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Aid Allocation and Aid Effectiveness

An Empirical Analysis

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Abstract

The paper performs aid allocation analysis using OECD-DAC data covering 20 aid donors and 176 recipients over the period 1980-2003. We improve upon earlier work in this area by employing *inter alia* the variable 'past outcome' measuring aid effectiveness in order to link together aid allocation and aid effectiveness. In line with previous work, we also account for both altruistic and selfish donor motives in the empirical analysis. As expected, empirical results based on Tobit estimates of aid allocation for individual donors vary quite significantly among donors. We also test the robustness of our results by estimating individual regressions for the major donors over the period 1990-2003 in view of major events in the aid arena during that time that could potentially have an impact on the aid allocation process. Our results seem to be similar to those derived over the 1980-2003 period, thus implying that this was not the case. Overall, both altruistic and selfish donor motives seem to motivate aid allocation for most donors over the two periods under examination. However, when we further restrict our time dimension to the 1999-2003 period, some important policy changes with regard to selectivity seem to emerge for a small group of donor countries.

Keywords: aid allocation, aid effectiveness, bilateral aid

JEL classification: F35

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1 Introduction

Why do some poor countries receive so much aid and others so little? Humanitarian, commercial, political and strategic motives are usually identified as the main factors driving the aid allocation process. This is consistent with policy statements, especially from the major donors, which assert that aid is motivated by a humanitarian concern to promote development and alleviate needs, especially in the most needy countries, but at the same time also by commercial, political and strategic self-interests. The vast empirical literature dealing with the determinants of aid allocation clearly concludes that donors pursue political, economic and strategic interests in inter-country aid allocation, especially with regard to bilateral aid allocation of the larger donors, and that developmental or humanitarian concerns such as the reduction of poverty, receive a relatively low or even zero weight in this process (see McGillivray 2004 for a comprehensive discussion).

Indeed, recent empirical work confirms that foreign policy goals of the donor continue to be the most important motive for giving aid (Alesina and Dollar 2000; Burnside and Dollar 2000; Neumayer 2003a, 2003b; Gates and Hoeffler 2004).[1] Earlier influential studies include McKinley and Little (1978, 1979); Mosley (1981); Maizels and Nissanke (1984) and Trumbull and Wall (1994) among others. Cassen (1994) also finds that the United States targets more than one-third of its total assistance to Egypt and Israel for political reasons. The same author shows that many of the countries that receive the most aid per capita, such as Israel, Jordan, Egypt and Poland, do so because of their strategic importance. More recent studies include *inter alia* Schraeder, Hook and Taylor (1998); Lundborg (1998); Gounder (1999); Gounder and Sen (1999); Alesina and Dollar (2000); Svensson (2000); Neumayer (2003a, 2003b); Berthélemy and Tichit (2004); Dollar and Levin (2004) and more recently Canavire *et al.* (2005).

Svensson (2000) examines the aid allocation of various donor countries over the period 1970 to 1994. He finds that respect for political and civil rights has a positive impact on whether a country receives any aid at all in the case of donors such as Canada, Japan, and the US, but not Germany, Italy, Denmark, France and Sweden. He also finds that political and civil rights lead to higher total aid flows from Canada, Denmark, Norway and Sweden, the so-called like-minded countries that traditionally put emphasis on democracy and human rights in their development assistance, and the UK. He finds no effect for the large donors—Germany, Japan and the US—on the part of whom he suggests that political and strategic goals render the rewarding of democratic regimes unimportant. Alesina and Dollar (2000) come to the conclusion that the 14 donors they look at differ from each other. They find that political rights have a positive impact on the amount of aid allocated by Australia, Canada, Germany, Japan, the Netherlands, the Scandinavian countries, the UK and the US but not for Austria, Belgium, France and Italy. Hence, while they confirm Svensson's finding with respect to the UK, France and Italy—the like-minded countries—they come to more positive conclusions about Germany, Japan and the US. Neumayer (2003a) analyses bilateral aid allocation over the period 1985-97 by all 21 countries that form the OECD-DAC. In addition to the respect for civil and political rights, in the empirical analysis he also employs personal integrity rights. He finds that respect for civil and political rights plays a statistically

[1] See also Mavrotas and Villanger (2006) for a recent discussion of altruistic and non-altruistic motives of donors.

significant role for almost all aid donors on whether a country is deemed eligible for aid. However, only the like-minded countries (with the exception of Sweden) as well as countries such as Germany, Italy, Japan, Luxembourg, Switzerland, the UK and the US also provide more aid to more democratic regimes. He finds that countries with a greater respect for these rights receive more aid only from Australia, Denmark, Japan, New Zealand and the UK. Interestingly, these rights play a role in the aid allocation process of only a few donors and no systematic difference is apparent between the like-minded countries and the rest of donor countries. This stands in striking contrast to the self-proclaimed commitment of the like-minded countries regarding the importance of human rights in their development assistance.

Regarding the impact of corruption on aid allocation, Alesina and Weder (2002) find no statistical evidence to confirm that more aid goes to less corrupt countries in the case of American, British, Canadian, Italian, German, Spanish and Swiss aid. Only for Australia and the Scandinavian countries is there some evidence that low corruption is rewarded with higher levels of aid. Similarly Svensson (2000) finds no evidence that countries with less corruption are systematically rewarded with higher levels of combined bilateral and multilateral aid. Similar evidence for the non-importance of corruption in the aid allocation process is observed by Neumayer (2003a) with respect to the aggregate multilateral aid flows, the regional development banks as well as three UN agencies. The main conclusion of the study by Dollar and Levin (2004) is that the efficiency of aid allocation has gained in recent years in view of the growing importance (according to the authors) of selectivity issues in the donor community.[2] Covering 22 donors and 137 recipients over the period 1980-99, Berthélemy and Tichit (2004) find that most donors rewarded good economic policies and good governance in the 1990s and that aid commitments per capita were higher for recipient countries with lower income levels. Gates and Hoeffler (2004) focus on the Nordic countries to examine donor behaviour over the period 1980-99 and to determine whether strategic motives affect the aid allocation process. They find that contrary to the case of the average bilateral donor, none of the Nordic countries allocated more aid to political allies, but rather that their aid flows were driven by the democracy and human rights records in aid recipients. More recently, Canavire *et al.* (2005) find that export-related self-interests of donor countries provide a fairly strong incentive for granting bilateral aid, as do colonial ties. Finally, in contrast to the findings by Dollar and Levin (2004), the authors cannot find evidence to indicate that multilateral aid is more poverty- and policy-oriented than bilateral assistance.

Against this background, the aim of this paper is to re-examine the factors affecting the aid allocation process. We use OECD-DAC data covering 20 aid donors and 176 recipients over the period 1980-2003. In line with previous work in this area we account for both altruistic and selfish donor motives in the empirical analysis. However, we improve upon earlier work by including a more specific indicator of project performance (a variable that we label as 'past outcomes') to test the hypothesis that foreign aid rewards good policies. The variable was computed by the Operations and Evaluation Department (OED) at the World Bank and is collected in their publication *Annual Review of Development Effectiveness*. In doing so, we link together aid allocation and aid effectiveness in the empirical analysis. Our empirical model is based

2 See Beynon (2003); McGillivray (2003) and; Munro (2005) on the selectivity issue.

on a simple, static contract theory model focussing on the nature and implications of the incentive compatibility of conditional aid for donors (see next section).

The paper is structured as follows: section 2 briefly presents the theoretical model on which our empirical model is based. In section 3 we discuss definitions of the variables and data issues whereas econometric methodology issues are reviewed in section 4. Empirical results for all individual donors covering the period 1980-2003 are presented in section 5 and in section 6 we conduct a sensitivity analysis to test the robustness of our results. The last section concludes the paper.

2 The model

The theoretical model employed here to derive our empirical model for the estimations draws on Isopi and Mattesini (2005). The model considers a bilateral development cooperation programme between two countries, a donor and a recipient country, which interact for one period. Foreign aid is given by the donor government to the government of the aid-recipient country with the aim of benefiting the recipient.

The recipient country is inhabited by two types of agents: type I agents, which we also call 'the elite', and type II agents defined as 'the poor'. The elite have access to a stochastic technology for converting an amount a of the good donated by the donor country into a higher level of output $y(a)$. The distribution of the output between type I agents and type II agents is determined by the government of the country. Production is stochastic and is affected by the actions undertaken by type I agents. In every period the government of the donor country decides the amount of aid to transfer, taking into account the utility of the recipient country weighting differently the two population groups of the recipient. The transfer will occur only if the poor of the recipient country can derive benefit from it. In doing this, the main objective is to favour the poor of the recipient country and therefore try to maximize the utility of type II agents. However the donor country also takes into account the effects that its action have on the utility of type I agent which, in this model, has an active role in the production process. This intends to capture the idea (supported by the empirical literature on aid allocation) that donors' motives may not be entirely oriented towards recipient needs.

The game is divided into the following stages. At the beginning of the game, the government of the donor country offers an aid transfer to the government of the recipient country to implement a project. The aid transfer is given to the elite, the population group owning the technology. During that period the project is executed but the donor cannot observe the action undertaken by type I agents. In the next stage, the outcome of the project is also observed by the donor and the output is distributed between type I agents and type II agents. Solving the model we come up with three possible equilibria: two of them lead the donor to deliver a positive quantity of aid while the third one is a corner solution which implies no aid policy exists for the donor.[3]

A reduced-form of the first equilibrium solution is given by:

$$a^* = a(\gamma, \lambda, \kappa, \delta) \tag{1}$$

where a^* represents the equilibrium level of aid that the donor wants to transfer to the recipient, λ represents the interest that the donor has towards the type I agent, γ is the fraction of the output given to the elite[4] and reflects the income distribution of the country. This fraction expresses not only the contribution type I agents give to the project due to ownership of the technology but also the political power they have within the country; δ represents the opportunity cost for the donor of giving foreign aid, i.e., reducing resources intended for his own population in favour of those of another country; the other component, κ, can be defined as the donor's subjective cost associated with aid fungibility. The donor is aware that a fraction of the aid transfer may be diverted away from its intended use and this may represent a reason of concern among the population of the donor country. The higher the fraction of aid transfer diverted to alternative use, the higher its cost.

This equilibrium indicates that in a situation where moral hazard is not a relevant problem, if the donor's preference for the elite increases, this will imply more aid to the recipient country only if the elite receives a significant fraction of the output. By analogy, an increase in the level of output going to the elite will increase aid only if the donor assigns a relevant weight to the elite in its utility function. This interpretation can support the theory that the trend in aid flows is independent of the recipients' ability in reducing poverty, as suggested by Berthélemy and Tichit (2004). From their empirical results a clear declining trend in aid flows seems to emerge in a period when international cooperation seems to have reached its highest level.

If the second equilibrium occurs, the optimal contract that the donor can offer to the recipient is given by the following reduced-form equation:

$$a^* = a(\psi, \mathbf{\Phi}_1 \gamma - \mathbf{\Phi}_0(\gamma + b)) \tag{2}$$

where ψ represents the elite's disutility of undertaking the good project, and $\mathbf{\Phi}_1 \gamma - \mathbf{\Phi}_0(\gamma + b)$ can be interpreted as the gain, in terms of utility, that the elite obtains from undertaking the project agreed in the contract. The level of aid implied by equilibrium (2) is increasing in the elite's disutility of undertaking the good project, ψ, and is negatively correlated with the private benefit b, that the elite obtains when it undertakes bad action and depends negatively on the level of γ. Differently from the previous equilibrium, in this optimal contract, in order to maximize its utility the donor sets an aid transfer which rewards the disutility of effort the elite faces when it exerts the high level of effort. Concerned with efficiency issues, the donor therefore reduces the size of the transfer, either when the elite diverts too much funds for its private consumption, thus becoming the only agent to derive benefit from the project or when the reward for undertaking the project (as proper salary) tends to be too high, which implies that the poor receive only a small portion. Depending on which of these solutions will be the equilibrium, different contracts will take place and their determinants will be different in each case. When equilibrium is represented by Equation (1), the optimal transfer decreases as the cost function increases, even though it will be positively affected by the interest of the donor in the elite group; the

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3 For a more detailed explanation of the corner solution equilibrium, see Isopi and Mattesini (2005).

4 In the model we assume that γ is exogenous.

distribution of the outcome between the two population groups in the recipient country also increases the aid transfer. If equilibrium is given by Equation (2), the donor decides to set the optimal transfer policy in accordance with the implementation made by the elite, i.e., the higher the disutility of the elite in exerting the effort, the higher the aid transfer the donor is prepared to make.

The model we refer to allows us, in fact, to test whether a donor is imposing an incentive mechanism on the recipient in order to promote respect for the signed contract, and whether or not the mechanism is perceived as binding. Therefore, in what follows we estimate a model of aid allocation in which we include, where possible, variables that are representative of the bilateral relationship between the donor and the recipient. Going back to the model, we can argue that equilibrium (1) describes a situation in which the aid allocation process does not impose an incentive mechanism on the recipient country or at least it is not perceived as binding. The relevant parameters for such behaviour are the parameter λ which we identify in the empirical model as the fraction of ODA (official development aid) devoted to social infrastructure; the parameter γ which represents the distribution of income being considered, including the Gini index variable. In the empirical analysis, the cost of wasting, κ, is converted into the outcome variable: if the results of past investment projects are positive and the donor is really concerned about the possibility of diversion, there will be a tendency to target transfers towards recipients with a higher performance rate. Equilibrium (2) instead occurs when the donor imposes an incentive mechanism which is perceived by the recipient as binding. In this kind of equilibrium, the donor should favour countries where the degree of corruption is low, the economic performance (GDP growth rate) is generally good, democracy level (civil liberties) is high and good past outcomes (captured by a qualitative measure of aid effectiveness) are rewarded.

3 Definitions of variables and data issues

Our sample covers 176 aid recipients and 20 donors, members of the Development Assistance Committee (DAC) of the OECD, spanning the period 1980-2003. For each of the years from 1980 to 2003, we observe the aid commitments received by each recipient from each DAC member, but in contrast to the analysis of Berthélemy and Tichit (2004), we run the regressions individually for each donor.

