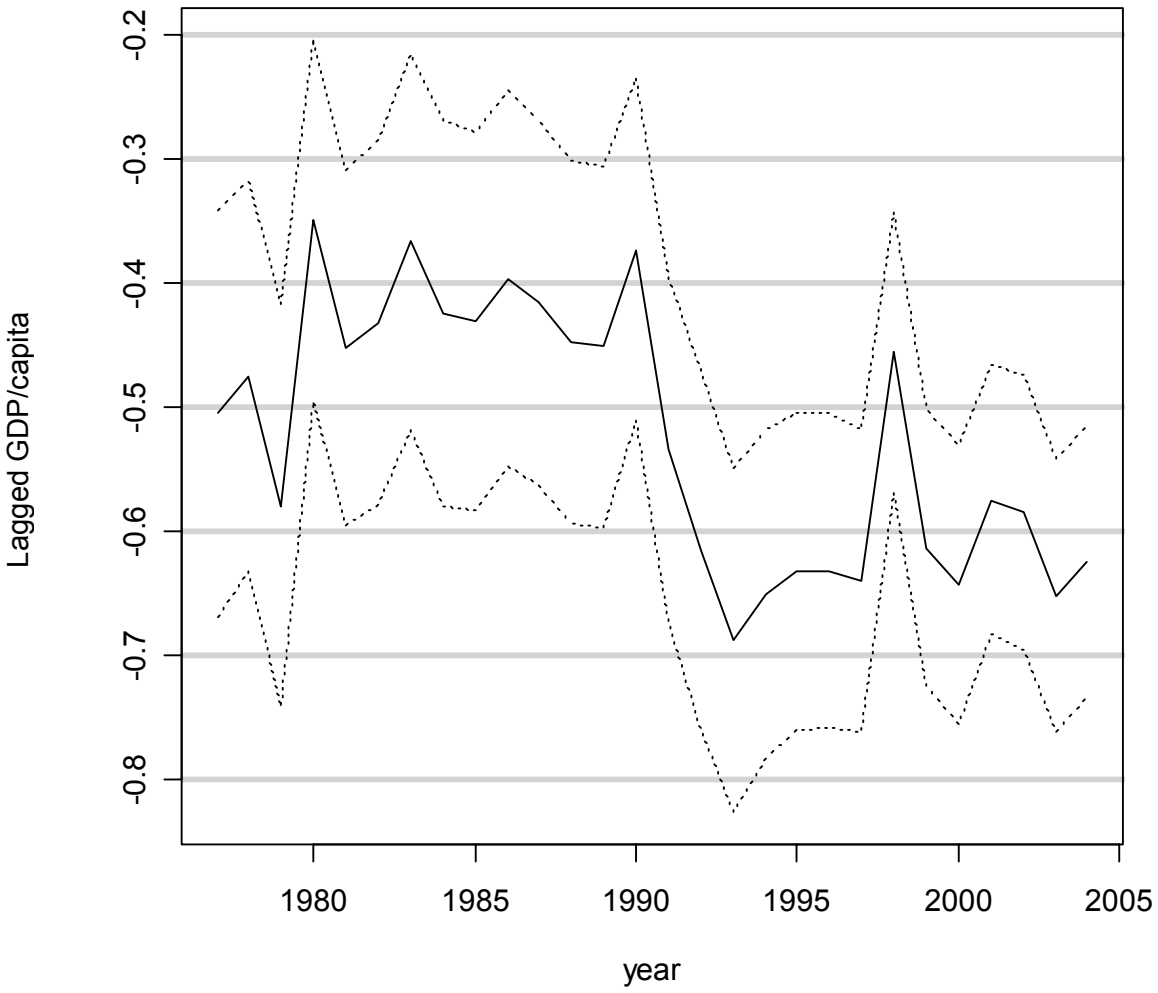


Figure 4. Evolution of Responsiveness of Aid to Countries' Population

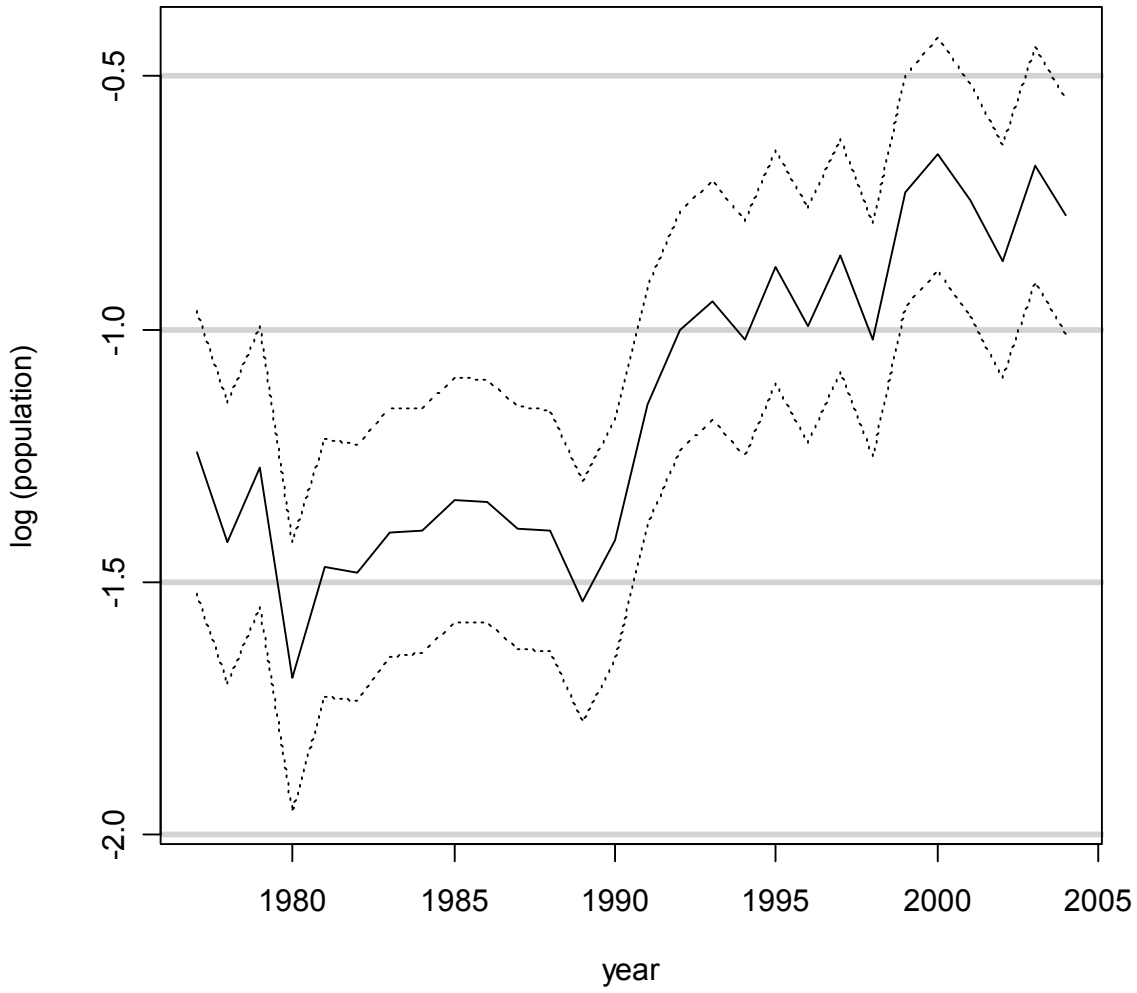


