A New Approach to the Allocation of Aid Among Developing Countries: Is the USA more Selfish than the Rest?

Jane Harrigan * (Senior Lecturer, School of Economic Studies, University of Manchester) and **Chengang Wang** (Research Associate, School of Economic Studies, University of Manchester)

Abstract:

This paper attempts to explain the factors that determine the geographical allocation of foreign aid. It develops a theoretical model and uses panel data taking account of the truncated nature of the dependent variable. We run regressions for different groups of donors (USA, non-USA bilateral and multilateral). We find that all the donors respond to recipient need in their allocation of aid, but compared to the rest the USA puts less emphasis on need and more emphasis on donor interest e.g. geopolitical, commercial, and other links with specific recipients. We conclude that the USA is a more selfish aid donor than other bilateral and multilateral donors when allocating its aid.

JEL Classification: F35, C23, C24.
Key Words: Aid allocation; US aid; Probit model; Panel.

* School of Economic Studies, University of Manchester, Manchester M13 9PL, UK, tel: 44 (161)275 824, Fax: 44 (161) 2754928, Email: jane.harrigan@man.ac.uk

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I. Introduction

'Does aid work?' This question has been a dominant one in the development literature, and yet still the answer seems unclear. There are numerous examples of countries that seem to have used aid to good effect in terms of helping to generate economic growth: Taiwan in the 1950s, Botswana and the Republic of Korea in the 1960s, Bolivia and Ghana in the 1980s, and Uganda and Vietnam in the 1990s. In addition, according to Collier and Dollar (2002), Official Development Assistance (ODA) alone brings 10 million people out of poverty each year. On the other hand, there is much formal and anecdotal evidence that suggests that, in many cases, and in many countries, aid does not work (Boone, 1994). Along with the successful stories mentioned above, there are many countries that have received a large amount of foreign aid but performed poorly in terms of economic growth, for instance, Zambia, Zaire, Niger, Jamaica, Nepal, among others (Mosley, 1987a[1]) whilst countries such as China, Algeria, and Costa Rica received little aid but have, so far, performed well according to a number of different development indicators.

The often disappointing impact of foreign aid has been attributed to a number of different factors in the literature, including corruption, inefficiencies and bureaucratic failures in the recipient countries (Alesina and Dollar, 2000), inappropriate

1. The countries in Mosley's sample are classified into four groups: high aid, high growth; high aid, low growth; low aid, high growth and low aid, low growth. The fact that 22 countries are classified as high aid and low growth (i.e. aid does not seem effective) and 22 are classified as low aid and high growth (i.e. aid does not seem to be necessary) casts doubt on aid effectiveness and also illustrates the country-specific diversity of the aid-growth relationship.

conditionality and aid tying[2] adopted by the donor countries (OECD, 1994), and lack of coordination between donors and between donors and recipients. Apart from these factors, disappointing aid impact might also be due to the inappropriate manner in which donors allocate their aid. There is one constant in the history of aid - the development objectives of foreign aid are often distorted by donors' commercial, strategic, and political motives[3], regardless of donor agencies' mission statements.

If foreign aid partly (or indeed perhaps only) responds to donor's strategic, political and economic consideration, there is indeed no reason for foreign aid to be effective in promoting development of the recipients (Berthélmy and Tichit, 2002). This is not to say that humanitarian motives and donor's strategic, political and economic motives are completely contradictory, but if recipient need does not figure highly in the aid allocation decision it is likely that the impact of foreign aid in promoting development and poverty alleviation will be reduced.

There are strong theoretical grounds for believing that foreign aid can promote economic growth and thereby help bring about development in recipient countries. The Keynesian argument for international assistance is echoed in the Brandt Commission (1980) and the early Two Gap theory of foreign aid (Chenery and Strout, 1966). Developing countries accept financial flows because most are short of capital, which is mainly due to their inability to generate sufficient savings. An injection of

2 Aid tying occurs when donors stipulate that part of the aid funds be used to import goods from the donor country, often at uncompetitive prices.

3 There is ample anecdotal evidence of donor interest influencing aid allocations. Sierra Leone and Israel were both classified as developing countries by the OECD's Development Assistance Committee in 1995 and both had a similar population size. However, Israel is one of the USA's most strategically important allies. From 1969 to 1995, Sierra Leone received an annual average of ODA of US$74 million, while Israel recieved US$937 million which is roughly 13 times the amount allocated to Sierra Leone despite the fact that Israel's income per capita was 27 times that of Sierra Leone.

foreign aid would help relieve countries from this investment bottleneck[4]. At later stages of development, shortages of foreign exchange become the binding constraint, which again can be alleviated by aid inflows.

However, the presence of donors' strategic, economic and political motivations is likely to distort the transfer process and diminish the efficiency gains from the resource reallocation. For example, if aid is used to support so-called 'friendly regimes' which are corrupt or authoritarian with ruling elites showing little interest in broader national development, there may be little correlation between aid and development[5]. Secondly, the conditionality attached to the aid often embodies elements of strategic, economic and political motivations of donors, which may diverge from recipient's own development strategies. The prescriptions of the IMF, World Bank and other bilateral donors, in the form of stabilisation and structural adjustment programmes (SAPs) are often based on pro-globalisation and market liberalisation ideologies (Mosley et al., 1995). Although such aid may promote the spread of donor-supported capitalism and open up the recipient's market to donor commercial interests, the developmental impact of programme loans remains controversial. Strategic and politically oriented transfer may also bring volatility to the recipient's capital market. As Hayter and Watson (1985, p. 214) alleged, it is common that bilateral donors and the World Bank 'intervene, or attempt to intervene, in the policies of a country with political objectives, but cease to lend when their efforts have little chance of succeeding'. Such volatility and uncertainty of aid receipts may well undermine aid effectiveness.

4 In such a transfer, developed donor countries may also gain when the rate of interest on loans is higher than the productivity of capital in the developed donor country and lower than the productivity of capital in the developing recipient country.