With regard to the dependent variable, it is more convenient to use aid commitments[5] rather than disbursements, as McGillivray and White (1993) point out.[6] There is also

[5] A commitment is a firm obligation expressed in an agreement or equivalent contract and supported by the availability of public funds, undertaken by the government, an official agency of the reporting country or an international organization, to furnish assistance in a specified amount under agreed financial terms and conditions and for specific purposes, for the benefit of a recipient country.

[6] A disbursement represents the actual international transfer of financial resources. They may be recorded at one of several stages: provision of goods and services, placing of funds at the disposal of the recipient in an earmarked fund or account, withdrawal of funds by the recipient from an earmarked fund or account payment by the donor of invoices on behalf of the recipient. The disbursement mechanism used tends to vary as a function of the type of financial (or technical) cooperation flow involved.

considerable debate on the choice of the endogenous variable as either aid per capita or aid levels (McGillivray and Oczkowski 1992; Neumayer 2003b). In this paper we use per capita commitments as they allow us to test whether small countries receive more international support per capita than the big ones.[7]

The first indicator we introduce is 'trade', a measure of bilateral trade between the donor and the recipient country. This variable describes the strength of commercial links between a donor and a recipient. In contrast to other papers where the economic interests of the donor are measured by the ratio of the sum of exports and imports of the donor country as a percentage of its GDP, we use here the bilateral exports of the donor country to the recipient in order to capture the measure of interest that the donor has for the economy of the recipient country: i.e., foreign policy assistance based on donor self-interests will be biased towards countries which naturally tend to have more trade with the donor. This will result in a possible bias because when aid is given conditionally, more conditional aid may imply more imports from the donor. We try to limit the risk of bias by following the literature and using aid commitments as the dependent variable instead of disbursements, because these normally lag behind commitments, especially for the project loans and grants that require new equipment. It is notable, however, that the use of this indicator requires attention since trade flows are also correlated with country performance: richer recipients tend to trade more and this may result in less aid.

Moreover, we include two regressors that provide information on the economic development of the recipient country: GDPpccd and GDPgrowthl. The former represents the level of GDP per capita in constant US dollars, whereas the latter represents the rate of growth of the GDP of the recipient. In line with conclusions emanating from the empirical literature, we expect that the first has a negative sign for those donors who target their transfers according to recipient needs and a positive sign for those donors who assign instead a higher weight to their self-interests. Since the second variable can be considered as a performance indicator of the recipient country, we would consequently expect a negative sign when recipient needs are supported by the donor.

An indicator capturing whether donors are driven by recipient needs is represented by the bilateral ODA commitments according to purpose and in particular the portion that falls under the heading 'social infrastructure and services'. The main category covers efforts to develop the human resource potential in order to ameliorate the living conditions in aid-recipient countries.[8] The assumption is that the more aid a donor provides under this category, the greater the role of the recipients' needs in the preferences of the donor: the poorest countries should receive more of this aid and the richest less. Moreover, this variable can also be considered as an indicator of the degree of altruism of the donor. If the share for this category is high in the overall amount of aid, we can conclude that the donor is truly oriented towards recipient needs. We are aware of the fact that recipients often receive huge amounts of per capita aid even though they are fairly advanced economically. Table 1 reports Spearman rank

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7 This analysis would not be possible if we consider the aid in absolute terms because in this case we will find for certain that big countries receive more aid.

8 It includes also education, health and population, water supply, sanitation and sewerage.

correlation statistics computed for the sample countries according to bilateral per capita aid and per capita income of the recipient countries.

The correlation analysis can provide some preliminary information on the issue of aid targeting. Denmark, Finland and Norway have the highest score, showing how targeting policies have always been implemented by these altruistic countries. Sweden and Ireland show an increasing trend, with a 38 per cent and 40 per cent, respectively, over the last four years. The opposite trend emerges for UK and Canada, indicating that in the past countries with a low per capita income received more aid than today.

Table 1
Bilateral per capita aid and per capita income

	Spearman rank correlation				
Country	1980-85	1986-90	1991-95	1996-2000	2000-03
Australia	-0.2333 0	-0.1783 0.0001	-0.1897 0	-0.1287 0.0024	-0.1429 0.0188
Austria	-0.0813 0.0873	-0.1388 0.002	-0.2268 0	-0.2443 0	-0.0982 0.1074
Belgium	-0.1244 0.0088	-0.2672 0	-0.2409 0	-0.2676 0	-0.2632 0
Canada	-0.2422 0	-0.1684 0.0002	-0.1527 0.0004	-0.2462 0	-0.1677 0.0057
Denmark	-0.3529 0	-0.3411 0	-0.384 0	-0.3129 0	-0.2695 0
Finland	-0.3827 0	-0.196 0	-0.3024 0	-0.3596 0	-0.3741 0
France	-0.0535 0.261	-0.0772 0.088	-0.0351 0.419	-0.1014 0.0176	-0.1768 0.0037
Germany	-0.2176 0	-0.1377 0.0022	-0.271 0	-0.3037 0	-0.3044 0
Ireland	-0.2475 0	-0.3143 0	-0.2503 0	-0.3991 0	-0.4086 0
Italy	-0.1755 0.0002	-0.2269 0	-0.2337 0	-0.1873 0	-0.254 0
Japan	-0.1607 0.0007	-0.1563 0.0005	-0.1023 0.018	-0.0947 0.0261	-0.1191 0.0506
Netherlands	-0.3548 0	-0.2812 0	-0.3597 0	-0.4165 0	-0.3456 0
New Zealand	-0.168 0.0004	-0.0782 0.0826	-0.1254 0.0037	-0.0899 0.0347	-0.1574 0.0096
Norway	-0.325 0	-0.2486 0	-0.3674 0	-0.4577 0	-0.351 0
Portugal			-0.1125 0.0092	-0.0408 0.3381	0.1278 0.0358
Spain			0.0192 0.6573	-0.0885 0.0376	-0.054 0.3764
Sweden	-0.1602 0.0008	-0.1437 0.0014	-0.1327 0.0023	-0.2865 0	-0.3856 0
Switzerland	-0.356 0	-0.3612 0	-0.4467 0	-0.4744 0	-0.4506 0
UK	-0.2099 0	-0.1635 0.0003	-0.1662 0.0001	-0.2423 0	-0.1135 0.0635
USA	-0.1404 0.0032	-0.0775 0.0869	-0.1595 0.0002	-0.2494 0	-0.2772 0

Japan does not reveal any significant relationship between the per capita income of recipients and per capita aid. This corresponds to Japan's unfavourable position in the ranking of bilateral donors with regard to the aid component of the so-called commitment to development index (Roodman 2004). Being the exception for the first five years in the 1980s, Belgium shows a stable level of correlation between the two variables, about 25 per cent on average. Germany and the Netherlands have improved the targeting of per capita aid since the early 1990s and have thus caught up with the Scandinavian donors.

We also include the Freedom House index of civil liberty, labelled 'government' in the regressions. This index measures freedom according to two broad categories: political rights and civil liberties. Political rights enable people to participate freely in the political process, also having the right to vote, to compete for public office, and to elect representatives who have a decisive impact on public policies and are accountable to the electorate. Civil liberties allow for the freedom of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state.[9] We expect this variable to have a positive influence on the aid allocation process, signalling to the recipient countries that democratic institutions may attract more foreign assistance.

As the 'usual factors', i.e., variables that are commonly included in aid allocation studies, we include few regressors belonging either to the recipient needs or the self-interests of the donor. The first one included in the analysis is the 'bilateral military transfers'. The SIPRI Arms Transfers Database contains information on all transfers of the seven different categories of major conventional weapons from 1950 to the present day. Information is compiled from publicly available media as well as government and industry sources. SIPRI uses the term 'transfer' rather than 'trade' since the latter is usually associated with sales.[10]

From Table 2, which presents the Spearman rank correlation between the variable 'arms transfers' and bilateral ODA,[11] it emerges that there is a link between the direction of foreign aid flows and arms transfers. The magnitude of the correlation coefficient changes from donor to donor and also over time but it is still possible to conclude from this preliminary test that countries, which receive more aid from a certain donor, are also the same countries to which the donor conducts more arms transfers. In view of this, we also include this variable as an indicator of donor self-interests and we expect the sign to be positive.

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9 The survey includes both analytical reports and numerical ratings for 192 countries and 18 selected territories. Each country and territory are assigned a numerical rating, which is calculated based on the methodology described below, on a scale of 1 to 7. The total number of points awarded to the political rights and civil liberties checklists determines the political rights and civil liberties ratings. Each point total corresponds to a rating of 1 through 7, with 1 representing the highest and 7 the lowest level of freedom.

10 This database covers not only the sales of weapons, including manufacturing licences, but also other forms of weapon supply, including aid and gifts. Transferred weapons must be destined for the armed forces, paramilitary forces or intelligence agencies of another country. Weapons supplied to or from rebel forces in an armed conflict are included as deliveries to or from the individual rebel forces, identified under separate recipient or supplier headings. Supplies to or from international organizations are also included and categorized in the same fashion.

11 See also tables on aid concentration in White (2004).

Table 2
Bilateral aid and arms transfers indicator

	Spearman rank correlation			
Country	1985	1990	1995	2000
USA	0.209 0	0.1688 0	0.155 0	0.1342 0
UK	0.2061 0	0.184 0	0.172 0	0.1318 0
France	0.316 0	0.282 0	0.242 0	0.192 0
Denmark	0.036 0.242	0.046 0.042	0.042 0.0254	0.037 0.0254
Japan	0.092 0.003	0.061 0.008	0.045 0.016	0.036 0.027
Germany	0.027 0	0.223 0	0.223 0	0.221 0
Canada	0.045 0.141	0.09 0.001	0.071 0.001	0.058 0.004
Switzerland	0.071 0.022	0.033 0.145	0.027 0.146	0.022 0.187

We include the infant mortality rate and the Gini index as social policy outcome variables. The first represents the infant mortality rate of the recipient country, i.e., the probability of dying between birth and one year of age, expressed per 1,000 live births. The second variable measures the extent to which the distribution of income (or consumption) among individuals or households within a country deviates from a perfectly equal distribution. According to the literature, these indicators belong to the category of need indicators, i.e., variables that provide information on the economic and social situation of the recipient country. By including these regressors in the estimation, we expect that the countries pursuing good policies be rewarded with a higher foreign aid flows, but that on the other hand, because these indicators represent for the donors a measure of need of the recipient country, aid flows should be higher in countries that have low values in both indices.

In order to test the hypothesis that foreign aid rewards good policies, we include in the estimation model a more specific indicator of project performance,[12] i.e., the variable we label 'past outcomes'. This variable is computed by the Operations and Evaluation Department (OED) at the World Bank and is collected in their publication *Annual Review of Development Effectiveness*. Each year, the OED evaluates the projects undertaken by the World Bank in a certain country and assigns to them an evaluation score that varies from highly unsatisfactory to highly satisfactory, i.e., a score ranging from one to six. In fact, this represents a qualitative measure of a revised economic rate

[12] We are perfectly aware that by focusing on project evaluation we are overlooking an important fraction of aid, i.e., programme assistance. However this is caused by data availability problems since the data on evaluations made by the World Bank are limited to project aid.

of return at evaluation calculated on the projects implemented by the World Bank. In order to have a single value per year, we take for each recipient country the evaluation average of the World Bank projects in that specific year without distinguishing for specific sectors. Project-specific appraisals can only assess the project's rate of return or its acceptability. This approach is problematic for two reasons, both of which are important for multilateral lending agencies and donors interested in the impact not only of aid-financed projects but also of aid itself. First, aid flows, at least to some extent, are fungible. It is unlikely that the projects evaluated by the World Bank, for example, are so marginal that they would not otherwise have been carried out. For the 99 projects evaluated in 1993, the World Bank (1994) finds an average economic rate of return of 21 per cent, which is too high to indicate marginal projects. Second, even if a project would not have been undertaken without external funding, there is no guarantee that that particular project was the best of those being considered.

It is well-known that careful evaluation is limited by the lack of information, but project evaluation still has a key role to play. The growth of the aid industry has in recent years had both positive and negative effects. On the plus side, there is more money available, and more experiences to share. On the negative side, in the frenetic rush to find and fund projects and to speed disbursement, there is not adequate time to assess what is being done, and to rely on past experience for programme improvement. In general, the scale of the evaluation operation correlates with the size of the agency. Several agencies have an evaluation unit which is independent of the operational divisions, as for example, the World Bank and FAO. This has the merit of allowing impartial assessment of projects, but it also means that it can only offer advice and suggestions, which are not always acted upon by the operational divisions. The World Bank is the only identified agency to have made a formal study of projects 10 to 15 years after completion. The observations from that study were found to be very instructive; perhaps this type of evaluation should be carried out more frequently. Along the above lines, the variable 'past outcome' seems to be a good proxy (though by no means perfect) in measuring the success or failure of past international cooperation projects.

4 Estimation methodology

Many of the statistical problems related to the estimation of aid allocation models emanate from the fact that many donors give a definite amount of aid to some recipient countries and nothing to others. The data include every country that has received aid from each donor in the period under examination. DAC lists 176 recipient countries and this represents the maximum number of countries a single donor may give aid to. No donor gives aid to fewer than 100 countries, and the most generous donors are France and Japan, giving aid to 160 and 161 recipients, respectively. Major donors tend to disburse aid to a large number of countries, whereas smaller donors tend to concentrate aid on a few recipients.[13]

[13] The Scandinavian countries provide a percentage of aid to a smaller number of recipients as compared to the potential number in the given sample.

The above seems to suggest that the dependent variable, aid, is only partly continuous with positive probability mass of zero value.[14] Consequently, we deal with a censored dependent variable, which implies that we need to implement a non-linear estimation method capable of estimating censored data.[15] Three models exist in the econometric literature to deal with this type of situation, all based on the maximum likelihood method. These are the Tobit model, the Heckman sample selection model and the two-part model. In line with Berthélemy and Tichit (2004) and Canavire *et al.* (2005) and since it is rather difficult to find appropriate exclusion variables for the first step of the Heckman procedure, we employ the Tobit model in our empirical analysis.

The Tobit model or censored regression model is characterized by a dependent variable which exhibits censoring at some value because all the negative values are censored to be zero; therefore, the model can be described as follows:

$$y^*_i = \alpha + x_i^{'}\beta + u_i \qquad \text{where} \quad u_i \approx N(0, \sigma^2) \tag{3}$$

$$y_i = y^*_i \quad \text{if} \ y^*_i > 0 \tag{4}$$

$$y_i = 0 \quad \text{if} \ y^*_i < 0 \tag{5}$$

As we have already anticipated, it would be meaningless to argue that donors have negative expected levels of aid commitments[16] for some countries. Therefore they set the level of this money to equal to zero.