Figure 5. Evolution of Responsiveness of Aid to Countries' Policy

Figure 6. Evolution of Responsiveness of Aid to Countries' Debt

Figure 7. Evolution of Responsiveness of Aid to Colonial Linkages

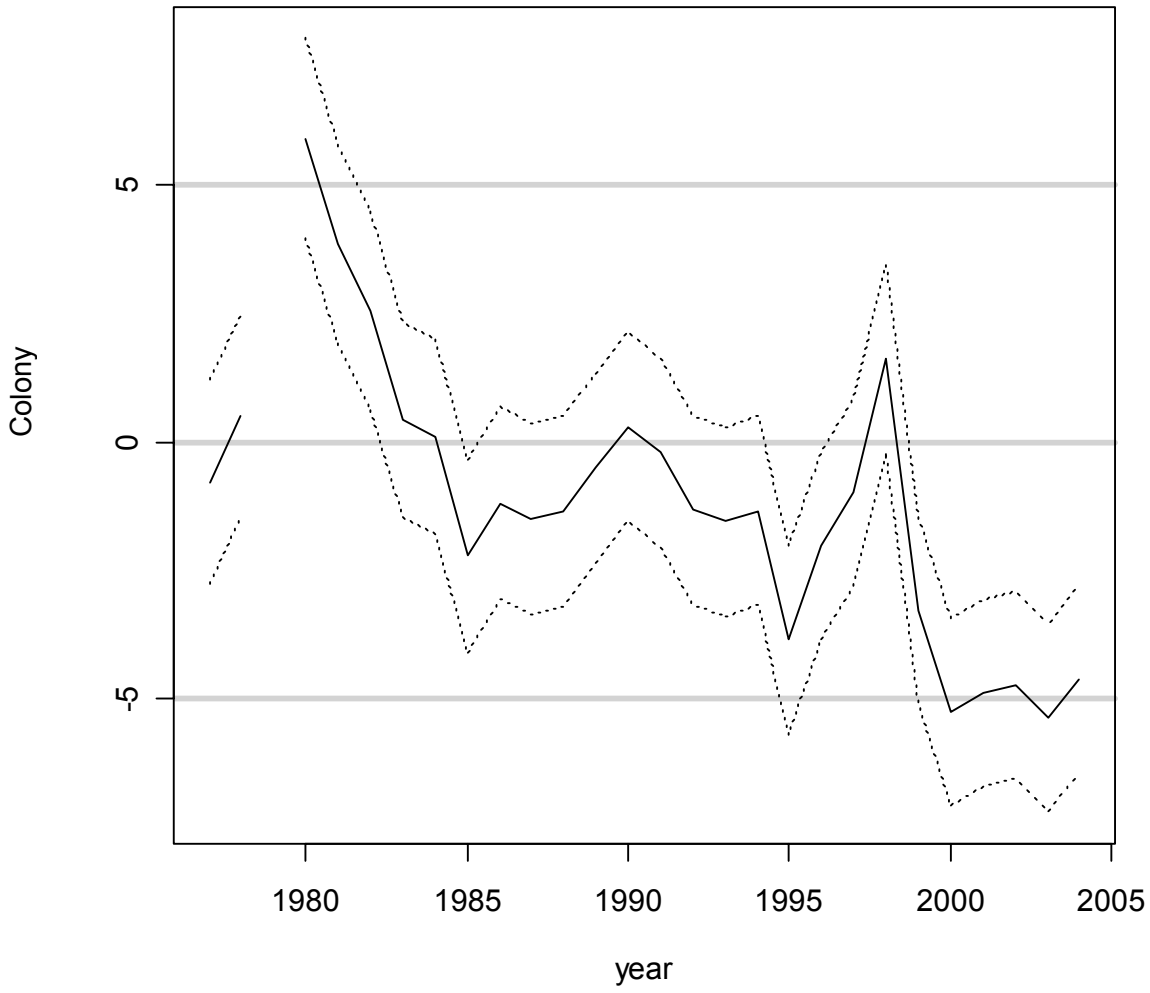


Figure 8a. Time-Varying, Donor-Specific Sensitivities for CPIA