Given the importance of the above debates and controversies, this paper seeks to investigate the factors that influence the aid allocations of bilateral donors and multilateral organisations. There is already a large number of empirical studies on aid allocation (for an excellent survey and methodological critique of such work see McGillivray and White, 1993). However, our study can be distinguished from other studies in three respects. First of all, it is based on an explicit economic model. Secondly, a panel data approach is adopted with explicit treatment of recipient and time effects and the truncated nature of the dependent variable. Thirdly, the study is motivated by a particular subset of questions. The international hegemony of the USA and the replacement of the Cold War by the War on Terror means that the allocation of US aid may well be particularly motivated by strategic donor interest rather than recipient need. Indeed, recent material on the U.S. Agency for International Development's (USAID) website seems quite forthright about this:

> "The new century has brought new threats to US security and new challenges and opportunities for the national interest…Pre-empting threats and disasters is not the only reason that fostering development is in the U.S. interest. Successful development abroad generated diffuse benefits. It opens new more dynamic markets for U.S. goods and services. It generates more secure, promising environments for U.S. investment. It creates zones of order and peace where Americans can travel, study, exchange and do business safely. And it produces allies…"

5 Western aid to Mobuto's Zaire or Marcos's Philippines designed to bolster pro-western anti-communist regimes are good examples.

www.usaid.gov/fani/overview (p. 2)

In March 2002, when U.S President George W. Bush proposed the first significant increase in U.S development assistance in a decade, he justified this at the United Nations Financing for Development in Monterrey, Mexico:

> "We fight against poverty because hope is an answer to terror."

The U.S Congress shares this view too.

> A potential threat facing the United Sates after the Cold War may be spread of mass destruction, especially combined with political instability. …'a brief survey of the world's trouble spots showed a fairly striking correlation between economic malaise on the one hand and domestic unrest and political instability on the other'. If the United States can address those problems by using its foreign aid to help to create economic opportunities and invest in human capital, then the chance of conflict may be reduced.
>
> Congressional Budget Office study (1997)

Given these statements, it is interesting to see whether the allocation of US aid to date shows greater responsiveness to donor self interest than that of other bilateral and multilateral donors. If so, this historical practice may well become more dominant in the future given the changing nature of USAID's mission statements in the light of the War on Terror. In order to investigate this idea we make a comparison between US aid and other bilateral aid.

There are also contrasting views on the allocation of multilateral aid. A standard line of argument, supported by a number of empirical studies (e.g. Maizels and Nissanke, 1984; Rodrik, 1995), is that multilateral organisations, because they do not represent the interests of one particular nation, are more likely to respond to recipient need rather than donor interest in their aid allocation. However, many people have argued that two of the Washington-based multilaterals, namely the IMF and the World Bank, predominantly respond to the interests of the U.S. administration in terms of both aid allocation and aid conditionality (e.g. Thacker, 1999, Barro and Lee, 2001, Frey and Schneider, 1986). In order to investigate this we compared US and bilateral aid with aid from the multilaterals[6].

II. The Aid Allocation Literature: A Brief Review

Development economists have always been interested in issues concerning the allocative patterns of foreign aid and its determinants. This has generated a large literature. Studies can be categorised into three broad approaches: explanatory, descriptive and prescriptive analyses (McGillivray and White, 1993). The explanatory studies attempt to explain the observed allocation of aid; the descriptive studies seek to describe or evaluate aid allocation against normative criteria; and the prescriptive studies aim to prescribe the inter-recipient allocation of aid by calculating the amounts of aid each country should receive. For the purpose of this review, we focus on the first group of studies, which has dominated the area so far.

Explanatory aid allocation studies can be categorised according to how they envisage the aid allocation process and hence the type of equations they estimate. McGillivray and White (1993) identify six non-mutually exclusive types of study: recipient need/donor interest; hybrid; bias; developmental; administrative/incremental and limited dependent variable. We review the different approaches below in order to help us decide upon and justify our own chosen methodology.

Recipient need/donor interest studies estimate two separate models of aid allocation - one containing variables to reflect recipient need and one containing variables to reflect donor interest (early well known examples are McKinlay and Little 1977, 1978, 1979 and Maizels and Nissanke 1984). In general, such studies found that the donor interest model performed better than the recipient need model.

The recipient need model is derived from moral and humanitarian argument that absolutely poverty is intolerable and from the economic argument that if the marginal utility of income diminishes, total welfare will be increased by a redistribution of income from the rich to the poor. Hence, there is a moral imperative for governments of developed countries to provide foreign aid because resources have been unequally distributed and/or there has been historical exploitation of poor country resources. As Chandrasekar (1965, p.5) argued, 'foreign aid is an economic problem, it may well be a political problem; but it is ultimately a moral problem … it is a positive factor in the struggle of millions of human being against the age-old enemies of hunger, poverty, disease, and ignorance' . The Pearson Commission on International Development in 1969 (Commission on International Development 1969) emphasised the moral and

6 Our multilateral data set covers all major multilateral aid agencies, not just the World Bank and IMF.

humanitarian motives for providing aid, and the Brandt Commission in 1980 and the Earth Summit in 2002 reiterated this view.

By contrast, the donor interest model is based on the hypothesis that donors seek to take advantage of the strategic and commercial gains they can derive from aid and hence allocate aid to pursue their own self-interests. From the late 1960s, a number of scholars (e.g. Jalée; 1968, Frank, 1969; Hayter, 1971 and 1981; and Hensman, 1971) have argued that aid is used to promote donor's own economic and foreign policy interests and to exercise their political power. The developed countries can exercise their financial muscles directly via their bilateral agencies as well as indirectly through multilateral organisations and international financial institutions (Riddell, 1987). Hence, the ultimate purpose for giving aid is to help spread donor values and ideas, such as capitalisation or more recently globalisation, and to perform the express functions of stabilising pro-Western governments, e.g. Egypt and Philippines, and containing the spread of communism, e.g. South Korea and Vietnam.

A criticism of the donor interest/recipient need approach is that when the models are constructed, they are based separately either on recipient's need or donor's interest (e.g. Wittkopf, 1973; Mckinlay and Little, 1978 and 1979). As a result, there is model specification bias due to omitted variables. Although each individual aid commitment decision can be based on either donor interest or recipient need, there is no ground for assuming that aggregate allocation of aid is purely based on just one set of motives. The correct option should be to adopt the so-called 'hybrid' models, which estimate an aid allocation equation which contains two sets of variables reflecting both the

recipient's needs and donor's interests (as done by Levitt 1968, Wittkopf 1972; Bowles, 1987, Poe and Sirirangsi, 1993).