It is true that one strand of research wants to determine if there are differences in the determinants of aid eligibility and the determinants of the amount of aid allocated. However, in this model we assume that the process of selecting recipient countries has been already concluded, and that the donor is only interested in setting the optimal amount of the aid transfer. Therefore, the model of aid allocation we intend to estimate is given by:

$$a^*_{ij,t} = Max(0, B\, x_{ij,t} + u_{ij,t} + v_{ij,t}) \tag{6}$$

where i stands for the recipient country, j the donor country and t time, a^* stands for the quantity of aid per capita, x is the vector of the explanatory variables (discussed in the previous section), B the vector of the parameters associated with the regressors and the u and v stand for two *iid* random variables.

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14 See also Roodman (2004) on the truncated nature of the aid variable.

15 OLS estimations depend on the assumption that the expected value of the dependent variable is linear in the explanatory variables, which is violated by the fact that the independent variable has positive probability mass at value zero.

16 Aid disbursements can be negative because of repayment, but not commitments.

5 Estimation results

The empirical analysis conducted in this paper uses a database consisting of 20 donor countries and 176 recipients spanning the period 1980-2003. In order to fully capture the differences in the aid allocation process among individual countries, we run separate regressions for each donor using the ODA per capita commitment of a single donor as the dependent variable. We also test whether the results are sensitive to a different specification of the estimation equation. Thus, we report the results in Tables 1-8 in Appendix I for the four separate regressions for each donor country. The tables are structured as follows: Equation (1) estimates the model without the 'past outcomes' variable whereas Equation (2) estimates the full model; in Equations (3) and (4) we test whether the model is sensitive to the use of the different poverty variables, i.e., the infant mortality rate and the Gini index.

Table 1 in Appendix I reports regression results for the USA. The per capita income has, as expected, a significantly negative impact on aid received, even though the magnitude of the coefficient is low. An even stronger negative impact on the aid allocated is given by the lagged growth. This variable is an indicator of the economic performance of the recipient countries. In our regressions, the negative sign seems to suggest that the US aid policy is oriented towards countries where the level of growth is still quite low. In line with the results of the empirical literature, the population variable has the expected negative sign even though it is not always significant. In the more complete specification of the estimation model, the sign remains negative although no longer significant. To capture whether the behaviour of the donor is driven by recipient needs, the variable included in the regression is 'social', i.e., the share of ODA devoted to developing human resource potential and ameliorating living condition in aid-recipient countries. As we can see from Table 1, the significance and the magnitude of the coefficient is independent from the possible specifications of the estimated equations. It is also notable that this variable is particularly significant when associated with the infant mortality rate. The 'government' variable used to measure the level of democracy and civil liberties in the recipient countries is an indicator which assigns a high number to countries where the level of civil liberties is low. Our results seem to suggest that in the case of the US, the relationship between the regressor and aid flows is negative and significant, as expected, thus indicating that USA gives more aid to countries where the level of civil liberties is low. This can have an ambiguous interpretation. Usually countries with a low level of civil liberties also depend on aid; on the other hand, this variable may be an indicator of a strategic donor which—by giving foreign aid—may more or less indirectly support the government of recipient country whose degree of democracy is low. In contrast to some results in the empirical literature, significance of the bilateral trade variable is very low also in the most complete specification. Another variable which apparently does not seem to influence ODA commitments is the 'arms transfers'. The sign of the coefficient changes according to the specification used but is always non-significant. This may be due to the lack of data for all the recipients in the sample. Summing up, it seems that the US aid allocation process is driven more by political and humanitarian reasons than economic variables.

On the basis of the results reported in Table 1, UK's aid allocation process presents different elements compared to the US. From the first equation we can notice that per capita income is not significant, suggesting that this variable is not a leading factor in allocating aid flows. Instead, an interesting finding is that the Gini index, when included, always has the expected sign and is significant, indicating that the income

distribution of the population is more relevant for the UK than the level of per capita income. Also the social and economic variables, social aid and civil liberties, are with the expected sign (and significance). In almost all the regressions, the bilateral trade variable has the expected sign (positive) but is never significant. The population variable is always significant and with the expected sign (negative), supporting the paradox that small countries receive more aid per capita than big ones. This interpretation is confirmed by the lagged growth variable, which is positive and significant almost in all the specifications. This reflects the assumption that in the allocation of foreign aid, UK is sensitive to growth performance, which would insure low probability of diversion of funds as well as their better utilization, but would also imply that the recipients are not the most needy. The variable outcome, which reflects recipients' past performance as evaluated by the World Bank, goes in the opposite direction. The variable in fact has the expected sign (positive) though not significant in all the regressions tried.

In contrast to both of the previously mentioned donor countries, it would seem that French aid flows are driven by factors other than altruism or a reflection of recipient needs. In fact, the fraction of the ODA devoted to develop the human resource potential is highly significant but the sign is negative. On the other hand, aid flows seem to be positively affected by bilateral trade. The level of democracy, expressed by the civil liberties indicator, is not significant in any of the estimated equations. Instead, the infant mortality rate is positive and significant, suggesting that a 20 per cent increase in the infant mortality rate corresponds to an increase of US$1.19 in bilateral aid flows. The other social policy outcome variable included in the model—the Gini index—is highly significant and positive; this seems to indicate that France directs its aid flows to developing countries where income distribution is more equitable. The indicator of bilateral arms transfers continues to remain non-significant in all the equations even though the sign is as expected (positive), thus preventing any firm conclusions. The per capita income variable is positive and significant and the size variable (population) is instead negative and highly significant. This means that France is more oriented to small countries with a medium level of per capita income. The outcome variable has the expected sign, which is positive and significant, i.e., the French foreign aid allocation takes in account the past performance of its recipients and uses its transfers to reward for good past outcomes. There is no major change in the results with the inclusion of the Gini index and the infant mortality rate separately in the model.

Turning to the results of Table 1 on the aid allocation process of Germany, we observe that Germany emerges as a donor country strongly motivated by recipient needs. Recipient countries that are governed with democratic institutions but with a high level of the infant mortality rate seem to receive higher per capita aid flows. Size also matters in all the regressions estimated: small countries receive more than the bigger nations. In Equation 1 the income distribution and the arms transfers indicator are not significant, thus preventing conclusions regarding their effect. Bilateral trade has the expected sign, i.e., negative but has a low level of significance, suggesting that Germany does not link trade relations to foreign aid assistance. In Equation 2 we drop the lagged growth variable and add the outcome variable. The new variable weakens the significance of the other regressors but remains non-significant. In Equation 4 we drop the Gini index, the social variable, from the model but the results do not seem to change dramatically.

Japan's aid allocation process seems to be driven by a combination of altruistic factors and donor self-interests. The portion of ODA utilized in social infrastructure affects

positively foreign aid flows. Also civil liberties have a strongly positive and significant impact on aid flows, suggesting overall that countries whose average level of the indicator is higher than 3.5 receive more aid flows.[17] The bilateral trade variable, even though it has a positive sign in all the regressions, is close to being significant but does not reach the threshold level. The other variables, i.e., income per capita, arms transfers and infant mortality, are not significant. Therefore we assume that they do not exert a relevant influence on Japanese aid flows. The situation described in Equation 2 (see Table 3, where the outcome variable is introduced) does not produce any relevant changes and the variable itself is not significant, making Japanese aid flows unconditional on the performance of the recipient.

Turning to Canada (Table 1), our results seem to suggest that the variable with the strongest impact is that portion of bilateral ODA which covers the efforts to develop and ameliorate the basic needs of the recipient countries, i.e., the social aid variable. This variable is positive and highly significant in all the specifications of the model and also has a coefficient of a high magnitude. Bilateral trade, on the other hand, has a negative impact, supporting the perception that only recipient needs matter for Canada, not donor self-interests. As already noted for other donors, small poor countries receive more aid than poor nations with a medium-income level.

In view of the results reported in Table 1, Switzerland appears to be strongly recipient-needs oriented with a high, positive and significant coefficient associated with bilateral ODA transferred to the social infrastructure sector, and a negative significant coefficient associated with bilateral trade. In the case of Switzerland the presence of democratic institution is not rewarded, but as we have already argued, this can be interpreted with two opposite views: it can be argued, on the one hand, that this is a signal that a donor is financing a non-democratic regime. But on the other hand we are aware that the less democratic country is also the less-developed one and consequently, the most in need of foreign assistance. The paradox regarding population size does not seem to apply in the case of Switzerland, and therefore, the most populated countries receive also more foreign aid per capita. Moreover, the per capita income level also matters. Finally, the distribution of income among the population and the past outcome variable do not seem to be important determinants of Switzerland's allocation process (see Equation 2 in Table 3 and Equation 4 in Table 7).

On the contrary, the elements that influence Spain's aid allocation are a mixture of donor self-interest and recipient needs (Table 1). The bilateral share of ODA devoted to investment in social infrastructure and development projects is significant and has a positive sign. But at the same time trade relations seem to play a leading role in foreign aid allocation. Comparing these results to those obtained previously for other donors, we can argue that the bilateral trade variable is usually more significant for countries which in the past have been colonial powers and which continue to have economic relations with their former colonies. Spain favours recipients with democratic institutions and more equal income distribution, characteristics belonging to the lower- and middle-income country categories.[18] The lagged growth variable is also positive and significant. In Equation 2, as we show in Table 3 where the outcome variable is

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17 The indicator level varies from one to seven.

18 The countries receiving from Spain the higher percentage of foreign aid belong to these categories.

introduced, the previously obtained results are confirmed. The variable itself is highly significant and with the expected sign (positive). In the last equation we included the social policy outcome variable, i.e., the infant mortality rate. According to the results reported, countries with unsatisfactory hygienic conditions and wide-spread malnutrition receive more aid per capita. The variables which always remain non-significant are the arms transfers indicator and the level of per capita income, suggesting that political and strategic factors do not exert a relevant impact in the allocation process.

Summing up the results for Netherlands, the country seems to be motivated more by recipient needs than by donor interests. In Equation 1, the high significance of the positive effect of the fraction of bilateral ODA committed to social projects needs to be highlighted, as does the negative effect of trade relationship on the aid flows transferred by the Netherlands. The sign of the performance indicators is ambiguous. In fact, an increase in the recipient's growth rate negatively affects aid flows, suggesting that as soon as Netherlands' aid-recipients show substantial improvement, the donor diverts the designated funds to other countries considered to be more needy. In that sense, the interpretation of the positive effect of the level of per capita income on the per capita bilateral aid becomes ambiguous, indicating that countries with even a small increase in the per capita income receive a high fraction of aid. In Equation 2 of Table 3 we include the outcome variable, which does not alter the results of the previous equation since it is non-significant. The picture does not change when the Gini index variable is included in the last two equations; it is non-significant even in the most complete specification of the model.

From the estimation results for Australia, it is noted that the economic (trade) interests have the strongest influence on the country's development cooperation. Furthermore, small, poor yet democratic countries receive more than big, medium-income and non-democratic nations. In all specifications neither the past outcome variable nor the lagged growth variable has a significant impact on the aid allocation process (see Tables 1 and 3).

From the regressions estimated for Italy (reported in Tables 2 and 4), it can be noted that some elements have a strong influence on the allocation of aid flows while others are somehow ambiguous. An increase of 1 per cent in bilateral ODA devoted to social infrastructure generates an increment of 15 per cent in the level of per capita aid flows; at the same time, it seems that aid flows are more concentrated towards small countries where the monitoring of funds is easier and aid can therefore be more effective. Moreover, it is found that countries with a more equitable income distribution, a high level in the indicator for civil liberties and a lower infant mortality rate receive more aid flows. The indicators for bilateral trade and arms transfers are not significant. The results obtained in the previous equation are confirmed in Equation 2 in Table 4, which includes the outcome variable. In fact, the new variable is significant and positive, sustaining the assumption that with regard to development cooperation Italy has increased the level of monitoring in resource transfers and that it is particularly affected by positive past performance in the recipient countries.

Ireland's policy of foreign aid allocation is, as we can see from Table 2, a weighted mix of donor interests and recipient needs. Size matters positively, as is also the case for more equitable income distribution. Moreover, Ireland recognizes that the ability of the population to organize themselves to participate in the political process and influence

national and local policies and programmes is the single most important factor for improving human conditions. Democracy and good governance—that is, democratic institutions and the quality of the processes and practice of governance—are critical factors influencing the development process and human conditions. Therefore, countries able to promote and encourage these conditions are rewarded with more aid per capita. In Equation 3 in Table 6 and Equation 4 in Table 8, we note that a decrease in the Gini index or in the infant mortality rate leads to higher aid flows. The outcome variable, on the other hand, has a negative coefficient but is non-significant.

Table 2 also presents the results on the factors driving the aid allocation process in New Zealand. Both equations presented in Tables 2 and 4 indicate that economic considerations are the leading factors in New Zealand. Bilateral trade is always positive and highly significant; investment in social infrastructure, on the contrary, tends to reduce the level of disbursed per capita foreign aid. Despite economic factors playing a key role for this donor, countries with more developed democratic institutions and with a low level of infant mortality rate are preferred. Apparently, it would seem that bigger-sized countries with good performance receive more aid per capita. In both equations, two regressors remain non-significant, namely the arms transfers indicator and the lagged growth variable. Economic factors seem to be more relevant than the political and strategic ones.

Portugal exhibits several relevant features, with bilateral trade and bilateral ODA targeted to infrastructure being dominant. Small democratic countries with a medium per capita income, equitably distributed, enjoy more per capita from Portugal's foreign aid. The high significance of the outcome variable (Equation 2 in Table 4) underlies the importance that this donor assigns to the use of resources.[19]

The results obtained for Denmark (Table 2) seem to suggest a clear tendency in focusing on recipient needs rather than donor interests. In fact, all the variables which formally reflect recipient needs have the expected sign and are highly significant. Also the bilateral trade variable which, as already explained, reflects the economic interests of the donor country, is negative and significant, highlighting that trade relations, at least for Denmark, are not an important factor in aid giving. The civil liberties variable is highly significant and with the expected negative sign. The only one which is highly non-significant is the arms transfers variable, indicating that strategic interests are not of relevance in Danish cooperation programmes. The outcome variable, introduced in Equation 2 in Table 4, is highly significant, i.e., the effectiveness of past aid transfers affects positively the probability of receiving more aid funds in the future.