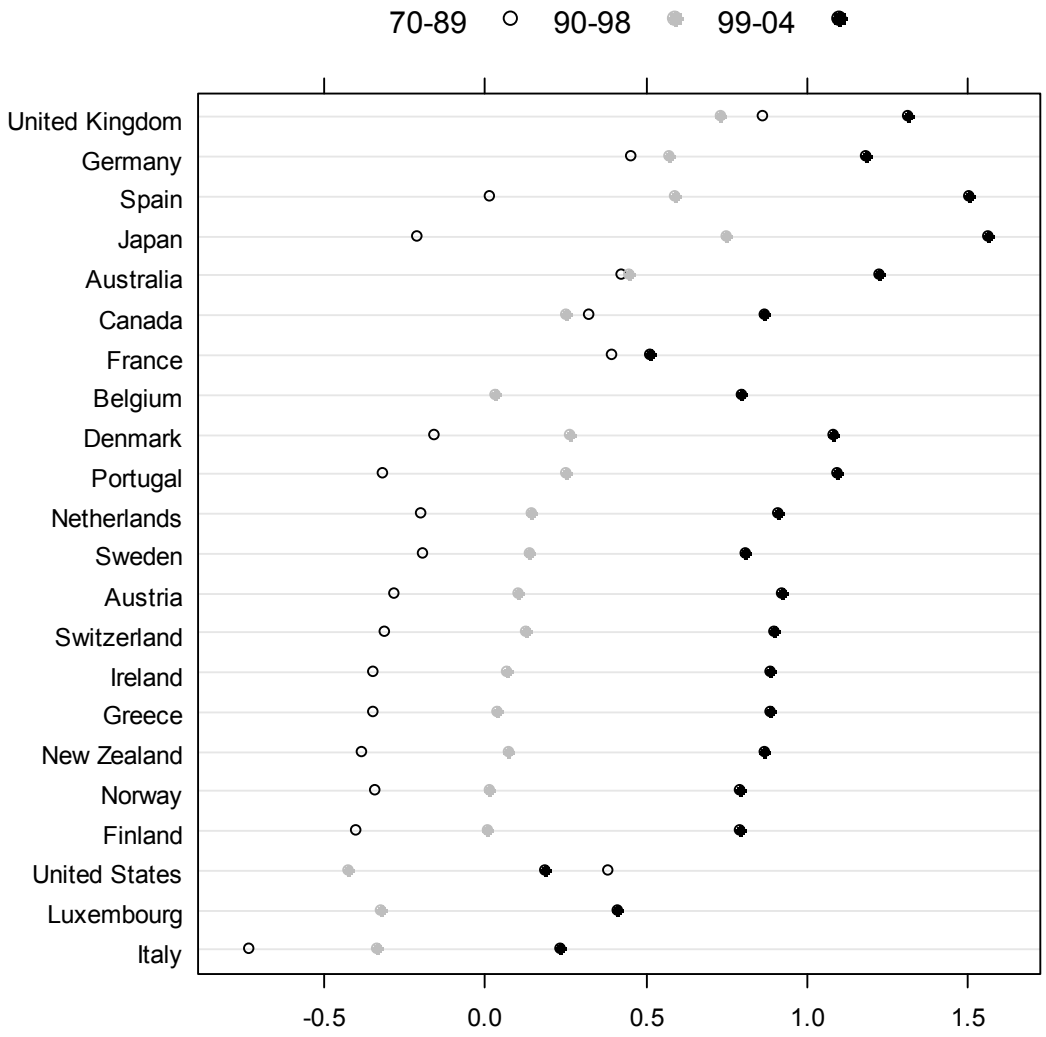


Figure 8b. Time-Varying, Donor-Specific Sensitivities for GDP per Capita

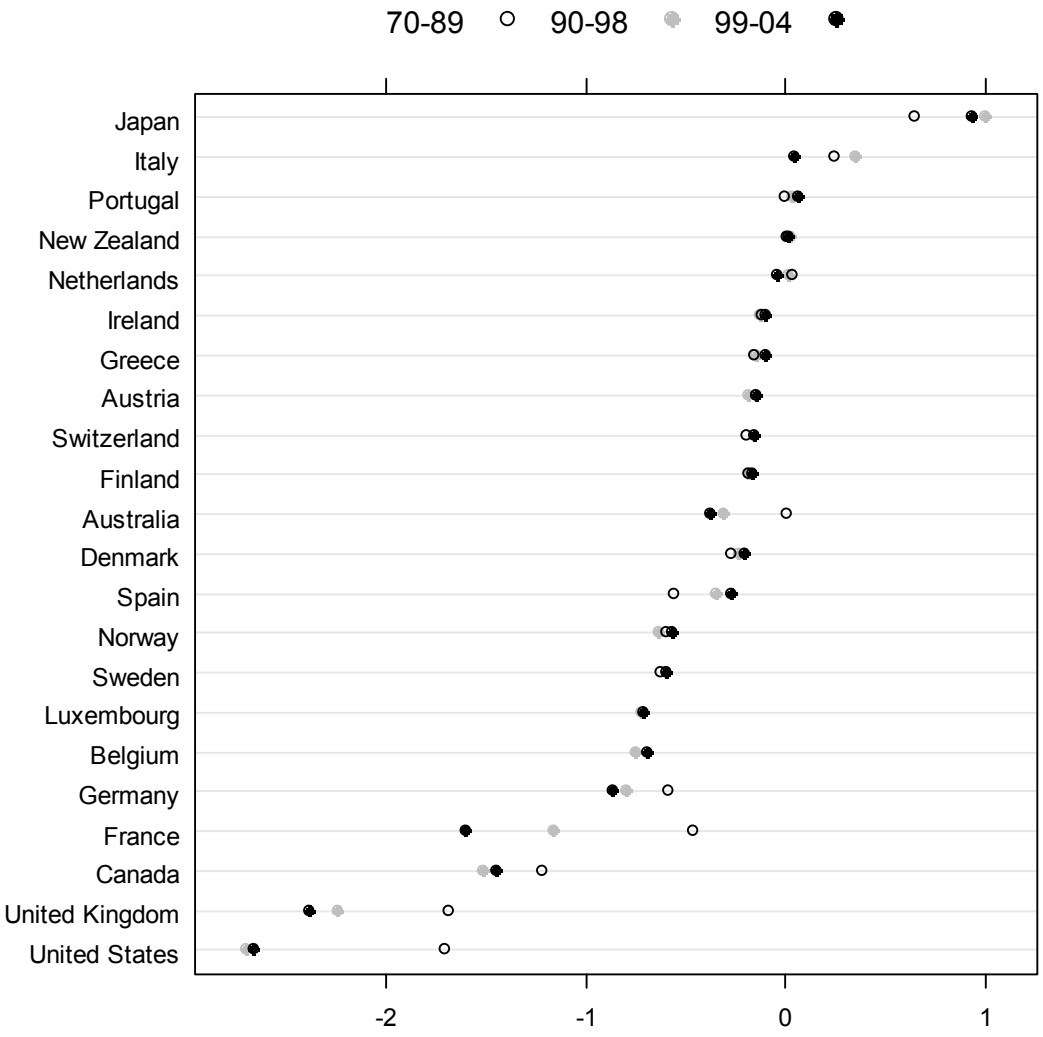