Although the above types of models have tended to dominate the literature so far, there are a small number of studies, which adopt the 'biases' approach. This work focused on two biases in aid allocation: the population bias and the middle-income bias. A population bias exists when there is an inverse relationship between per capita aid and recipient country size measured by population. There are a number of possible explanations for the existence of this bias. First of all, specialisation in the production process caused by economies of scale induces small countries to trade a higher percentage of their specialised output and import a great deal of their non-specialised products. If business groups and sections of the donor bureaucracy concerned with trade promotion are particularly active, small countries with a high percentage of trade shares are likely to be favoured by donors. Secondly, the population bias can be explained by donor's geo-political interests. As population increases, the marginal political benefit to the donor decreases (Dowling and Hiemenz, 1985). As Isenman (1976, p. 632) notes '…a very small country can potentially help or hurt a donor by its vote in UN or its voice in other international fora'. Since aid allocation is a process established on a nation-by-nation basis rather than a population basis, it offers the small country a bargaining advantage. Consequently, this would push donors to spread their aid across a large number of countries in order to maximise as many good relations with recipients as possible (Arvin and Drewes 2001)[7]. Small countries are also chosen by the donors, since the cost of exerting political leverage is lower in less populous countries and small countries may be more likely to accept the

conditionality attached to the aid programmes. As a result, aid dependency may be higher in small countries than in large countries. Thirdly, it has been argued that the capacity of large countries to absorb additional amounts is questionable as technical and administrative expertise often present bottlenecks to effective utilisation of additional aid (Dowling and Hiemenz, 1985).

The middle-income bias refers to the observation that poorer countries often tend to receive little aid. However, once a certain income threshold has been reached, aid and income per capita become positively correlated. The middle-income bias may creep in mainly due to the economic and political importance of the middle-income countries (i.e. bilateral trade is one consideration) or their relatively well-developed bureaucracies which can administer the aid and make the aid more effective (Dowling and Hiemenz, 1985)[8].

Bureaucratic/Incremental models hypothesise that marginal incrementalism or bureaucratic inertia influence aid allocation and hence estimate allocation equations containing variables such as the preceding year's allocations (Gulhati and Nallari 1988; Gang and Khan 1990; Grounder1991) whilst developmental models (e.g. Davenport, 1970) use developmental variables alone to explain aid allocation - as such they are similar to recipient need models.

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[7] See Mosley (1987b) for a discussion of political and commercial pressures for the diffusion of aid allocation; See Hjertholm and White (1998) for the evidence of aid diffusion among countries.

[8] It is worth noting here that the population or middle-income biases may not be free from incentives based either on the recipient's need or on the donor's interest. This is important, since it matters in hypothesis testing and results interpretation. For example, Wittkopf (1972) treats population as an indicator of political importance, unlike others who treat it as an indicator of recipient's need - Maizels and Nissanke (1984) put population in a recipient's need model while dropping it from their donor interest model.

In recent years, two advances have emerged in the aid allocation literature. One is the recognition of the truncated or censored nature of the dependent variable (the Limited Dependent Variable Approach) in aid allocation studies. Another is the panel data approach (Trumbull and Wall, 1994) in which the relationship between donor and recipient is captured by the fixed-effects coefficients.

Limited dependent variable models address the issue of country eligibility for aid, which is an important part of the aid allocation decision. McGillivray (2003) argues, given the censored nature of the dependent variable in aid allocation which is not properly recognised in the existing empirical literature, that it is likely that most studies have reported biased results, and consequently, much of popular opinion on aid allocation may well be misleading. A more appropriate approach would be to use limited dependent variable techniques such as sample selection models. These portray aid allocation as a two stage process i.e. "Yes/no" (stage one deciding on eligibility) and "if yes, how much" (stage two). Such models can help to explain why some countries receive no aid at all as well as explaining the amounts allocated to those deemed eligible. Examples of this approach include Dudley and Montmarquette 1976 and 1978; Cingranelli and Pasquarello 1985; Poe 1992; McGillivray and Oczkowski 1991. These studies treat aid allocation as a utility maximising problem and often use Probit and OLS to explain the eligibility and amount decisions respectively. It can be argued this method suffers from the risk of introducing a selection bias in the second step, since the fact that a country receives only positive aid flows is not independent of the explanatory variables (Berthelemy and Tichit, 2002).

More recent studies have adopted a Tobit model, which treats the decision on eligibility and the decision on amounts as a single simultaneous process instead of using the OLS method of estimation. However, there are a number of potential difficulties with this approach. The Tobit model relies crucially on the assumptions of normality and homoskedasticity in the underlying latent variable model. If any of these fail to hold, the Tobit model is meaningless (Woodridge 2003, p. 572). Moreover, the Tobit model imposes the condition that the relationship generating the ones and zeros (eligible or ineligible) is the same as the process that produces the positive values (in terms of allocated amounts), which may not be the case in the aid allocation process. One example is the effect of population, which may have a positive effect on eligibility due to the administrative costs (Dudley and Montmarquette, 1976) and a negative effect on the amount of aid allocated due to the population bias. This would require the coefficient on population to have different signs, which is impossible in the Tobit model because they are the same coefficient (Greene, 2000).

In this regard, it is argued in the literature that Heckman's two-step method may be appropriate. The first step is to estimate a Probit model which determines the eligibility of receiving aid, and in the second step, a linear model explaining aid commitments is estimated based only on strictly positive observations and the inverse Mills ratio obtained from the first step to correct selection bias. However, Lewis (1986, p. 59) notes that estimates using this approach seemed to exhibit much greater variability across studies than those using simpler techniques. This may due to a number of factors. First of all, the parameters of the model appear to be sensitive to the presence of heteroscedasticity, or non-normality. Secondly, it is difficult to find

variables that affect the probability of receiving aid and do not enter the linear model in the second step.

Another recent development in the aid allocation literature is the use of panel data. Trumbull and Wall (1994) argue that existing studies based on cross-sectional data do not account for the heterogeneity of recipient countries, and that these models are of limited use if there are unobserved recipient-specific variables that correlate with one or more of the explanatory variables. Variables of this type could be those geopolitical factors such as recipient's colonial histories, their strategic value to donors, their political regimes or their geographical location. A panel data set possesses several major advantages over cross-sectional or time series data. For example, it gives more informative data, more variability, less collinearity among the variables, more degree of freedom and higher efficiency (Baltagi, 1995). Moreover, the groupwise heteroscedasticity can be substantially reduced. The panel data can also be used for the limited dependent variable approach (LDVA) such as the Probit and Tobit models discussed above. Most of the LDVAs can be applied in a panel data setting when the random-effects are introduced. For the Count and Tobit models, fixed-effects can be introduced as well (Woodridge 2002 and Baltagi, 1995)[9].