The aid allocation process of Sweden, as illustrated in Table 2, is strongly influenced by humanitarian elements and is oriented towards recipient needs. In fact, in the first regression, the social policy variables—i.e., infant mortality rate, Gini index and civil liberties—are significant and have the expected sign. Bilateral trade, instead, is negative and highly significant. It also becomes apparent from the estimation results that in addition to factors which reflect recipient needs, Sweden's aid allocation is affected by the recipient's performance or its stage of development. In fact, it clearly emerges that countries with a higher level of per capita income receive more aid flows, even if lagged growth is non-significant. When the outcome variable is included, it is also positive and

[19] In the case of Portugal we had to drop the arms transfers variable due to lack of observations.

highly significant, suggesting that Sweden tends to transfer a higher level of aid flows to countries that are able to use aid effectively.

In Table 2 we give the regression results for Norway, a country that has always been considered as altruistic among the DAC donors. The share of bilateral ODA commitment devoted to social infrastructure and human development enhancement has the expected sign and is highly significant, thus supporting the view that Norway's aid is positively affected by recipient needs. We also find that the government variable, i.e., civil liberties, has the right sign and is significant, implying therefore that recipients with democratic institutions receive more aid transfers. Even thought the infant mortality rate has the expected sign (negative), it is never significant, but this may be due to the high number of missing values for this variable. The Gini index, which reflects income distribution considerations, is non-significant, as is also the case with the level of per capita income. The size of the recipient country (the population variable) seems to matter and is not affected by the usual paradox regarding this variable, i.e., that small countries usually receive more aid per capita. In Equation (1) of Table 2, the arms transfers indicator is not significant, indicating that it is not important in the Norwegian aid flows. When we choose a more general specification (Equation 2 of Table 4), the results are not affected by the inclusion of the outcome variable. In Equations 3 and 4 in Tables 6 and 8, we drop the infant mortality rate and re-run the regressions with and without the outcome variable. The exclusion of the social policy variable alters the results significantly: first, the level of per capita income becomes significant and with the expected sign (negative), suggesting that recipients with lower per capita income receive more foreign aid. The lagged growth variable, indicating country performance, remains positive and significant while the indicator of arms transfers and the Gini index remain non-significant. In Equation 4 in Table 8, we include the outcome variable which is positive and highly significant, i.e., countries attaining good outcome in past projects should receive a higher level of aid flows in the future.

The dataset for Finland does not allow us to draw substantial conclusions regarding factors that affect its allocation process. As we can see from Table 2, the majority of the regressors included in the model are not significant in any of the specifications tried. The fraction of bilateral ODA enhancing the development process is one of the few factors having the expected sign (positive) and being highly significant. Moreover, from the estimation results we can argue that in the case of Finland, big countries with a low level of per capita income receive a higher level of foreign aid. On the other hand, it seems that bilateral trade and income distribution do not significantly affect the aid allocation process. Both in Equation 3 in Table 6 and Equation 4 in Table 8, the outcome variable is positive and highly significant, indicating that Finland tends to reward more generously countries that indicate good performance on the aid effectiveness front. The arms transfers indicator is not significant, but as Finland has always been considered an altruistic donor, this result is not surprising.

The last two countries in our sample—Austria and Belgium—deserve a brief introduction. First of all, we were unable to estimate the complete model due to difficulties in obtaining long series for the arms transfers and GDPpccd variables because of missing values. The results for Austria, shown in Table 2, do not allow us to draw robust conclusions with regard to aid allocation. Also, variables that usually seem to be highly significant in most of the donors do not seem to play a key role in this case. Overall it appears that the most populated countries with equitable income distribution

receive more Austrian aid. The outcome variable is also non-significant. For Belgium, even though some variables had to be dropped, we are able to draw certain conclusions. It seems that the social component of aid is highly significant, as are the size of the recipient country and its form of government. Furthermore, the more equal the income distribution of the recipient country and more sound its institutional environment, the more aid will be forthcoming. Finally, the outcome variable in the case of Belgium is highly significant.

6 Sensitivity analysis: testing for the experience of the 1990s and 2000s

In this section we examine whether the results discussed above are sensitive to the selection of the time period utilized. The recent empirical literature suggests that due to major events in the aid arena in recent years, it is possible to argue that the factors driving the aid allocation process might have been different in the 1980s than in the 1990s. In a recent paper, Dollar and Levin (2004) argue that while donors in the 1980s allocated aid without adopting a selection criterion, this trend was reversed in the following decade, partly due to major events in the overall aid architecture but also partly to the policy lessons emerging from the very influential (but also debatable) study 'Aid, Polices and Growth' (Burnside and Dollar 2000). According to these authors, only countries that can guarantee a sound institutional environment and 'good policies' should deserve to receive foreign aid. Along the above lines and in order to test the this hypothesis, we estimate our empirical model for 11 major donors over the period 1990-2003. We run two regressions for each donor, with and without the past outcome variable. Our results are reported in Tables 1a-1b and Tables 2a-2b in Appendix II.

Comparing the results for the United States in Table 1 in Appendix I and Table 1a in Appendix II, we can observe that no great changes have occurred. All the regressors maintain the same sign for the entire period, even though they lose in significance. This is not the case for the trade variable which turns to be non-significant in the 1990s, thus indicating that economic factors lost their importance after the end of the cold war. The outcome variable continues to be non-significant also during the 1990s, confirming the conclusions of other studies (see Gates and Hoeffler 2004) that not all donors have become more selective in recent years. Table 1a (and 2a) in Appendix II, reporting results also for the UK, exhibits very little change compared to the full period model. The variable trade continues to be significant, as is also the case with the outcome variable. It is also noted that the more democratic countries or those investing in the reform of their political institutions receive more aid. This variable has the expected sign already in the full model but becomes significant only in the 1990s.

In the case of France, we can report several changes. First, both the social aid component and the economic component become non-significant. The population variable seems to explain the majority of the variance of the model, confirming that the smaller the recipient, the generous its aid receipts. The infant mortality rate is still a leading factor in the French aid allocation process, while the outcome variable is significant but only at the 10 per cent level. For Germany we find that all the results obtained in the full period model are also confirmed for the 1990s. As we can see from Tables 1a and 2a in Appendix II, all the variables in fact maintain the same sign and almost the same level of significance.

Japan[20] continues to be among the donors rewarding good policies and sound institutional environment. From Tables 1a and 2a, we also see that both the social and the economic components of aid are important in its allocation process. The outcome variable continues to be non-significant also in the restricted time-period model.

For Canada the most striking change concerns the income distribution variable in the recipient countries. As we can see, the level of per capita income now turns out to be non-significant but the population's income distribution becomes relevant, which may reveal more selectivity towards the very poor countries. An other important feature of the new results is reflected in the arms transfers variable which is now significant and with the right sign also, suggesting that arms transfers negatively affect Canada's aid allocation process. The results for Switzerland are substantially maintained (see Tables 1a and 2a). The only feature worthy of comment is the loss of significance of the government variable, indicating that the recipient country's level of democracy does not affect Switzerland's aid allocation criteria.

Let us now focus on the Scandinavian countries. Tables 1b and 2b in Appendix II report the results for Denmark. The new estimates also on the part of Denmark confirm the previous results: the majority of the regressors maintain the expected sign and turn out to be significant, but with two notable exceptions: the Gini and arms transfers variables. The former becomes significant only for the 1990s, but only when the outcome variable is excluded from the model. Instead, the latter variable becomes highly significant in both specifications, indicating a major change in the determinants of aid allocation. The results for Sweden verify all the main findings already obtained for the full sample. Also in this case, all the variables maintain the sign of the full time-period model and in certain cases (see outcome and arms transfers) the significance increases in the 1990s. In the case of Norway, we can observe a general decrease in the significance of the variables included in the regressions, although overall the variables that were non-significant in the full-period model also remain non-significant in the restricted time period. Some of these, such as the population and government variables, become non-significant in the 1990s. Finally, results for Finland overall seem to confirm the initial conclusions, although the outcome variable now gains significance.

In order to strengthen our conclusions further, we decided to restrict the time period covered by focussing on the last five years, i.e., 1999-2003. As already mentioned, new empirical literature exists which seems to suggest that during the last decade donors have increased their policy of selectivity towards recipients. As our regression results have shown, this result does not emerge from the regressions for the 1990s. However, we reach different conclusions when we focus on the last five years and rerun the regression with the inclusion of the outcome variable for selected donor countries (see Tables 3 and 4 in Appendix II).

For the USA, this last regression basically confirms the results obtained for the 1990s. The variable trade, which has always had a negative sign, becomes highly significant, highlighting how the USA aid allocation process, especially recently, has been motivated by factors other than economic ones. The outcome variable remains non-significant, thus not allowing us to draw any conclusions regarding its impact on the aid allocation process. Another important fact is that the Gini index changes its sign and

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[20] We had to drop the Arms Transfers variable due to the lack of data in period under examination.

now becomes negative but highly significant. This may be considered as a signal that the USA aid allocation policy has lately been motivated more by recipient needs than self-interest. The arms transfers variable remains non-significant.

In Table 4 we report the results for the United Kingdom. Comparing these with results reported in Table 1a in Appendix II, we notice that overall there are no changes in the UK aid allocation policy. In fact, this process seems to be strongly driven by factors which refer to recipient needs, such as the variables government, Gini index and social aid. In the case of this country, the outcome variable continues to be a non-relevant factor.

The results obtained for France seem to suggest some change over the 1999-2003 period. Indeed, in comparison to Table 3 economic factors become positive and highly significant. The government variable decreases in significance in line with results obtained previously. The outcome variable seems to start increasing in significance, suggesting that France may belong to the particular group of donor countries that have recently adopted selectivity.

Table 3 presents the results for Germany. Comparing these results to those reported in Table 1a of Appendix II, a relevant change in the aid allocation process seems to emerge. In fact, if we exclude the variables social aid and trade, the other regressors either change sign or significance. This is the case for the variable government, for instance, which becomes non-significant. On the other hand, the infant mortality rate is significant and with a positive sign, indicating that Germany tends to give more aid to countries where the infant mortality rate is high and income distribution among the population groups more equal. Another relevant difference is obvious from the outcome variable, which turns out to be highly significant. Summing up, we can argue that the German aid allocation process seems to have changed completely in the last few years, with increased attention towards the recipient countries and more generous aid towards those that can guarantee better results in terms of outcome.

Substantial changes are documented also for Japan, as Table 3 shows. First, we can notice that economic factors as captured by the variable trade, have a significant negative effect on the aid allocation process, compared to results for the 1990s. The Gini index variable changes signs and becomes almost significant, thus suggesting that the more warped the income distribution becomes in a recipient country, the more aid it receives from Japan. The infant mortality rate and the government variables are not significant, which is in line with the results reported in Table 1a of Appendix II. Finally, the outcome variable continues to be non-significant.

The results for Switzerland also indicate some change. The first is related to the variable government which has the expected sign and turns out to be highly significant, thus indicating that countries ruled by democratic institutions receive more aid. Looking at the other regressors, it seems that the aid allocation process in Switzerland has recently been oriented more towards recipient needs, and has favoured countries plagued by unequal income distribution, high infant mortality rates and lacking good results in project outcome, as Table 4 shows.

In contrast to the above-mentioned donor, the results of the 1999-2003 period for Denmark seem to confirm the findings obtained for the 1990s. In fact, all the variables keep the same sign even though some of them decrease in significance, as can be seen

for population, social aid and government, which turn to be non-significant. The outcome variable loses in significance, even though the sign remains positive.

Sweden (Table 4) seems to be associated with certain changes over the period examined with regard to the criteria of its overall aid allocation process. Indeed, it is confirmed that the social aid variable has a strong impact on the aid allocation process but at the same time, economic factors tend to have a stronger negative effect. The variables government and the Gini index turn out to be non-significant, whereas the strong influence of the variables arms transfers, level of the GDP per capita and outcome remains the same.

The results for Norway for the 1999-2003 period seem to confirm those obtained for the 1990s with regard to the outcome variable, which continues to appear with the positive sign but now non-significant. Similar conclusions can be drawn for Finland. All the variables retain the same sign as in Table 2b in Appendix II, although (in certain cases) with decreased significance. The outcome variable continues to be positive and highly significant, thus suggesting that Finland may have recently adopted a selectivity approach. Similar findings are also obtained for Spain where the past outcome variable is significant and with the expected sign in all the specifications tried.

Table 3 reports the results for Italy. It is notable that compared with Table 1a of Appendix II, the most relevant change is captured by the outcome variable. In fact, even though all the other regressors (with the exception of social aid) do not seem to have a strong effect on the aid allocation process, the outcome variable appears with a positive sign and is highly significant. According to our results, this shows that Italy has shifted in the last five years towards selectivity. The same table also gives the results for the Netherlands which, in contrast to the previous donor, does not exhibit any relevant changes versus the results obtained in Appendix I.

7 Concluding remarks

In this paper we perform an aid allocation analysis using the OECD-DAC data for 20 aid donors and covering 176 recipients over the period 1980-2003. We attempt to improve on earlier work in this area by utilizing *inter alia* an aid-effectiveness variable 'past outcome' in order to link together aid allocation and aid effectiveness. In line with previous work, we also account for both altruistic and selfish donor motives in the empirical analysis. Empirical results based on Tobit estimates of aid allocation for all individual donors over the above period vary, as expected, quite significantly among donors.

We also test the robustness of our results by estimating individual regressions for the major donors over the period 1990-2003 to account for any major events in the aid arena during this period that could have potentially had an impact on the aid allocation process. The results for 1990-2003 seem to be similar to those derived for the 1980-2003 period, thus implying that this is not the case. Overall, both altruistic and self-interest motives seem to improve the aid allocation process of most donors in the two periods under examination. However, when we restrict our time dimension in the sample further to the 1999-2003 period, some important changes regarding selectivity seem to emerge for a small group of donor countries.