Figure 8c. Time-Varying, Donor-Specific Sensitivities for (log) Population

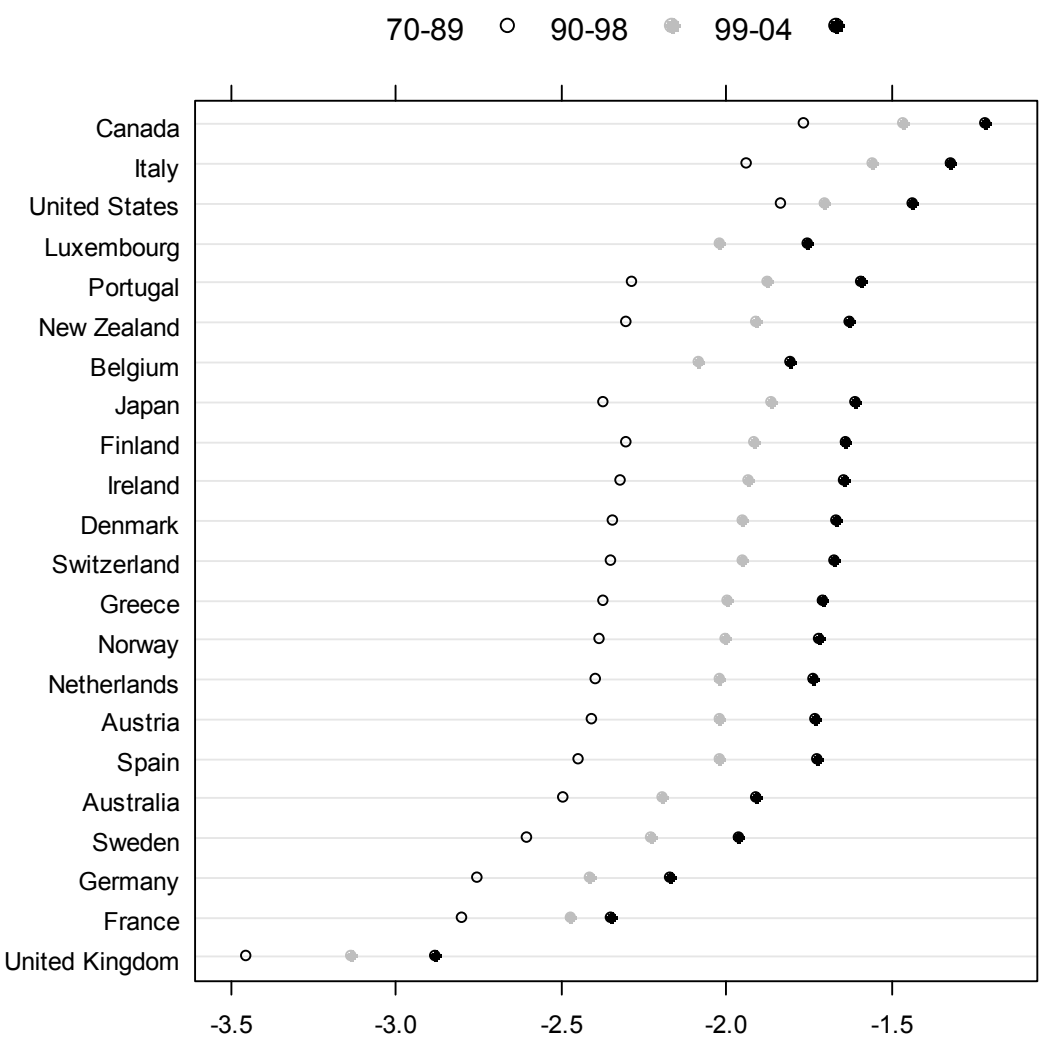


Figure 8d. Time-Varying, Donor-Specific Sensitivities for PV Debt