The above survey of the empirical aid allocation literature illustrates the simple truth, as White and McGillivray (1993) have argued, that the aid allocation process is complex and no one knows exactly how it works. In the real world, donor-recipient

[9] The difference between the fixed-effects and random effects is that individual effect is specified as a group specific constant term in the former, while as a group specific disturbance in the later. Unlike the random-effects model, the error term in the fixed-effects model is assumed to be heteroskedastic and free of autocorrelation. In the case of aid allocation studies, a Tobit model that allows country-specific effects and takes account of the censored nature of the dependent variable may be preferred.

relations are likely to involve the interplay of bureaucratic, political, commercial, developmental and other factors, and these are rarely sufficiently appreciated and accounted for in aid allocation models[10]. As a result there are huge variations in the models employed in aid allocation studies, and as such it is unsurprising that the results generated from existing work also vary, and sometimes even contradict each other.

The above critique of aid allocation studies has helped shaped the methodological approach we employ below in our own study. Firstly, we feel it is important to formulate a mathematical model of the aid allocation process rather than simply starting with an econometric model (to the best of our knowledge there are only two other papers that have adopted such an approach Dudley and Montmarquette, 1976 and Trumbull and Wall, 1994). The mathematical model formulates, albeit in a limited way, our view of what constitute the key factors in the complex real world aid allocation process. From this we derive an econometric model for testing which is essentially a hybrid model incorporating both donor interest and recipient need. We use a panel data set, which is estimated using a fixed effects model. This empirical work is only concerned with countries that receive a positive amount of aid. However, in light of the above discussion of truncated variables we also run the Probit and Tobit regressions using the same set of variables to see if the findings are consistent with the regressions that used only the positive values of aid per capita.

[10] In their attempt to assess the robustness and credibility of empirical results obtained in the literature, McGillivray and White (1993) provided a thorough critical assessment of the methodological properties of various statistical models adopted in those studies. Some of their recommendations for improvement of the methodology include using aid commitments instead of aid disbursement as the dependent variable, avoiding separate recipient need and donor interest in models, and giving consideration to the limited dependent variable and non-random sample selection issues.

III. The model

In order to model the aid allocation process, the first step should be to define the nature of aid. As mentioned above, according to the Keynesian argument for international assistance, developing countries accept foreign aid because most of them can not generate sufficient savings to relieve investment bottlenecks. Developed donor countries may also gain from such transfers when the rates of return on aid are higher than the marginal productivity of capital in their own countries and lower than the marginal productivity of capital in the developing recipient countries. As such, foreign aid can be termed an international public good because the donor countries can only benefit from the total welfare raised by the aid. The implication is that donor countries can benefit from its social returns while the recipients benefit from its private returns as well as its social returns. The aid allocation model that follows is based on the assumption that donors derive welfare or utility from the positive impacts of aid in the recipient country and they aim to maximise this welfare.

Supposing the donor believes that ODA is put to good use by recipient governments, each year a donor country allocates its ODA budget among the m recipients, with the objective of maximising the total impact of ODA to the recipients. Let *H* be the sum of the impacts of the donor's aid on its own welfare, the problem faced by the donor is[11]

$$\text{Max H} = \sum_{j=1}^{m} \theta_j H_j = \sum_{j=1}^{m} \theta_j n_j h_j (n_j, a_j, y_j, p_j) \qquad (1)$$

where H_j = subjectively measured impact on beneficiary j;

h_j = subjectively measured impact on an individual citizen (identical within the country);

n_j = population of beneficiary j;

a_j = aid per capita received by country j;

y_j = per capita GDP of country j;

p_j = an index measures the policy environment in the recipient country

θ_j = a rate of return to the donor from the impact on beneficiary j. This is determined by economic, political and other linkages between donor and recipient.

The above model is based on the following assumptions. y_j appears in the equation since, other things being equal, the poorer the recipient country, the more aid is needed and the more benefit the country will derive from an additional unit of aid. p_j is based on the hypothesis that the better the policy instruments the recipient government employs, the more benefit the country will derive from an additional unit of aid (Burnside and Dollar 2000). In giving aid, the recipient's population n_j can be important. If two countries have the same level of GDP per capita, it is the smaller country that will have the larger financial gap in per capita terms such that the impact of aid per capita will decrease with population size. In summary, the impact of aid on each individual in country j will be an increasing function of aid per capita and a decreasing function of j's per capita GDP and of population. The donor country can only benefit from a proportion of this impact and the rate may depend on the social,

[11] In this model, a given donor will grant a positive amount of aid to every country.

economic as well as political linkages. These assumptions can be represented as follows:

$$\frac{\partial h_j}{\partial a_j} > 0, \qquad \frac{\partial h_j}{\partial y_j} < 0, \qquad \frac{\partial h_j}{\partial p_j} > 0, \qquad \frac{\partial h_j}{\partial n_j} < 0$$

The donor has five options to increase the total impact of its foreign aid, including increasing the magnitude of aid, switching funds from a relatively rich country to a relatively poor country, from a country with bad policies to one with good policies, from a less populous country to a more populous country[12], or from a country with less linkages with itself to one with more linkages with itself.

We can specify the aid impact function on recipient country *j* as the following:

$$H_j = h_j * n_j = \frac{a_j^{\alpha} p_j^{\delta}}{n_j^{\beta} y_j^{\gamma}} * n_j, \qquad 0< \alpha, \beta, \gamma, \delta < 1;\ \alpha+\beta < 1;\ \alpha + \gamma < 1 \qquad (2)$$

The assumption of $\alpha + \lambda < 1$ rules out the possibility that each individual can benefit from given up one unit of income for an additional unit of aid (holding other things constant)[13] and the assumption of $\alpha + \beta$ <1 indicates that there is an effect of economic scale[14].