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List of variables and their sources

Variable	Definition	Source
Aid cap	Total real ODA commitments divided by the population of the recipient country	OECD Development Aid Committee database (international development statistics)
Social aid	Bilateral ODA/OA commitments by purpose (social Infrastructures and services)	OECD (Geographical Distribution of Financial Flows)
Trade	Net bilateral exports between the donor and the recipient country	IMF bilateral trade statistics
Population	Population expressed in millions, total	World Development Indicators
Government	Freedom House democracy index	Freedom House Evaluation website
Past outcome	Operations evaluated by OED at the World Bank	Annual Review of Development Effectiveness by World Bank
Infant mortality rate	Infant mortality rate (per 1,000 live births)	World Development Indicators
Gini index	Inequality measures: Gini index x measures the extent to which the distribution of income among individuals or households within a country deviates from a perfectly equal distribution	Human Development Reports
GDP growth	GDP growth (annual per cent) of the recipient lagged one period	World Development Indicators
Arms transfers	Bilateral military exports from the donor country to the recipient country	SIPRI database
Per capita GDP	Real GDP per capita in constant dollars (base year 1985)	Penn World tables

Notes: Method of estimation: Random-effects Tobit model

ρ: standard deviation of the random effects/standard deviation of residuals;

σ_u : panel level standard deviation;

σ_e : standard deviation of the errors;

Standard errors are displayed below the coefficients and z provides information regarding the statistical significance of the variables.

Recall that:

Equation 1 estimates the model without the past outcomes variable;

Equation 2 estimates the full model;

Equations 3 and 4 test to determine whether the model is sensitive to the use of different poverty variables, i.e., the infant mortality rate and the Gini index.

Table 1
Equation 1

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland		Spain		Netherlands		Australia	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.6257	13.72	0.3906	5.27	-1.0200	-5.97	0.6198	14.97	1.3689	5.35	1.2018	55.82	1.8224	5.81	1.0223	13.22	1.1610	9.38	0.0781	1.78
	0.1185		0.0742		0.1710		0.0414		0.2558		0.0215		0.3138		0.0773		0.1238		0.0438	
Trade	-0.0106	-2.53	-0.0003	-0.28	0.0048	1.60	-0.0003	-1.61	0.0011	1.21	0.2197	1.59	-0.0023	-1.60	0.0056	6.42	-0.0015	-1.28	0.0027	3.42
	0.0042		0.0010		0.0030		0.0002		0.0009		0.1385		0.0015		0.0009		0.0012		0.0008	
Population	-1.0014	-4.23	-0.0381	-0.09	-4.9462	-11.14	0.1433	1.28	-2.8501	-4.54	-0.2675	-1.35	1.6488	8.37	1.0695	7.15	-0.0589	-0.44	-0.4839	-2.35
	0.2366		0.4324		0.4439		0.1120		0.6280		0.1983		0.1970		0.1495		0.1350		0.2058	
Government	-0.5504	-3.35	-0.0226	-0.12	0.0485	0.13	-0.1006	-1.30	-1.3230	-3.36			0.2002	1.46	-0.6449	-6.17	-0.0950	-1.18	-0.3337	-1.43
	0.1645		0.1807		0.3760		0.0775		0.3934				0.1374		0.1046		0.0807		0.2336	
Past outcome									0.0085	0.25										
									0.0345											
Infant mortality	0.0180	2.76	-0.0040	-0.48	0.0200	1.60	-0.0010	-0.32	-0.0111	-0.69	0.0017	0.38	0.0050	0.95	0.0043	1.16	0.0051	1.41	-0.0044	-0.50
	0.0065		0.0083		0.0125		0.0030		0.0162		0.0045		0.0052		0.0037		0.0036		0.0088	
Gini index					0.0495	1.81	-0.0006	-0.09			0.0053	0.52	-0.0019	-0.15	0.0459	5.96	0.0042	0.57	0.0053	0.27
					0.0273		0.0066				0.0102		0.0124		0.0077		0.0073		0.0200	
GDP growth	-0.0815	-2.72	0.0496	1.22	-0.0012	-0.02	0.0176	1.27	-0.1228	-1.61	0.0009	0.04	-0.0003	-0.01	0.0743	3.84	-0.0513	-3.42	0.0196	0.44
	0.0300		0.0406		0.0580		0.0139		0.0760		0.0223		0.0280		0.0193		0.0150		0.0447	
Per capita GDP	-0.0001	-1.48	-0.0007	-2.91	0.0004	3.44	0.0000	0.80	0.0000	0.02	-0.0002	-3.11	-0.0002	-2.81	0.0000	-0.41	0.0001	3.40	-0.0006	-4.90
	0.0001		0.0002		0.0001		0.0000		0.0002		0.0001		0.0001		0.0000		0.0000		0.0001	
Arms transfers	0.0000	0.02	-0.0055	-0.56	0.0021	0.63	-0.0008	-0.36	0.0237	0.08	-0.0399	-1.08	-0.0491	-1.25	0.0034	0.42	-0.0061	-0.95	0.0433	1.61
	0.0018		0.0098		0.0033		0.0023		0.3114		0.0369		0.0395		0.0081		0.0065		0.0269	
Constant	4.5174	3.79	4.9293	3.93	11.9168	4.41	2.5053	6.40	17.5508	6.39	-0.0010	0.00	-6.0635	-7.88	-5.0724	-7.13	0.9762	1.74	-4.5007	-3.79
	1.1923		1.2536		2.7008		0.3913		2.7456		0.4766		0.7693		0.7110		0.5599		1.1866	
σ_u	4.2963	9.57	9.5362	19.26	14.0644	21.31	4.0907	30.89	7.9369	8.54	3.1235	9.89	2.9697	7.65	3.6529	9.65	1.6614	10.07	14.4835	42.66
	0.4489		0.4952		0.6598		0.1324		0.9293		0.3159		0.3882		0.3786		0.1650		0.3395	
σ_e	4.4838	28.63	12.0932	61.65	9.2137	31.10	4.5507	65.56	11.3129	30.20	6.3459	57.63	8.2040	·	4.1604	32.31	2.2475	28.38	11.3561	46.68
	0.1566		0.1962		0.2963		0.0694		0.3746		0.1101		0.0000		0.1288		0.0792		0.2433	
ρ	0.4787		0.3834		0.6997		0.4469		0.3299		0.1950		0.1158		0.4353		0.3534		0.6193	
	0.0565		0.0255		0.0237		0.0178		0.0565		0.0322		0.0000		0.0516		0.0484		0.0141	

Table 2
Equation 1

	Italy		Ireland		New Zealand		Portugal		Denmark		Sweden		Norway		Finland		Austria		Belgium	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.4247	3.73	1.3837	1.96	-0.1699	-2.97	3.1462	9.91	1.8066	19.30	0.3128	2.32	1.2018	9.57	2.0420	8.06	-0.0082	-0.09	0.0439	2.56
	0.3815		0.7049		0.0572		0.3176		-0.0935		0.1348		-0.1255		0.2535		0.0926		0.0172	
Trade	-0.0002	-0.48	0.0001	1.36	0.0063	3.77	0.0919	3.46	-0.0115	-5.52	-0.0111	-1.70	-0.0060	-0.98	-0.0004	-0.63	0.0009	0.40	0.0152	0.79
	0.0004		0.0001		0.0017		0.0266		-0.0020		0.0065		-0.0061		0.0006		0.0022		0.0192	
Population	-0.2526	-0.90	0.0547	3.50	0.5264	7.44	-0.6746	-0.51	0.5006	10.69	0.8754	2.62	0.2149	2.40	0.1476	4.21	1.0837	5.91	7.3842	2.81
	0.2792		0.0156		0.0708		1.3305		-0.0468		0.3338		-0.0894		0.0351		0.1833		2.6278	
Government	0.3954	1.99	-0.0074	-0.75	-0.2897	-4.03	-3.5201	-2.54	-0.1181	-3.31	-0.4092	-1.98	-0.0971	-1.50	0.0016	0.08	0.0570	0.46	10.7113	3.62
	0.1984		0.0098		0.0719		1.3843		0.0357		0.2065		-0.0649		0.0219		0.1252		2.9611	
Past																	0.0933	0.87		
outcome																	0.1076			
Infant	0.0293	3.38	-0.0011	-2.46	-0.0077	-2.48	-0.0980	-1.73			-0.0030	-0.35	-0.0002	-0.09	0.0006	0.67	0.0011	0.22	0.9477	6.08
mortality	0.0087		0.0004		0.0031		0.0567				0.0084		-0.0028		0.0010		0.0052		0.1558	
Gini index	0.0360	1.89	0.0012	1.29	0.0166	2.87	0.1965	1.44	0.0039	1.02	0.0255	1.45	-0.0014	-0.23	0.0006	0.31	-0.0177	-1.47	2.3802	6.99
	0.0190		0.0010		0.0058		0.1366		0.0038		0.0176		-0.0060		0.0020		0.0120		0.3404	
GDP growth	0.0247	0.57	0.0040	1.75	-0.0041	-0.26	0.3098	0.85	0.0249	2.64	0.0083	0.19	0.0298	2.14	-0.0047	-1.13	0.0263	1.02	1.3486	1.55
	0.0435		0.0023		0.0157		0.3635		0.0094		0.0429		-0.0139		0.0042		0.0257		0.8717	
Per capita	0.0002	2.19	0.0000	-1.55	-0.0001	-3.75	0.0001	0.15	-0.0001	-3.62	0.0002	2.40	0.0000	-0.57	0.0000	0.44	-0.0001	-1.00	-0.0039	-2.60
GDP	0.0001		0.0000		0.0000		0.0004		0.0000		0.0001		0.0000		0.0000		0.0001		0.0015	
Arms	0.0171	0.48			-0.1169	-0.42			0.0057	0.18	0.0464	1.80	0.3364	0.49	0.1687	0.84	-0.0025	-0.09		
transfers	0.0358				0.2807				0.0314		0.0258		-0.6907		0.2005		0.0270			
Constant	-4.2939	-3.19	0.0199	0.32	0.2336	0.71	-23.1592	-2.91	-1.8748	-9.68	-2.0346	-1.50	-0.1476	-0.35	-0.5554	-3.53	-4.2480	-6.05		-12.70
	1.3453		0.0628		0.3275		7.9476		0.1936		1.3583		-0.4245		0.1573		0.7018		14.8750	
σ_u	3.5439	8.06	0.4673	22.79	5.3006	42.35	0.0000		0.1252	0.00	3.6214	7.73	0.9570	5.52	0.3904	6.75	3.0569	8.72	10.2938	
	0.4396		0.0205		0.1252						0.4688		-0.1732		0.0579		0.3504		0.0000	
σ_e	5.9267	28.16	0.2808	22.03	3.3637	37.87	29.4834	10.78	2.4309	35.19	5.2338	22.64	1.9543	26.18	0.5848	23.03	7.9908	0.00	0.0000	
	0.2105		0.0127		0.0888		2.7340		0.0691		0.2312		-0.0746		0.0254				0.0000	
ρ	0.2634		0.7348		0.7129		0.0000		0.0026	0.00	0.3238		0.1934		0.3083		0.1277		0.0012	
	0.0503		0.0244		0.0130				0.0000		0.0587		-0.0590		0.0662					

Table 3
Equation 2

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland		Spain		Netherlands		Austria	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.6251	15.00	0.3855	5.25	-1.0360	-6.09	0.5162	12.98	1.3614	5.31	1.2018	55.82	1.8276	5.82	1.0001	12.59	1.1628	9.41	0.0840	2.01
	0.1084		0.0734		0.1701		0.0398		0.2563		0.0215		0.3140		0.0794		0.1236		0.0417	
Trade	-0.0009	-1.93	0.0010	1.22	0.0044	1.47	-0.0004	-2.16	0.0011	1.22	0.2265	1.61	-0.0024	-1.65	0.0043	4.75	-0.0015	-1.26	0.0030	2.96
	0.0004		0.0008		0.0030		0.0002		0.0009		0.1402		0.0015		0.0009		0.0012		0.0010	
Population	-0.4324	-1.48	-0.6754	-2.52	-5.0066	-11.91	-0.3158	-3.60	-2.9103	-4.53	-0.2927	-1.40	1.6256	8.07	0.7115	4.47	-0.0464	-0.34	-3.0670	-15.55
	0.2923		0.2680		0.4205		0.0878		0.6428		0.2084		0.2015		0.1591		0.1378		0.1972	
Government	-0.5885	-3.62	0.0235	0.15	0.1053	0.29	-0.1382	-1.81	-1.2999	-3.28	0.0171	0.14	0.2112	1.52	-0.5005	-4.20	-0.0986	-1.22	-0.2415	-1.17
	0.1626		0.1609		0.3570		0.0763		0.3961		0.1184		0.1388		0.1191		0.0810		0.2070	
Past outcome	0.0844	0.66	0.2467	1.56	0.4343	1.79	0.0302	0.49	0.0069	0.20	0.0381	0.43	0.0557	0.49	0.6572	8.37	-0.0374	-0.59	-0.1797	-0.99
	0.1286		0.1584		0.2429		0.0613		0.0346		0.0884		0.1136		0.0785		0.0636		0.1810	
Infant mortality	0.0209	2.94	-0.0035	-0.47	0.0240	1.87	0.0069	2.57	-0.0096	-0.58	0.0017	0.38	0.0050	0.95	0.0070	1.85	0.0046	1.25	-0.0099	-1.15
	0.0071		0.0074		0.0128		0.0027		0.0165		0.0045		0.0052		0.0038		0.0037		0.0086	
Gini Index	0.0004	0.03			0.0426	1.55	-0.0014	-0.23	0.1450	0.47	0.0051	0.50	-0.0024	-0.19	0.0375	4.75	0.0047	0.65	0.0166	0.89
	0.0148				0.0275		0.0063		0.3060		0.0102		0.0124		0.0079		0.0073		0.0187	
GDP growth	-0.0893	-3.03	0.0457	1.11	0.0001	0.00	0.0198	1.40	-0.1217	-1.60	0.0012	0.05	-0.0003	-0.01	0.0789	4.13	-0.0515	-3.44	0.0120	0.26
	0.0294		0.0411		0.0576		0.0141		0.0760		0.0223		0.0280		0.0191		0.0150		0.0461	
Per capita GDP	0.0002	2.18	-0.0004	-3.48	0.0004	3.61	0.0000	-1.04	0.0000	0.07	-0.0002	-3.14	-0.0002	-2.78	0.0000	-0.10	0.0001	3.33	-0.0006	-6.08
	0.0001		0.0001		0.0001		0.0000		0.0002		0.0001		0.0001		0.0000		0.0000		0.0001	
Arms transfers	0.0001	0.07	-0.0044	-0.61	0.0024	0.74	-0.0006	-0.25	0.0401	0.13	-0.0392	-1.07	-0.0485	-1.23	0.0081	0.98	-0.0058	-0.90	0.0369	1.44
	0.0016		0.0072		0.0033		0.0025		0.3131		0.0368		0.0394		0.0083		0.0065		0.0256	
Constant	3.3121	3.04	-2.7637	-2.46	11.0064	4.80	5.2326	11.35	17.2583	6.12	-0.0879	-0.13	-6.1283	-7.88	-5.5581	-7.99	1.0431	1.83	-3.4944	-3.05
	1.0885		1.1217		2.2951		0.4612		2.8178		0.6801		0.7776		0.6958		0.5708		1.1468	
σ_u	3.9038	8.69	10.6424	22.81	14.0687	23.14	4.6071	30.77	7.9791	8.56	3.1184	9.78	2.9405	7.52	3.0965	9.12	1.6682	10.13	11.9976	41.42
	0.4493		0.4666		0.6080		0.1497		0.9319		0.3188		0.3908		0.3396		0.1646		0.2897	
σ_e	4.5194	28.12	12.1028	62.06	9.1756	31.29	4.6447	65.21	11.3033	30.14	6.3462	57.61	8.2041		4.1244	32.43	2.2453	28.36	11.2873	47.30
	0.1607		0.1950		0.2932		0.0712		0.3750		0.1102		0.0000		0.1272		0.0792		0.2386	
ρ	0.4273		0.4361		0.7016		0.4959		0.3326		0.1945		0.1138		0.3605		0.3557		0.5305	
	0.0617		0.0230		0.0224		0.0180		0.0566		0.0325		0.0000		0.0510		0.0482		0.0149	