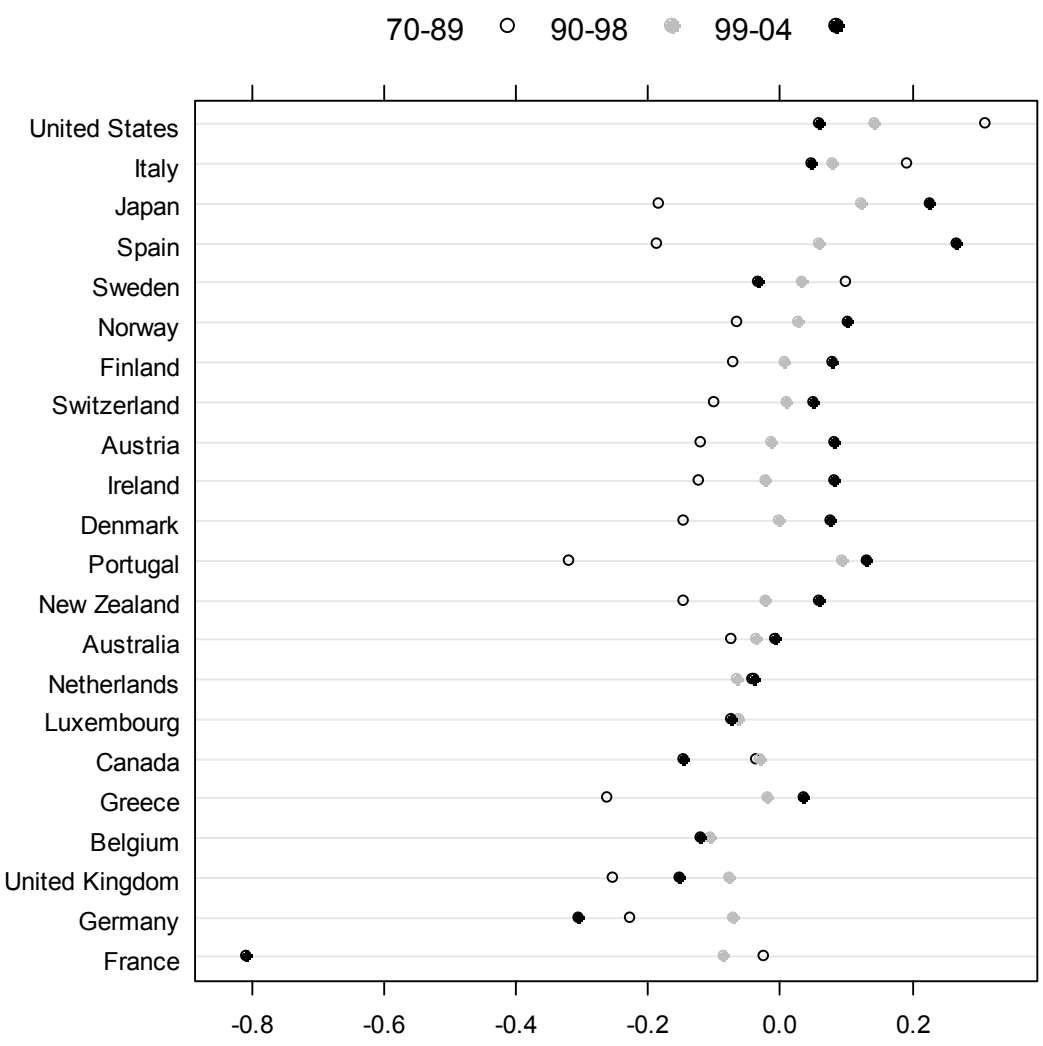
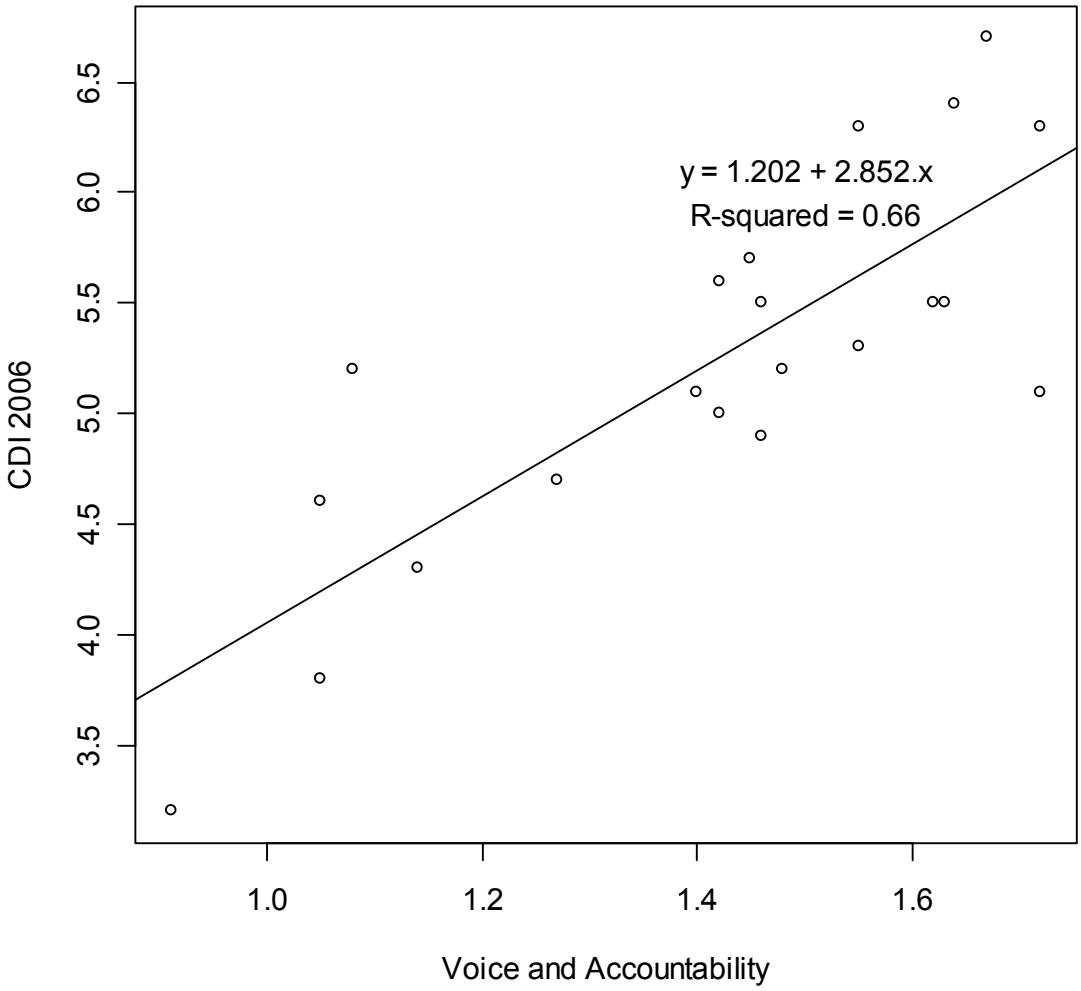


Figure 9. Relationship between KKM Voice and Accountability and CGD Commitment to Development Index



Appendix: Additional Regression Results

Appendix Table 1: Expanded Regression Results for Debt Shares Interacted with Time Periods