[12] Note, though $\frac{\partial h_j}{\partial n_j} < 0$, $\frac{\partial H_j}{\partial n_j} > 0$

[13] Each individual person's welfare change is $-1+\alpha+\gamma$, and it should be negative, otherwise each individual would sacrifice one unit of income to get an additional unit of aid. In other words, this condition ensures that aid is not a simple cash transfer that substitutes for productive effort.

[14] When the total aid to a country is given, holding p_j and y_j constant, the marginal impact of population is $1-\alpha-\beta$.

Finally, the donor country is limited by its budget constraint.

$$\sum_{j=1}^{m} a_j n_j = B \tag{3}$$

Substituting (2) into (1) and then solving the constraint problem faced by the donor

$$\text{Max L} = \sum_{j=1}^{m} \theta_j n_j \frac{a_j^{\alpha} p_j^{\delta}}{n_j^{\beta} y_j^{\gamma}} + \lambda(B - \sum_{j=1}^{m} a_j n_j) \qquad 0< \alpha, \beta, \gamma, \delta < 1;\ \alpha+\beta < 1;\ \alpha + \gamma < 1$$

The first order conditions are

$$\frac{\partial H}{\partial a_j} = \sum_{j=1}^{m} \frac{\alpha \theta_j a_j^{\alpha-1} p_j^{\delta}}{n_j^{\beta-1} y_j^{\gamma}} - \sum_{j=1}^{m} \lambda n_j = 0 \qquad 0< \alpha, \beta, \gamma, \delta < 1;\ \alpha+\beta < 1;\ \alpha + \gamma < 1 \tag{4}$$

$$\frac{\partial H}{\partial \lambda} = B - \sum_{j=1}^{m} a_j n_j = 0 \tag{5}$$

Equating (4) and (5) gives the optimal allocation of aid per capita for each recipient.

$$a_j = \left[\frac{\alpha \theta_j p_j^{\delta}}{\lambda n_j^{\beta} y_j^{\gamma}} \right]^{1/(1-\alpha)} \tag{6}$$

Taking the log transformation, we have

$$\log a_j = \frac{1}{1-\alpha}\log\alpha + \frac{1}{1-\alpha}\log\theta_j + \frac{-1}{1-\alpha}\log\lambda + \frac{-\beta}{1-\alpha}\log n_j + \frac{-\gamma}{1-\alpha}\log y_j + \frac{\delta}{1-\alpha} p_j;$$
$$j = 1,....., m \tag{7}$$

Equation (7) provides the basic model, which will be estimated and tested in the next section. However, before proceeding with the regression analysis, we first elaborate on a number of issues concerning the representation of aid impact in our model.

Donor's benefit vs. recipients' benefits

Consider a scenario where all the recipient countries are homogenous in terms of population, GDP per capita and policy index. A donor can choose between two approaches to its allocation of aid: one is to allow the allocation of aid resources to recipients to be influenced by the linkages θ_j between donor and recipient, the other is to ignore such linkages. The impacts of the first strategy on recipients can be varied, since some recipients will benefit more and the others benefit less. Note $\frac{\partial h_j}{\partial a_j} > 0$ and $0 < \alpha < 1$ ($y_j = y_k$, $n_j = n_k$ and $p_j = p_k$, $j,k \in m$). The recipient countries as a whole would gain less when the donor adopted the first strategy since resources may be shifted from more productive countries to less productive countries. If all recipients are equally important (in terms of linkages) to the world as a whole but vary in terms of their importance to a specific donor, the world as a whole would also gain less when the first strategy is adopted by the donor.

Comparison among donors

In the previous section, only one donor is considered when recipient countries are given as homogenous. Now, we assume that there are two identical donors, again assuming recipient countries are homogenous and equally important to the world as a whole. The only difference between these two donors is that one donor has the same

level of linkages as those applied to the world with all the recipients, the other's linkages with recipients varies. In order to maximise the total impact of its aid allocation on its own welfare, the first donor would simply distribute its aid equally among recipients, and the second would put more emphasis on the linkages. It is clear that if both donors achieved their objectives in this way, the benefit to the world generated from the first donor's aid is larger than that from the second. As a result, in the empirical literature on aid allocation, when comparisons are made between donors based on a recipient's need model, it is likely that R^2s are higher for donors such as Denmark and Sweden, but lower for the USA and France since the recipient need model fits well with the Nordic countries' emphasis on the developmental and humanitarian needs of developing countries. It is also likely that the standard deviation of the fixed-effects coefficient would be lower for the former and higher for the later when the fixed-effects panel approach is adopted.

IV. Results

Equation (7) can only be tested when one can find an appropriate measure for each variable. However, there is no generally agreed measurement for the linkage θ_j between donor and recipient. The linkage could be colonial ties, strategic alliance, cultural similarity, proximity in terms of geographic location, commercial links and so on. In order to overcome this problem, following Trumbull and Wall (1994) we adopt the panel data approach and introduce fixed-effects to take account of the donor-recipient linkage (Hummels and Levinsohn (1995) use the same approach to capture OECD countries specific trade relationships)

By introducing a time subscript, adding the error term and replacing the parameters with coefficients in equation (7), we obtain the following equation for estimation:

$$\log a_{jt} = b_0 + b_j + b_t + b_1 \log n_{jt} + b_2 \log y_{jt} + b_3 p_{jt} + e_{jt};$$
$$j = 1,.....,m; \quad t = 1,.....T \qquad (8)$$

where $b_t = \frac{-1}{1-\alpha}\log \lambda_t$, $b_j = \frac{1}{1-\alpha}\log \theta_j$, $b_1 = \frac{-\beta}{1-\alpha}$, $b_2 = \frac{-\gamma}{1-\alpha}$, $b_3 = \frac{\delta}{1-\alpha}$ and λ_t^* is the equilibrium shadow values of aid. Note $-1 < b_1 < 0$, $-1 < b_2 < 0$ *and* $b_3 > 0$, Since, 0< α, β, δ, γ < 1; $\alpha+\beta$ < 1 and $\alpha + \gamma$ < 1.

In equation (8), a_{jt}, n_{jt} *and* p_{jt} are measured as country j's ODA commitment per capita in year t, j's population in year t and j's average growth rate of year t-2 to t. Note our measurement of the policy environment is different from the one employed by Burnside and Dollar (2000), which is a composite index of inflation, budget surplus and openness based on the growth regression. Their index only covers three policy instruments and takes short-run effects; while ours is an ex-post measure of the medium term policy environment (proxied by growth performance)[15]. The ODA commitment data is obtained from the OECD's on line database whilst data for the other variables is taken from the WDI indicators CD-Rom. Detailed definitions of each variable and data sources are given in Appendix Table 1 and descriptive statistics and the correlation matrix for the variables are given in Appendix Tables 2 and 3.