Table 4
Equation 2

	Italy		Ireland		New Zealand		Portugal		Denmark		Sweden		Norway		Finland		Austria		Belgium	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	Z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.6732	10.36	1.4512	2.06	-0.1780	-3.13	3.1929	9.96	1.8033	19.18	0.1598	5.82	1.2025	9.57	1.0737	17.38	-0.0362	-0.35	0.0421	2.45
	0.1614		0.7049		0.0569		0.3207		0.0940		0.0274		-0.1256		0.0618		0.1029		0.0172	
Trade	-0.0003	-1.09	0.0001	1.42	0.0069	3.46	0.0911	3.40	-0.0122	-5.78	0.0001	0.09	-0.0060	-0.99	0.0000	-0.06	0.0033	1.24	0.0119	0.61
	0.0003		0.0001		0.0020		0.0268		0.0021		0.0012		-0.0061		0.0003		0.0027		0.0194	
Population	0.9241	3.13	0.0584	3.57	0.2815	3.63	-2.0933	-1.43	0.4622	9.68	0.5371	4.71	0.2183	2.37	0.1797	9.19	1.3875	0.14	1.2973	0.47
	0.2952		0.0163		0.0775		1.4600		0.0478		0.1140		0.0919		0.0196		0.1975		2.7867	
Government	0.3299	2.46	-0.0079	-0.82	-0.3031	-4.38	-3.1035	-2.21	-0.0999	-2.76	-0.1516	-1.99	-0.0982	-1.50	-0.0066	-0.51	0.0943	0.69	13.6966	4.55
	0.1341		0.0096		0.0692		1.4035		0.0362		0.0763		-0.0653		0.0129		0.1367		3.0125	
Past	0.0150	0.15	-0.0104	-1.21	0.2560	4.36	3.8254	2.84	0.1509	4.22	0.3254	5.85	-0.0086	-0.16					2.1123	6.14
outcome	0.1013		0.0085		0.0587		1.3476		0.0357		0.0556		0.0535						0.3438	
Infant			-0.0012	-2.73	-0.0094	-3.04	-0.0878	-1.52					-0.0003	-0.12			0.0013	-1.28	0.9052	5.79
mortality			0.0004		0.0031		0.0577						-0.0029				0.0053		0.1563	
Gini index	0.0047	0.41	0.0013	1.40	0.0158	2.74	0.1124	0.79	0.0021	0.55	0.0105	1.72	-0.0013	-0.21	-0.0005	-0.44	-0.0156	0.69	22.8487	6.49
	0.0114		0.0010		0.0058		0.1426		0.0038		0.0061		-0.0061		0.0011		0.0123		3.5212	
GDP growth	0.0167	0.61	0.0042	1.83	-0.0016	-0.10	0.2631	0.70	0.0245	2.57	0.0050	0.31	0.0299	2.14	0.0023	-0.44	0.0199	7.02	1.2752	1.46
	0.0273		0.0023		0.0156		0.3775		0.0095		0.0161		0.0139		0.0024		0.0272		0.8762	
Per capita	-0.0002	-2.52	0.0000	-1.64	-0.0003	-9.20	0.0002	0.52	-0.0001	-3.13	-0.0002	-5.18	0.0000	-0.57	0.0000	0.95	-0.0004	0.25	-0.0030	-1.98
GDP	0.0001		0.0000		0.0000		0.0004		0.0000		0.0000		0.0000		0.0000		0.0007		0.0015	
Arms	0.0025	0.41			-0.1304	-0.41			0.0065	0.20	0.0212	2.69	0.3370	0.49	0.0236	-4.99				
transfers	0.0060				0.3184				0.0319		0.0079		0.6908		0.0603					
Constant	-5.5118	-6.64	0.0401	0.62	0.6975	1.93	-29.4286	-3.41	-2.0751	-10.27	-2.3039	-5.50	-0.1305	-0.30	-0.5332	0.39	-2.0061	0.73	-21.1600	-3.91
	0.8300		0.0648		0.3619		8.6181		0.2020		0.4191		0.4380		0.0866		0.7410		15.5835	
σ_u	5.4543	17.96	0.4704	22.88	5.1495	40.52	0.0000		0.0987		3.8740	25.40	0.9585	5.52	0.4383	-6.16	6.9742	-2.71	10.2130	
	0.3036		0.0206		0.1271				0.0000		0.1525		0.1737		0.0000					
σ_e	7.2181	54.93	0.2799	22.06	3.3487	37.82	29.4945	10.78	2.4460	35.34	3.5567	44.19	1.9542	26.19	0.6456		8.2915		0.0000	
	0.1314		0.0127		0.0885		2.7357		0.0692		0.0805		0.0746		0.0148					
ρ	0.3635		0.7386		0.7028		0.0000		0.0016		0.5426		0.1939		0.3155	43.57	0.4143		0.0012	
	0.0265		0.0240		0.0135				0.0000		0.0204		0.0592		0.0000					

Table 5
Equation 3

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland		Spain		Netherlands		Australia	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	Z
Social aid	1.6326	15.09	0.7647	5.44	1.7460	34.71	0.5981	13.81	1.3680	5.35	1.1638	46.82	1.8194	5.80	1.0271	13.27	1.1631	9.39	0.0637	1.36
	0.1082		0.1405		0.0503		0.0433		0.2558		0.0249		0.3137		0.0774		0.1238		0.0467	
Trade	-0.0009	-1.96	0.0007	0.51	0.2435	1.02	-0.0003	-1.70	0.0011	1.22	0.0007	0.43	-0.0024	-1.63	0.0055	6.48	-0.0015	-1.35	0.0041	5.34
	0.0004		0.0013		0.2378		0.0002		0.0009		0.0017		0.0015		0.0008		0.0011		0.0008	
Population	-0.3873	-1.31	-1.4366	-4.50		-5.53	-0.0518	-0.56	-2.8200	-4.58	-0.4216	-2.45	1.6673	8.40	1.0956	7.48	-0.0431	-0.33	-0.6025	-3.30
	0.2961		0.3194		30.2157		0.0933		0.6154		0.1721		0.1984		0.1464		0.1306		0.1826	
Government	-0.5934	-3.62	-0.4110	-1.74	14.7511	0.29	-0.1070	-1.17	-1.3302	-3.39			0.2045	1.48	-0.6390	-6.11	-0.0979	-1.21	-0.3465	-1.70
			0.2365		50.3027		0.0917		0.3925				0.1381		0.1046		0.0809		0.2037	
Past outcome																				
Infant mortality	0.0198	2.86	-0.0020	-0.21	5.9458	2.69	0.0011	0.32	-0.0125	-0.82	0.0002	0.04					0.0045	1.32		
	0.0069		0.0099		2.2101		0.0035		0.0152		0.0048						0.0034			
Gini index			-0.1038	-1.97									-0.0030	-0.24	0.0448	5.89			-0.0065	-0.77
			0.0527										0.0124		0.0076				0.0084	
GDP growth	-0.0888	-3.01	-0.0108	-0.24	5.0514	0.39	0.0146	1.05	-0.1220	-1.61	0.0134	0.52	-0.0002	-0.01	0.0748	3.86	-0.0510	-3.40	0.0286	0.64
	0.0295		0.0459		12.8558		0.0139		0.0760		0.0256		0.0281		0.0194		0.0150		0.0448	
Per capita GDP	0.0002	2.11	-0.0001	-0.44	0.0057	0.26	0.0000	-0.75	0.0000	0.00	-0.0003	-3.26	-0.0002	-2.84	0.0000	-0.36	0.0001	3.41	-0.0013	-13.71
	0.0001		0.0001		0.0221		0.0000		0.0002		0.0001		0.0001		0.0000		0.0000		0.0001	
Arms transfers	0.0001	0.04	0.0007	0.11	0.0440	0.06	-0.0008	-0.35	0.0242	0.08	-0.0413	-0.96	-0.0488	-1.24	0.0036	0.45	-0.0063	-0.98	0.0389	1.52
	0.0016		0.0060		0.7683		0.0023		0.3115		0.0429		0.0395		0.0081		0.0065		0.0256	
Constant	3.4959	3.31	11.0761	4.46	-66.7500	-20.16	3.6675		17.7159	6.66	0.6098	0.89	-5.9975	-7.77	-5.0702	-7.20	1.0425	1.88	-3.4214	-3.26
	1.0574		2.4843		33.3800				2.6603		0.6824		0.7718		0.7044		0.5552		1.0486	
σ_u	3.8778	8.90	5.4729	15.93	14.4660	39.66	4.0522	23.10	7.9314	8.53	4.0873	9.36	3.0189	7.80	3.7055	9.87	1.6577	10.07	14.4458	43.13
	0.4356		0.3436		36.4700		0.1754		0.9295		0.4366		0.3869		0.3752		0.1647		0.3349	
σ_e	4.5232	28.24	6.1685	27.09	22.4100	35.54	4.5529	65.39	11.3152	30.21	7.4080	60.48	8.2043	·	4.1574	32.34	2.2488	28.39	11.3190	47.16
	0.1602		0.2277		63.4418		0.0696		0.3745		0.1225		0.0000		0.1286		0.0792		0.2400	
ρ	0.4236		0.4405		0.9763		0.4420		0.3295		0.2334		0.1192		0.4427		0.3521		0.6196	
	0.0600		0.0374		0.0017		0.0226		0.0564		0.0388		0.0000		0.0505		0.0483		0.0140	

Table 6
Equation 3

	Italy		Ireland		New Zealand		Portugal		Denmark		Sweden		Norway		Finland		Austria	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.4457	3.78	0.8486	4.94	-0.1871	-3.31	2.4936	13.29	1.2646	8.79	0.1518	5.52	1.2931	13.15	1.0409	17.44	-0.0082	-0.09
	0.3825		0.1718		0.0566		0.1877		0.1438		0.0275		0.0983		0.0597		0.0927	
Trade	-0.0002	-0.45	0.0014	11.19	0.0086	5.08	0.1083	6.43	-0.0020	-0.31	0.0004	0.30	0.0024	1.34	-0.0001	-0.42	0.0009	0.40
	0.0004		0.0001		0.0017		0.0168		0.0064		0.0012		0.0018		0.0004		0.0022	
Population	-0.0052	-1.21	0.1138	9.44	0.3078	4.50	1.4795	2.41	0.2260	0.93	0.2852	3.19	0.4360	6.21	0.1863	9.77	1.0837	5.91
	0.0043		0.0121		0.0684		0.6151		0.2443		0.0895		0.0702		0.0191		0.1833	
Government	0.3703	1.87	-0.0411	-3.88	-0.3308	-4.98	-1.6602	-2.85	-0.1927	-2.02	-0.1780	-2.28	-0.0250	-0.56	-0.0026	-0.20	0.0570	0.46
	0.1976		0.0106		0.0664		0.5816		0.0953		0.0782		0.0443		0.0129		0.1252	
Past outcome															0.0371	3.82	0.0935	0.87
															0.0097		0.1076	
Infant mortality	0.0302	3.47							0.0053	1.35							0.0011	0.22
	0.0087								0.0039								0.0052	
Gini index	0.0358	1.90	0.0038	4.89	0.0199	3.48	0.2053	3.51	0.0126	1.55	0.0116	2.09	-0.0002	-0.04	-0.0011	-1.07	-0.0177	-1.47
	0.0188		0.0008		0.0057		0.0586		0.0081		0.0056		0.0037		0.0011		0.0120	
GDP growth	0.0234	0.54	0.0024	1.10	-0.0038	-0.25	-0.0287	-0.19	0.0176	0.85	0.0083	0.57	0.0320	3.74	0.0027	1.11	0.0262	1.02
	0.0435		0.0022		0.0149		0.1547		0.0206		0.0146		0.0086		0.0024		0.0257	
Per capita GDP	0.0004	2.11	0.0000	-6.41	-0.0003	-9.83	0.0000	0.14	0.0001	1.00	-0.0003	-6.66	-0.0001	-5.71	0.0000	-3.54	-0.0001	-1.00
	0.0002		0.0000		0.0000		0.0002		0.0001		0.0000		0.0000		0.0000		0.0001	
Arms transfers	0.0167	0.47			-0.1009	-0.38			0.0842	0.88	0.0188	2.44	0.0135	0.44	0.0147	0.25		
	0.0356				0.2644				0.0951		0.0077		0.0310		0.0591			
Constant	-4.6332	-3.55	-0.2563	-3.00	0.8773	2.81	-42.6237	-11.25	-1.3494	-1.57	-2.0832	-5.19	-1.5349	-4.90	-0.6542	-7.15	-4.2491	-6.05
	1.3046		0.0855		0.3120		3.7896		0.8603		0.4017		0.3131		0.0915		0.7019	
σ_u	3.4215	7.33	0.5451	28.69	5.1067	41.03	0.0000		1.8388	5.58	4.1190	21.03	1.7813	9.95	0.5062	16.82	3.0573	8.72
	0.4670		0.0190		0.1245				0.3298		0.1959		0.1791		0.0301		0.3506	
σ_e	5.9489	28.18	0.4586	40.01	3.3452	37.97	25.7063	17.32	2.2648	21.25	3.5765	44.32	2.3358	49.15	0.6446	43.56	7.9931	.
	0.2111		0.0115		0.0881		1.4845		0.1066		0.0807		0.0475		0.0148			
ρ	0.2486		0.5856		0.6997		0.0000		0.3973		0.5701		0.3677		0.3815		0.1276	
	0.0534		0.0188		0.0138				0.0882		0.0247		0.0472		0.0296			