	Base regression results (HT)	Multilateral debt share interacted	Bilateral debt share interacted
Lagged GDP/capita	-0.598**	-0.487**	-0.627**
	(0.043)	(0.040)	(0.044)
Log (population)	-1.013**	-0.947**	-1.002**
	(0.097)	(0.095)	(0.094)
CPIA	0.0898*	0.104*	0.106*
	(0.044)	(0.044)	(0.044)
PV debt	-0.00366	0.00223	-0.00198
	(0.010)	(0.011)	(0.011)
Net aid others	6.602**	7.462**	5.889**
	(1.10)	(1.09)	(1.11)
Donor net aid sum	-0.252**	-0.251**	-0.249**
	(0.043)	(0.043)	(0.043)
Lagged bilateral trade	13.22**	13.07**	13.23**
	(1.09)	(1.09)	(1.09)
Multilateral debt share	-0.161		-0.0246
	(0.33)		(0.34)
Bilateral debt share	0.171	-0.0242	
	(0.27)	(0.27)	
Colony	7.543**	7.561**	7.541**
	(0.90)	(0.89)	(0.87)
*dummy1970-1989		0.684+	1.067**
		(0.40)	(0.31)
*dummy1990-1998		-0.0841	-0.300
		(0.37)	(0.34)
*dummy1999-2004		-0.478	-0.881*
		(0.36)	(0.36)
Constant	18.13**	16.60**	17.64**
	(1.58)	(1.56)	(1.55)
Observations	47883	47883	47883
Number of bilateral effects	2349	2349	2349

Note: Robust standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1. All regressions use the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt, CPIA and HIPC as endogenous.

Appendix Table 2: Basic Regression Results for Variables Interacted with Four Period Splits

	Base regression (HT)	Variables Interacted with Time-Period Dummies			
		Lagged GDP/capita	Log (population)	CPIA	PV debt
	(1)	(2)	(3)	(4)	(5)
Lagged GDP/capita	-0.598**		-0.528**	-0.741**	-0.588**
	(0.043)		(0.043)	(0.046)	(0.044)
Log (population)	-1.013**	-1.101**		-1.064**	-1.014**
	(0.097)	(0.11)		(0.097)	(0.097)
CPIA	0.0898*	0.102*	0.126**		0.0662
	(0.044)	(0.044)	(0.044)		(0.044)
PV debt	-0.00366	-0.00857	0.0140	0.00181	
	(0.010)	(0.010)	(0.010)	(0.011)	
Net aid others	6.602**	5.662**	0.819	4.780**	6.228**
	(1.10)	(1.11)	(1.15)	(1.12)	(1.10)
Donor net aid sum	-0.252**	-0.263**	-0.251**	-0.251**	-0.252**
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Lagged bilateral trade	13.22**	13.01**	12.90**	13.15**	13.18**
	(1.09)	(1.08)	(1.08)	(1.09)	(1.09)
Multilateral debt share	-0.161	-0.570+	0.425	0.0744	-0.153
	(0.33)	(0.34)	(0.34)	(0.33)	(0.33)
Bilateral debt share	0.171	0.323	0.242	0.258	0.227
	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Colony	7.543**	7.528**	7.478**	7.540**	7.544**
	(0.90)	(1.03)	(0.95)	(0.90)	(0.90)
*dummy1970-1989		-0.434**	-1.418**	-0.0542	-0.0768**
		(0.051)	(0.10)	(0.051)	(0.020)
*dummy1990-1998		-0.567**	-1.040**	0.228**	0.00869
		(0.048)	(0.10)	(0.067)	(0.011)
*dummy1998-2001		-0.599**	-0.726**	0.857**	-0.0167
		(0.047)	(0.11)	(0.13)	(0.035)
*dummy2002-2004		-0.610**	-0.794**	1.072**	-0.0131
		(0.046)	(0.11)	(0.14)	(0.042)
Constant	18.13**	20.71**	15.00**	17.49**	18.56**
	(1.58)	(1.88)	(1.81)	(1.70)	(1.59)
Observations	47883	47883	47883	47883	47883
Number of bilateral effects	2349	2349	2349	2349	2349

Note: Robust standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1. All regressions use the Hausman-Taylor model with Lagged GDP/capita, Bilateral debt share, Multilateral debt share, Net aid others, Lagged bilateral trade, PV debt, and CPIA as endogenous.