[15] In other empirical work on aid allocation, the growth rate is interpreted as the absorptive capability. Although differences exist between the two concepts, it is often the case the better policy environment

Using equation (8), we investigate and contrast the allocation of USA bilateral aid and non-USA bilateral and multilateral aid to see whether the USA, given its geo-political hegemony, displays specific behaviour in its aid allocation. We also contrast non-USA bilateral ODA with multilateral ODA allocations to see if there are differences in allocation. Non-USA bilateral aid is equal to total DAC bilateral ODA less the USA ODA. One might question whether equation (8) is applicable to the other two types of aid flows apart from USA ODA since it is based on a model that only takes account of one donor's behaviour. However, if coupled with the assumptions that all the donors within any one of the two groups use the same subjective measure of the impact of ODA to a recipient and each recipient is equally important to all the donors within the group (see Trumball and Wall, 1994), equation (8) is readily applicable.

It is well understood that generally, a panel data set can be estimated in three ways, depending on whether the individual cross-sectional effects are considered to be constant, fixed or random. The corresponding statistical models are OLS, fixed effects (FE) or random effects (RE). These three models have their own advantages and disadvantages. The OLS model is simple to estimate, but the assumption that the individual-specific effects do not differ is often too strong to hold in most of cases. The FE model allows variation in these effects, but including dummy variables as extra regressors make it less efficient than the RE model because of the loss of degrees freedom. Finally, the RE model relegates the individual-specific effects into the error term and assumes that they are uncorrelated with the regressors. Violation of this assumption may cause the RE model to produce biased and inconsistent

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is, the more efficiently the additional resource can be utilised and therefore the larger the absorptive

estimates. There is no rule of thumb for choosing among the three models. The choice is largely dependent on three factors: the model specification, the sample size and the statistical testing.

In the case of this study, the model specification favours a fixed-effects model over the other two and the sample size is quite respectable (with 2484 observations covering 32 years and 138 countries). Three tests are usually applied to identify the best statistical model. The likelihood ratio (LR) statistic is applied to test the country fixed effects vs. OLS, with a high value favouring country effects over OLS. The Lagrange multiplier (LM) statistic is applied to test the country and time random (&fixed) effects vs. OLS, with a high value favouring random (&fixed) effects over OLS. The Hausman statistic is applied to test fixed effects vs. random effects, and a high value favours the fixed effects model over random effects. These test statistics are supplied at the bottom of Table 1, which presents the results from pooled regression and two-way fixed effect panel regression based on equation (8), and they indicate that the two-way (country and time) fixed effects model is statistically a better model than the others.

capability.

Table 1: Estimation Results Based on Eq.(8)

	LUSMPC	LNUSMPC	LMULTPC[16]
OLS Without Group Dummy Variables			
LPOP	-0.2153 (0.0122)***	-0.4242 (0.0102)***	-0.4664 (0.0092)***
LGDPPC	0.0797 (0.0198)***	-0.2431 (0.0165)***	-0.4539 (0.0149)***
GDPGRAV	0.0011 (0.0043)	0.0369 (0.0036)***	0.0183 (0.0032)***
ONE	4.4099 (0.2582)***	11.0152 (0.2153)***	12.7654 (0.1948)***
Adj. R Sq.	**.120**	**.398**	**.512**
Least Squares with Group Dummy Variables and Period Effects			
LPOP	0.3416 (0.2166)	-0.8144 (0.1827)***	-0.6034 (0.2153)***
LGDPPC	-0.7775 (0.0748)***	-0.4419 (0.0631)***	-0.3698 (0.0743)***
GDPGRAV	0.0151 (0.0036)***	0.0224 (0.0030)***	0.0202 (0.0036)***
ONE	1.5153 (3.5229)	18.4870 (2.9704)***	14.3178 (3.5017)***
Adj. R Sq.	**.650**	**.755**	**.696**
Diagnostic Test Statistics (No. Obs.= 2484)			
LR1	**2730.50*** **	**2670.35*** **	**1028.60*** **
LR2	**294.77*** **	**270.32*** **	**172.87*** **
LM	**9869.94*** **	**7820.32*** **	**1778.34*** **
HS	**59.49*** **	**24.62*** **	**.62**

Notes:

1. Country and time effects are not reported here.
2. Standard errors are in parentheses, and values of degrees of freedom are in square brackets.
3. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5% and 10% levels respectively.
4. The likelihood ratio (LR1) statistic is applied to test the country and time fixed effects vs. OLS, high value favours two way effects over OLS.
5. The likelihood ratio (LR2) statistic is applied to test the country and time fixed effects vs. country fixed effects only, high value favours two-way effects over country fixed effects.
6. The Lagrange multiplier (LM) statistic is applied to test the country and time random (&fixed) effects vs. OLS, high value favours random (&fixed) effects over OLS.
7. The Hausman statistic is applied to test fixed effects vs. random effects, high value favours fixed effects model over random effects.

[16] Though the Hausman test favours random effects over fixed effects in the estimation of LMULTPC, there is no significant difference on estimated coefficients. The coefficients on each explanatory variable are –0.459, -0.382, -0.02 and 12.1478 respectively, and all are significant at 1% level.

Most results in Table 1 are consistent with expectations. Basing our analysis on the statistically superior two-way fixed effects model (least squares with group dummy variables and period effects) we can see that in all the regressions the coefficients on GDP per capita (LGDPPC) have the expected negative sign and are significant. The coefficients on population (LPOP) also have the expected negative sign and are significant, apart from the USA aid regression (LUSMPC). The absolute values of coefficients on LGDPPC and LPOP are less than one as the model predicted. These results suggest that all donors (US, non-US bilateral, and multilateral) respond to recipients' need in their aid allocations and tend to allocate their funds effectively, that is: the poorer recipients (in terms of GDP per capita) get more aid but this is not excessive (i.e. the coefficient is not less than -1); the larger recipients (in terms of population size) get less aid, except in the case of aid from the USA. The significant positive coefficient on growth rate (GDPGRAV) indicates that donors reward those recipients with a good policy environment. The coefficient of 0.02 (roughly the average from the four regressions for the different donors) on GDPGRAV indicates that a country with one percent higher growth rate than another is likely to get 2 per cent more aid, other things being equal.