Table 7
Equation 4

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland		Spain		Netherlands		Australia	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.6251	14.99	0.7638	5.43	-1.0325	-6.05	0.2218	2.45	1.3604	5.31	1.1635	46.77	1.8245	5.81	1.0078	12.46	1.1648	9.42	0.0640	1.37
	0.1084		0.1406		0.1706		0.0907		0.2563		0.0249		0.3140		0.0809		0.1237		0.0466	
Trade	-0.0009	-1.94	0.0006	0.48	0.0045	1.51	0.0002	0.57	0.0011	1.22	0.0006	0.35	-0.0025	-1.68	0.0042	4.67	-0.0015	-1.35	0.0041	5.35
	0.0004		0.0013		0.0030		0.0004		0.0009		0.0017		0.0015		0.0009		0.0011		0.0008	
Population	-0.4298	-1.54	-1.4464	-4.50	-4.9204	-11.52	-0.7435	-3.59	-2.8886	-4.56	-0.4162	-2.32	1.6442	8.10	0.7514	4.70	-0.0302	-0.23	-0.5797	-2.97
	0.2784		0.3211		0.4273		0.2074		0.6332		0.1794		0.2029		0.1598		0.1338		0.1955	
Government	-0.5887	-3.62	-0.4034	-1.68	0.0578	0.15	-0.5046	-3.05	-1.3048	-3.30	-0.0516	-0.38	0.2156	1.55	-0.4927	-4.18	-0.1013	-1.25	-0.3463	-1.70
	0.1626		0.2395		0.3757		0.1653		0.3955		0.1372		0.1395		0.1178		0.0813		0.2040	
Past outcome	0.0845	0.66	0.0358	0.21	0.4962	2.04	-0.0272	-0.22			0.0238	0.23	0.0549	0.48	0.6479	8.21	-0.0320	-0.51	-0.0612	-0.33
	0.1286		0.1702		0.2430		0.1242				0.1020		0.1137		0.0789		0.0632		0.1843	
Infant mortality	0.0209	3.13	-0.0020	-0.21	0.0210	1.62			-0.0106	-0.68	0.0002	0.05					0.0040	1.13	-0.0067	-0.80
	0.0067		0.0098		0.0130				0.0157		0.0048						0.0035		0.0084	
Gini index			-0.1041	-1.97			0.0488	1.54	0.1510	0.50			-0.0036	-0.29	0.0359	4.57				
			0.0527				0.0318		0.3046				0.0124		0.0078					
GDP growth	-0.0892	-3.04	-0.0110	-0.24	0.0077	0.13	-0.0295	-0.86	-0.1210	-1.59	0.0134	0.52	-0.0002	-0.01	0.0791	4.14	-0.0510	-3.41	0.0283	0.63
	0.0294		0.0459		0.0579		0.0343		0.0760		0.0256		0.0280		0.0191		0.0150		0.0450	
Per capita GDP	0.0002	2.22	-0.0001	-0.42	0.0004	3.28	0.0001	1.64	0.0000	0.05	-0.0003	-3.25	-0.0002	-2.81	0.0000	-0.05	0.0001	3.35	-0.0013	-13.71
	0.0001		0.0001		0.0001		0.0001		0.0002		0.0001		0.0001		0.0000		0.0000		0.0001	
Arms transfers	0.0001	0.07	0.0009	0.15	0.0022	0.68	-0.0011	-0.32	0.0412	0.13	-0.0411	-0.95	-0.0482	-1.22	0.0086	1.03	-0.0061	-0.94	0.0390	1.52
	0.0016		0.0061		0.0033		0.0035		0.3131		0.0431		0.0395		0.0083		0.0065		0.0256	
Constant	3.3213	3.20	11.0159	4.39	11.7622	4.57	4.2293	2.73	17.3781	6.32	0.7886	0.93	-6.0613	-7.77	-5.5234	-7.82	1.1086	1.94	-3.3346	-3.06
	1.0371		2.5082		2.5751		1.5499		2.7517		0.8461		0.7800		0.7063		0.5709		1.0913	
σ_u	3.9015	8.82	5.4807	15.80	13.9720	22.63	4.2021	17.66	7.9757	8.56	4.0856	9.08	2.9898	7.67	3.1320	9.19	1.6632	10.11	14.4340	42.78
	0.4423		0.3468		0.6173		0.2380		0.9319		0.4501		0.3896		0.3407		0.1645		0.3374	
σ_e	4.5197	28.17	6.1674	27.06	9.1975	31.24	4.7144	29.66	11.3050	30.15	7.4085	60.44	8.2043		4.1240	32.45	2.2471	28.38	11.3219	47.20
	0.1604		0.2279		0.2945		0.1590		0.3749		0.1226		0.0000		0.1271		0.0792		0.2399	
ρ	0.4270		0.4412		0.6977		0.4427		0.3323		0.2332		0.1172		0.3658		0.3539		0.6191	
	0.0607		0.0378		0.0229		0.0335		0.0566		0.0400		0.0000		0.0508		0.0482		0.0141	

Table 8
Equation 4

	Italy		Ireland		New Zealand		Portugal		Denmark		Sweden		Norway		Finland	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.5378	4.01	0.8820	5.13	-0.1819	-3.20	-0.1571	-0.85	1.2335	8.82	0.3244	2.46	1.3000	13.41	2.0117	8.08
	0.3834		0.1719		0.0569		0.1858		0.1398		0.1320		0.0969		0.2489	
Trade	-0.0001	-0.33	0.0016	11.17	0.0022	1.37	0.0139	4.99	-0.0018	-0.33	-0.0112	-1.76	0.0029	1.45	-0.0004	-0.57
	0.0004		0.0001		0.0016		0.0028		0.0053		0.0064		0.0020		0.0006	
Population	-0.0090	-2.26	0.2846	18.61	0.3647	4.59	0.1577	0.77	0.0405	0.32	0.6252	1.88	0.3332	4.08	0.1381	3.95
	0.0040		0.0153		0.0795		0.2054		0.1265		0.3331		0.0818		0.0350	
Government	0.4126	2.09	-0.0261	-3.23	-0.3219	-4.63	-0.3587	-2.73	-0.1817	-1.98	-0.3267	-1.59	-0.0126	-0.28	0.0031	0.14
	0.1974		0.0081		0.0696		0.1314		0.0916		0.2054		0.0459		0.0221	
Past outcome	0.0342	3.88	-0.0098	-1.31	0.2761	4.76	-0.1638	-1.01	0.0035	0.86	0.5758	3.69	0.0603	1.81	0.0242	1.40
	0.0088		0.0075		0.0580		0.1626		0.0041		0.1560		0.0334		0.0174	
Infant mortality	0.4155	2.56			-0.0106	-3.46			0.0125	0.18	0.0041	0.49			0.0009	0.97
	0.1625				0.0031				0.0711		0.0084				0.0009	
Gini index	0.0292	1.55	0.0037	4.76			0.0292	3.76	0.0112	1.36	0.0191	1.11	-0.0004	-0.12		
	0.0188		0.0008				0.0078		0.0082		0.0172		0.0037			
GDP growth	0.0222	0.51	0.0034	1.48	-0.0020	-0.13	-0.0312	-1.06	0.0185	0.90	0.0050	0.12	0.0326	3.78	-0.0049	-1.17
	0.0433		0.0023		0.0154		0.0295		0.0207		0.0421		0.0086		0.0042	
Per capita GDP	0.0004	2.34	0.0000	-1.50	-0.0003	-9.13	0.0001	1.97	0.0000	-0.04	0.0003	2.85	-0.0002	-5.41	0.0002	1.32
	0.0002		0.0000		0.0000		0.0001		0.0000		0.0001		0.0000		0.0002	
Arms transfers	0.0136	0.38			-0.1386	-0.43			0.0877	0.93	0.0575	2.27	0.0177	0.57	0.1539	0.77
	0.0355				0.3223				0.0946		0.0254		0.0313		0.2010	
Constant	-5.6352	-4.14	-0.9821	-17.96	0.9055	2.31	-2.7628	-2.38	-0.8654	-1.25	-3.2897	-2.37	-1.3856	-4.59	-0.5916	-3.66
	1.3610		0.0547		0.3916		1.1617		0.6939		1.3899		0.3019		0.1617	
σ_u	3.3824	7.07	0.6390	28.40	5.1983	39.94	2.4345	8.86	2.0076	7.19	3.5300	7.54	1.6976	11.33	0.4000	6.89
	0.4786		0.0225		0.1302		0.2749		0.2793		0.4681		0.1498		0.0581	
σ_e	5.9333	28.07	0.4589	40.91	3.3406	37.78	1.9691	13.50	2.2485	21.16	5.1557	22.66	2.3362	49.15	0.5831	23.02
	0.2114		0.0112		0.0884		0.1459		0.1063		0.2276		0.0475		0.0253	
ρ	0.2453		0.6597		0.7077		0.6045		0.4436		0.3192		0.3456		0.3200	
	0.0550		0.0180		0.0133		0.0633		0.0718		0.0599		0.0403		0.0663	

Table 1a
Equation 1

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.7029	16.71	0.6545	4.39	-0.1320	-0.62	0.6516	14.53	1.2609	3.54	3.1990	54.80	2.6009	5.86
	0.1019		0.1492		0.2129		0.0449		0.3565		0.0584		0.4435	
Trade	-0.0001	-0.18	0.0007	0.43	0.0039	0.92	-0.0003	-1.20	0.0017	1.41	0.0097	0.08	-0.0031	-1.81
	0.0005		0.0017		0.0042		0.0002		0.0012		0.1201		0.0017	
Population	-0.4312	-1.41	-1.7205	-3.37	-4.0535	-5.76	0.1665	1.50	-3.3324	-4.10	0.4344	2.56	2.3117	9.12
	0.3065		0.5101		0.7041		0.1111		0.8131		0.1696		0.2534	
Government	-0.5000	-2.49	-0.6587	-1.90	0.2955	0.58	0.0511	0.59	-1.4670	-2.50			0.1683	0.87
	0.2004		0.3469		0.5071		0.0864		0.5874				0.1932	
Past outcome														
Gini index	0.0154	1.01	-0.1728	-2.61	0.0370	1.23	0.0017	0.23	0.0043	0.09	0.0173	1.79	-0.0024	-0.13
	0.0153		0.0662		0.0301		0.0071		0.0489		0.0097		0.0185	
Infant mortality	0.0142	1.96			0.0318	2.12	-0.0006	-0.17	-0.0066	-0.29	0.0014	0.31	0.0109	1.26
	0.0073				0.0150		0.0034		0.0226		0.0045		0.0086	
GDP growth	-0.0721	-2.29	0.0216	0.32	-0.0061	-0.09	0.0020	0.13	-0.1022	-0.92	-0.0183	-0.82	-0.0068	-0.16
	0.0316		0.0665		0.0676		0.0155		0.1108		0.0223		0.0418	
Per capita GDP	0.0001	0.83	-0.0003	-1.08	0.0004	2.34	-0.0001	-1.51	0.0000	-0.05	-0.0001	-1.10	-0.0003	-3.45
	0.0001		0.0002		0.0002		0.0000		0.0003		0.0001		0.0001	
Arms transfers	0.0002	0.15	0.0002	0.01	0.0013	0.41					-0.0815	-1.60	-0.1372	-1.28
	0.0016		0.0103		0.0031						0.0508		0.1076	
Constant	3.4486	2.91	16.0732	4.70	7.5911	2.74	2.3855	5.62	19.0109	5.08	-1.6052	-3.90	-7.7252	-7.62
	1.1843		3.4177		2.7740		0.4243		3.7458		0.4111		1.0134	
σ_u	3.3747	8.10	5.9655	11.39	11.3833	10.52	4.0160	23.88	7.9036	6.63	2.5402	10.70	2.2528	3.34
	0.4169		0.5239		1.0819		0.1682		1.1928		0.2373		0.6739	
σ_e	3.9973	23.27	6.0735	20.30	8.5231	24.26	4.0959	49.88	13.5925	23.94	4.9903	45.04	10.4264	
	0.1718		0.2992		0.3514		0.0821		0.5678		0.1108		0.0000	
ρ	0.4161		0.4910		0.6408		0.4901		0.2527		0.2058		0.0446	
	0.0655		0.0551		0.0496		0.0236		0.0617		0.0318		0.0000	