It would seem from the above results that most donors have responded to recipients' need, but to what extent? One way to address this issue is to look at the adjusted R square from the OLS regressions. The adjusted R square statistics for the estimations of USA (LUSMPC), non-USA bilateral aid (LNUSMPC), and multilateral aid (LMULTMPC) allocations are 0.12, 0.40 and 0.51. These statistics explain how much variation is explained by the recipient's need variables (LPOP, LGDPPC and GDPGRAV). In other words, the USA, non-USA donors and multilateral donors

allocate 12, 40 and 51 percent of their aid based on recipient's need respectively. It is clear that USA puts less emphasis on recipients' need than other bilateral donors do, and other bilateral donors care less than multilateral donors do. We further divided the sample into three periods: 70s, 80s and 1990 onwards, the results are consistent with those presented in Table 1[17].

The time effects and donor-recipients specific effects are reported in Tables 2 and 3 respectively. The time effects in the model are supposed to capture the changes in the budget constraint facing the donor. They worked rather well. As can be seen from Table 2, the coefficients on the years between 1969 and 1977 and on the years after 1992 are negative whilst for the rest of the years they are the positive. This does seem to capture the genuine trend of donors' aid budget.

The donor-recipients specific effects are of interest here since they capture the linkages between donor and specific recipient's which might reflect such factors as long term strategic relations, economic linkages, colonial ties, geographic approximation and culture or language similarities. If a donor puts more weight on linkages i.e. donor interest, rather than recipient need, the standard deviation would be larger. The standard deviation of the fixed effects coefficients are reported in the bottom right of Table 3. These standard deviation statistics suggest that the United States places more emphasis on the inter-linkages than other bilateral donors and other bilateral donors put more weight on linkages and donor interest than multilateral donors do.

[17] Due to space limits, these results are not reported in the paper but are available from the authors

Table 2: Period effects Coefficients Based on Eq.(8)

Year	Lusmpc	Lnusmpc	lmultmpc
1969	-0.0698	-0.76749	-0.56767
1970	-0.2310	-0.68978	-0.44373
1971	-0.0157	-0.61696	-0.41315
1972	-0.0690	-0.39962	-0.39694
1973	-0.0986	-0.28199	-0.23303
1974	-0.0550	-0.21801	-0.21983
1975	0.011771	-0.14686	-0.1621
1976	-0.0141	-0.26572	0.119042
1977	0.00641	-0.16288	-0.0283
1978	0.312638	0.007519	0.070427
1979	0.155117	0.13825	0.111442
1980	0.270561	0.198279	0.235691
1981	0.094707	0.209492	0.272398
1982	0.264265	0.180462	0.266008
1983	0.240181	0.236582	0.211534
1984	0.527163	0.313981	0.11402
1985	0.387169	0.31262	0.105578
1986	0.301846	0.246204	0.025653
1987	0.106089	0.204137	0.13073
1988	0.132856	0.306991	0.240262
1989	0.047896	0.357429	0.199523
1990	0.118346	0.197953	0.088881
1991	0.35524	0.094033	0.207509
1992	0.029516	0.136874	0.082585
1993	-0.06928	-0.00659	-0.04598
1994	-0.12406	-0.08282	-0.0193
1995	-0.18554	-0.02199	0.064347
1996	-0.38191	-0.0505	-0.09336
1997	-0.41373	0.053823	-0.12593
1998	-0.46786	0.125918	0.001514
1999	-0.15696	-0.04921	0.040056
2000	-0.12273	-0.02717	-0.05244

request.

Table 3: Fixed-effects Coefficients Based on Eq.(8)