Table 1b
Equation 1

	Denmark		Sweden		Norway		Finland	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.1188	17.56	2.3271	6.74	2.1807	6.75	2.6864	18.70
	0.0637		0.3455		0.3233		0.1436	
Trade	-0.0030	-1.55	-0.0148	-2.29	-0.0062	-0.88	-0.0002	-0.65
	0.0019		0.0065		0.0071		0.0003	
Population	0.5631	8.05	0.7833	3.21	0.1097	1.32	0.0725	4.83
	0.0699		0.2440		0.0829		0.0151	
Government	-0.1026	-2.33	-0.2564	-1.36	-0.0263	-0.37	0.0073	0.63
	0.0440		0.1889		0.0718		0.0116	
Past outcome								
Gini index	0.0046	1.46	0.0298	1.52	0.0071	0.88	0.0020	1.66
	0.0032		0.0196		0.0081		0.0012	
Infant mortality			-0.0095	-1.11	0.0031	0.91	0.0004	0.86
			0.0086		0.0034		0.0005	
GDP growth	0.0143	1.64	0.0653	1.35	0.0283	1.63	-0.0046	-1.87
	0.0087		0.0484		0.0174		0.0025	
Per capita GDP	-0.0002	-6.57	0.0002	2.19	0.0000	-0.11	-0.0001	-2.00
	0.0000		0.0001		0.0000		0.0000	
Arms transfers	0.2595	2.12	0.1008	2.67	0.3696	0.46	0.1047	0.97
	0.1226		0.0378		0.8075		0.1085	
Constant	-1.8921	-7.31	-2.5062	-2.18	-0.7131	-1.58	-0.3134	-4.08
	0.2588		1.1503		0.4501		0.0769	
σ_u	1.8042	13.79	0.0000	0.00	0.0000		0.0000	
	0.1308		0.9567					
σ_e	1.4539	29.80	5.5976	19.77	2.3774	23.25	0.3405	20.27
	0.0488		0.2831		0.1023		0.0168	
ρ	0.6063		0.0000		0.0000		0.0000	
	0.0361		0.0000					

Table 2 a
Equation 2

	USA		United Kingdom		France		Germany		Japan		Canada		Switzerland	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.6963	16.50	0.6538	4.38	-0.1337	-0.64	0.6195	14.94	1.2603	3.54	3.1976	54.77	2.6309	5.94
	0.1028		0.1492		0.2099		0.0415		0.3565		0.0584		0.4431	
Trade	-0.0001	-0.13	0.0006	0.35	0.0036	0.93	-0.0003	-1.78	0.0017	1.41	0.0484	0.39	-0.0031	-1.82
	0.0005		0.0018		0.0039		0.0002		0.0012		0.1232		0.0017	
Population	-0.4619	-1.46	-1.6364	-2.91	-4.1546	-6.43	0.1338	1.14	-3.3616	-4.00	0.3103	1.67	2.2108	8.28
	0.3160		0.5628		0.6457		0.1176		0.8410		0.1860		0.2669	
Government	-0.4970	-2.48	-0.6810	-1.94	0.2485	0.50	-0.0957	-1.19	-1.4620	-2.48	0.1421	1.16	0.2045	1.06
	0.2003		0.3517		0.4940		0.0806		0.5888		0.1229		0.1937	
Past outcome	0.0716	0.46	-0.1184	-0.47	0.4261	1.40	0.0178	0.29	0.0655	0.14	0.1111	1.21	0.1866	1.05
	0.1546		0.2525		0.3052		0.0623		0.4752		0.0919		0.1778	
Gini index	0.0137	1.97	-0.1700	-2.57	0.0244	0.78	-0.0007	-0.11	0.0024	0.05	0.0163	1.67	-0.0056	-0.30
	0.0157		0.0662		0.0313		0.0066		0.0507		0.0097		0.0187	
Infant mortality	0.0143	0.46			0.0313	2.11	-0.0009	-0.31	-0.0066	-0.29	0.0015	0.33	0.0112	1.30
	0.0073				0.0148		0.0030		0.0226		0.0045		0.0086	
GDP growth	-0.0721	0.87	0.0224	0.34	-0.0049	-0.07	0.0176	1.27	-0.1014	-0.91	-0.0177	-0.80	-0.0069	-0.16
	0.0315		0.0665		0.0668		0.0139		0.1110		0.0223		0.0416	
Per capita GDP	0.0001	-2.29	-0.0003	-0.95	0.0004	2.34	0.0000	0.79	0.0000	-0.05	-0.0001	-0.93	-0.0003	-3.36
	0.0001		0.0003		0.0002		0.0000		0.0003		0.0001		0.0001	
Arms transfers	0.0002	0.80	-0.0001	-0.01	0.0016	0.51					-0.0799	-1.60	-0.1341	-1.26
	0.0016		0.0103		0.0031						0.0499		0.1067	
Constant	3.3755	0.16	16.1729	4.77	7.4648	2.74	2.4935	6.28	18.9346	5.00	-2.2494	-3.60	-8.0156	-7.71
	1.2077		3.3913		2.7262		0.3969		3.7884		0.6241		1.0394	
σ_u	3.3914	2.80	5.9544	11.48	11.3595	11.11	4.0872	30.83	7.9122	6.62	2.5085	10.62	2.1185	3.01
	0.4209		0.5187		1.0223		0.1326		1.1950		0.2362		0.7036	
σ_e	3.9934	8.06	6.0745	20.30	8.4910	24.32	4.5510	65.55	13.5906	23.94	4.9890	45.03	10.4263	
	0.1719		0.2993		0.3491		0.0694		0.5678		0.1108		0.0000	
ρ	0.4190	23.24	0.4900		0.6416		0.4465		0.2531		0.2018		0.0396	
	0.0660		0.0547		0.0474		0.0178		0.0618		0.0316		0.0000	

Table 2 b
Equation 2

	Denmark		Sweden		Norway		Finland	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	1.1227	17.67	0.3082	4.73	2.1931	6.73	2.1018	9.96
	0.0635		0.0652		0.3256		0.2109	
Trade	-0.0028	-1.48	-0.0018	-1.14	-0.0064	-0.89	-0.0001	-0.32
	0.0019		0.0016		0.0071		0.0003	
Population	0.5352	7.76	0.6979	4.40	0.1194	1.35	0.0799	3.39
	0.0689		0.1586		0.0883		0.0235	
Government	-0.0970	-2.25	-0.1406	-1.28	-0.0291	-0.40	0.0107	0.69
	0.0431		0.1102		0.0724		0.0154	
Past outcome	0.0629	1.94	0.5628	7.23	-0.0236	-0.32	0.0341	2.82
	0.0324		0.0778		0.0741		0.0121	
Gini index	0.0324		0.0778		0.0741		0.0004	0.33
	0.0036	1.12	0.0112	1.58	0.0079	0.94	0.0012	
Infant mortality	0.0032		0.0071		0.0084		0.0003	0.67
					0.0031	0.93	0.0005	
GDP growth	0.0146	1.68	-0.0015	-0.08	0.0034		-0.0034	-1.33
	0.0087		0.0192		0.0285	1.64	0.0025	
Per capita GDP	-0.0002	-6.43	-0.0002	-3.64	0.0174		-0.0001	-1.91
	0.0000		0.0000		0.0000	-0.12	0.0000	
Arms transfers	0.2517	2.05	0.0687	4.49	0.0000		0.0666	0.63
	0.1226		0.0153		0.3627	0.45	0.1059	
Constant	-1.9825	-7.76	-3.4817	-5.43	0.8077		-0.3870	-3.69
	0.2555		0.6407		-0.6881	-1.51	0.1049	
σ_u	1.8067	14.00	2.8811	13.13	0.4567		0.2003	5.28
	0.1290		0.2194		0.0000		0.0379	
σ_e	1.4535	29.83	3.6234	35.07			0.3030	18.83
	0.0487		0.1033		2.3772	23.25	0.0161	
ρ	0.6071		0.3873		0.1022		0.3040	
	0.0355		0.0378		0.0000		0.0857	

Table 3
Estimation results for selected donors, 1999-2003

	Denmark		Finland		France		Germany		Italy		Japan		Netherlands		Norway		New Zealand		Spain	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	Z	Coeff.	z
Social aid	1.7750	9.77	3.1240	14.38	1.9460	15.14	0.7350	6.29	2.0520	2.04	2.8360	15.18	1.7620	2.44	1.7900	2.76	-0.1340	-1.98	0.5290	2.83
	0.1820		0.2170		0.1290		0.1170		1.0060		0.1870		0.7230		0.6490		0.0680		0.1870	
Trade	-0.0060	-1.34	0.0000	-0.39	0.0050	1.90	0.0000	-1.78	0.0000	0.65	-0.0020	-2.18	-0.0030	-1.11	0.0110	0.47	0.0060	3.45	0.0000	-0.31
	0.0050		0.0000		0.0030		0.0000		0.0000		0.0010		0.0030		0.0230		0.0020		0.0010	
Population	0.4930	3.15	0.0560	2.46	-0.6710	-1.66	0.0560	0.31	-0.0020	-0.75	-2.2690	-1.69	2.7460	3.36	-0.0440	-0.23	-0.8970	-7.50	0.2190	0.93
	0.1560		0.0230		0.4050		0.1820		0.0020		1.3380		0.8170		0.1910		0.1200		0.2350	
Government	-0.0840	-0.76	0.0030	0.16	0.0890	0.31	0.0090	0.07	0.0900	0.66	-1.3100	-1.28	-1.0440	-1.67	-0.1040	-0.71	0.2420	1.91	0.0390	0.22
	0.1110		0.0170		0.2890		0.1360		0.1370		1.0220		0.6260		0.1460		0.1270		0.1770	
Infant			0.0010	1.14	0.0030	0.27	0.0110	1.99	0.0040	0.63	-0.0410	-0.85	0.0000	-0.02	0.0040	0.60	0.0010	0.29	0.0000	0.03
mortality			0.0010		0.0110		0.0050		0.0060		0.0480		0.0320		0.0060		0.0030		0.0070	
Gini index	0.0070	1.00	0.0010	0.65	0.0110	0.44	0.0230	2.47	0.0120	0.88	-0.1180	-1.37	-0.0310	-0.54	0.0030	0.21	-0.0030	-0.40	0.0220	1.85
	0.0070		0.0020		0.0240		0.0090		0.0130		0.0860		0.0570		0.0150		0.0070		0.0120	
Past	0.1130	1.13	0.0300	1.74	0.3430	1.16	0.2430	1.88	0.2370	1.69	0.7750	0.72	0.1950	0.29	0.0390	0.24	-0.2900	-2.45	0.4010	2.45
outcome	0.1000		0.0170		0.2970		0.1290		0.1410		1.0760		0.6770		0.1600		0.1180		0.1640	
GDP growth	0.0370	1.52	-0.0010	-0.19	0.0050	0.05	0.0310	0.95	0.0200	0.48	-0.0760	-0.25	0.0560	0.28	0.0000	-0.17	-0.0060	-0.30	0.0570	1.40
	0.0240		0.0050		0.0870		0.0330		0.0430		0.2990		0.1990		0.0000		0.0190		0.0410	
Per capita	0.0000	-2.25	0.0000	-1.42	0.0000	0.46	0.0000	1.56	0.0000	0.57	-0.0010	-1.61	-0.0010	-2.08	0.0950	2.13	0.0000	-6.41	0.0000	-0.71
GDP	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0440		0.0000		0.0000	
Arms			0.3070	0.92	0.0680	4.53			-0.0060	-0.19			-0.0610	-0.56			0.2860	0.25	0.0050	0.16
transfers			0.3340		0.0150				0.0310				0.1090				1.1350		0.0330	
Constant	-2.5260	-4.10	-0.3540	-2.95	0.3340	0.18	-0.0520	-0.07	-1.2900	-1.42	16.3420	2.99	-4.6620	-1.37	-0.2870	-0.30	1.4900	3.02	-2.4010	-2.56
	0.6160		0.1200		1.8290		0.7090		0.9100		5.4590		3.4070		0.9520		0.4930		0.9360	
σ_u	1.6740	7.46	0.0000	0.00	2.6320	4.50	2.4290	10.06	0.0000	.	13.8280	4.74	3.6730		0.0000	0.00	4.8150	43.99	3.1410	8.65
	0.2240		0.0570		0.5850		0.2410				2.9170				1.1090		0.1090		0.3630	
σ_e	1.8720	15.93	0.3260	14.32	4.9720	14.66	3.2920	26.55	3.0330	16.60	33.2420	25.31	22.4920	24.06	3.1770	16.37	1.8450	22.38	3.8700	23.50
	0.1180		0.0230		0.3390		0.1240		0.1830		1.3130		0.9350		0.1940		0.0820		0.1650	
ρ	0.4440		0.0000		0.2190		0.3520		0.0000		0.1480		0.0260		0.0000		0.8720		0.3970	
	0.0710		0.0000		0.0870		0.0510				0.0580				0.0000		0.0110		0.0600	

Table 4
Estimation results for selected donors, 1999-2003

	Sweden		Switzerland		United Kingdom		USA	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Social aid	3.7080	8.84	5.1530	1.92	0.7110	5.91	1.9730	20.75
	0.4190		2.6840		0.1200		0.0950	
Trade	-0.0050	-3.17	-0.0090	-2.35	0.0000	-0.09	-0.0010	-1.89
	0.0020		0.0040		0.0020		0.0000	
Population	0.6270	4.00	3.9970		-0.9200	-1.80	-0.1000	-0.37
	0.1570				0.5110		0.2730	
Government	-0.0390	-0.35	-2.7360	-6.72	-0.7040	-2.07	-0.2710	-1.26
	0.1120		0.4070		0.3400		0.2160	
Infant mortality			-0.0590	-2.28			0.0010	0.14
			0.0260				0.0060	
Gini index	-0.0070	-0.70	-0.1050	-2.18	-0.1640	-2.76	-0.0260	-2.01
	0.0100		0.0480		0.0590		0.0130	
Past outcome	0.3780	3.34	-1.6710	-3.11	-0.2610	-0.94	-0.0030	-0.01
	0.1130		0.5380		0.2770		0.2490	
GDP growth	-0.0240	-0.70	-0.0070	-0.04	0.0020	0.03	0.0570	1.36
	0.0350		0.1610		0.0720		0.0420	
Per capita GDP	0.0000	-2.24	-0.0020	-5.11	0.0000	-0.68	0.0000	-3.03
	0.0000		0.0000		0.0000		0.0000	
Arms transfers	0.0720	3.33	-1.2440	-1.13	0.0030	0.17	-0.0010	-0.53
	0.0220		1.1010		0.0180		0.0030	
Constant	-1.9340	-3.11	1.3980		14.5350	4.23	4.1700	4.15
	0.6210				3.4360		1.0060	
σ_u	0.0000		29.4750	16.08	4.3830	8.27	4.8600	12.16
			1.8340		0.5300		0.4000	
σ_e	4.0160	25.68	15.8380	23.17	4.7880	14.65	2.4030	12.96
	0.1560		0.6840		0.3270		0.1850	
ρ	0.0000		0.7760		0.4560		0.8040	
			0.0300		0.0740		0.0340	