Country	lusmpc	Lnusmpc	lmultmpc		Country	lusmpc	lnusmpc	lmultmpc
Angola	-1.15	0.03	0.17		Lithuania	0.59	-0.44	-0.11
Argentina	-0.42	0.82	0.27		Macao	1.83	-3.12	-2.80
Armenia	1.74	-0.80	0.51		Madagascar	-1.64	0.01	0.32
Azerbaijan	-0.89	-0.87	0.13		Malawi	-1.74	-0.37	-0.03
Bahamas	3.23	-3.56	-1.29		Malaysia	-0.96	1.22	-0.84
Bangladesh	-2.23	1.22	1.11		Maldives	0.78	-1.20	-0.16
Barbados	2.11	-1.81	-0.64		Mali	-0.98	0.03	0.44
Belarus	0.12	-1.29	-1.18		Malta	2.74	-1.08	-1.50
Belize	3.06	-1.00	-0.66		Mauritania	0.08	-0.32	0.60
Bhutan	-1.10	-0.42	0.10		Mauritius	1.06	-0.32	-0.19
Bolivia	1.34	0.42	0.83		Mexico	-1.21	0.89	0.16
Bosnia-Herzegovina	2.54	1.07	1.19		Micronesia	4.78	-1.17	-1.19
Botswana	2.02	0.24	0.03		Moldova	0.67	-1.97	-1.03
Brazil	-1.30	1.36	0.61		Mongolia	0.11	-0.08	-0.14
Bulgaria	0.39	-0.25	0.09		Morocco	0.35	1.23	0.25
Burkina Faso	-1.58	-0.18	-0.01		Mozambique	-1.58	0.68	0.37
Burundi	-1.89	-1.03	-0.22		Namibia	1.46	0.52	0.39
Cambodia	-1.44	-0.37	-0.13		Nepal	-2.39	-0.39	-0.04
Cameroon	-1.06	0.74	0.22		Nicaragua	1.04	-0.29	0.59
Cape Verde	2.46	-0.03	0.77		Niger	-1.05	0.00	0.09
Central African Rep.	-1.16	-0.39	-0.12		Nigeria	-3.14	-0.37	-0.66
Chad	-1.51	-0.68	-0.14		Oman	1.91	-1.85	-1.21
Chile	0.09	0.31	-0.49		Pakistan	-2.00	1.14	0.80
China	-3.96	2.07	0.75		Palestinian adm.areas	2.44	1.21	1.74
Colombia	-0.42	0.29	-0.02		Panama	2.27	-1.39	-0.36
Comoros	-0.14	-1.20	-0.37		Papua New Guinea	-1.23	1.09	0.05
Congo Dem.Rep. (Zaire)	-2.21	0.20	0.03		Paraguay	0.16	-0.05	-0.19
Congo, Rep.	-0.32	0.08	-0.51		Peru	0.66	1.17	0.16
Costa Rica	2.19	-0.23	0.01		Philippines	-0.73	1.78	-0.07
Cote d'ivoire	-1.25	0.98	0.26		Poland	-0.25	1.20	0.73
Croatia	1.44	-0.43	-0.40		Romania	-0.80	-0.12	0.33
Cyprus	4.07	-1.07	0.49		Russia	-0.24	1.21	0.57
Czech Republic	-0.17	-0.31	0.23		Rwanda	-1.23	-0.29	0.09
Djibouti	0.88	0.09	-0.16		Samoa	1.84	-0.59	-0.20
Dominica	2.23	-2.02	1.00		Sao Tome & Principe	0.67	-1.63	-0.28
Dominican Republic	0.97	-0.93	-0.05		Senegal	-0.09	0.80	0.83
Ecuador	0.10	-0.03	0.16		Seychelles	4.20	-0.10	-0.74
Egypt	0.87	1.56	0.72		Sierra Leone	-0.87	-1.29	-0.61
El Salvador	2.01	-0.66	0.21		Singapore	0.40	0.23	-0.94
Equatorial Guinea	-0.39	-2.21	-0.94		Slovak Republic	0.46	-0.55	-0.01
Eritrea	-1.01	-1.02	-0.74		Slovenia	1.43	-0.91	1.07
Estonia	0.47	-0.42	-0.11		Solomon islands	0.28	-0.58	-1.00
Ethiopia	-2.99	0.02	0.31		South Africa	-0.03	1.23	0.72
Fiji	1.13	-0.08	-0.96		Sri Lanka	-0.82	0.87	0.54
Gabon	1.37	0.88	-0.14		Sudan	-1.90	-0.24	0.18
Gambia	0.61	-1.47	-0.44		Suriname	1.11	-0.51	-1.26
Georgia	0.61	-0.88	0.35		Swaziland	1.81	-0.87	-0.27
Ghana	-0.98	0.25	0.39		Syria	-0.34	-1.45	-0.49
Grenada	3.84	-1.47	0.11		Tajikistan	-0.60	-1.78	-0.24
Guatemala	0.93	-0.58	-0.11		Tanzania	-2.58	0.85	0.36
Guinea	-0.27	-0.01	0.56		Thailand	-1.43	1.74	-0.18
Guinea-Bissau	-0.30	-1.01	-0.10		Togo	-0.70	-0.59	-0.08
Guyana	1.51	-1.12	0.11		Tonga	2.24	-0.71	-0.68
Haiti	0.46	-1.08	-0.05		Trinidad & Tobago	0.37	-1.92	-0.05
Honduras	1.24	-0.60	0.58		Tunisia	0.65	1.34	0.39
Hong Kong, China	0.46	-0.46	-1.07		Turkey	-0.60	1.46	0.15
Hungary	0.10	-0.02	0.54		Turkmenistan	0.19	-2.22	-1.45
India	-3.78	1.75	1.14		Uganda	-1.65	0.08	0.63
Indonesia	-2.19	2.16	0.17		Ukraine	-0.49	-0.02	-0.12
Iran	-1.61	-0.21	-0.83		Uruguay	1.03	-0.72	-0.78
Israel	6.03	1.40	-1.22		Uzbekistan	-2.02	-0.67	-1.26
Jamaica	2.53	0.16	0.19		Venezuela	-0.54	-0.56	-0.55
Jordan	2.41	0.85	0.67		Viet Nam	-3.37	0.37	-0.01
Kazakstan	-0.18	-0.04	-0.76		Yemen	-2.24	-0.55	-0.23
Kenya	-1.44	0.73	0.26		Zambia	-0.43	0.83	0.31
Korea, Dem. Rep.	0.28	0.22	0.31		Zimbabwe	-0.44	0.69	0.00
Kyrgyz Rep.	0.78	-0.36	0.96		Std.	1.72	1.03	0.65
Laos	-1.69	-0.20	0.22		lusmpc	1.00		
Latvia	0.34	-0.56	-0.20		lnusmpc	-0.33	1.00	
Lebanon	0.91	0.00	0.72		ldacmpc	0.27	0.80	
Lesotho	0.37	-1.00	-0.11		lmultmpc	-0.20	0.54	1.00

Following the standard deviation, the correlation matrix of fixed effects is also given in the bottom right of Table 3. The correlation between the USA-recipients fixed effects and non-USA or multilateral-recipients fixed effects are negative. This suggests that the USA may behave quite differently from other donors, perhaps due to its economic size, political hegemony and its location. In other words, the donor interest linkage effects between USA and recipients as captured by the fixed effects coefficients are quite different to those for the other donors. By contrast, non-USA and multilateral–recipient fixed effect are positively correlated illustrating similarities in terms of their donor interest as captured by the fixed effects coefficients.

Since this data set covers 138 countries, it would be very demanding to discuss all the recipient specific fixed effects for all the donors. However, as mentioned at the start of this paper, one of the motivations of our research was to speculate whether, in light of the current War on Terror, aid allocations in the future, especially on the part of the USA, are likely to become more influenced by geo-political concerns. For example, aid flows may become more geared towards supporting pro-Western regimes in the Middle East and North Africa. If we can establish that such practices are already embedded in the geographical allocation of aid then we can speculate that this may well intensify in years to come. Hence, in looking at the donor and country specific fixed effects coefficients we shall concentrate the discussion on one region – the Middle East and North Africa and pay particular attention to the behaviour of the USA as a donor. The statistics of fixed effects coefficients for MENA countries are given in Table 4.

Table 4: donor-recipients fixed effects coefficient for MENA countries

Country	lusmpc	Lnusmpc	ldacmpc	lmultmpc
Egypt	0.87	1.56	1.74	0.72
Iran	-1.61	-0.21	-0.99	-0.83
Israel	6.03	1.4	3.58	-1.22
Jordan	2.41	0.85	1.21	0.67
Lebanon	0.91	0	0.1	0.72
Morocco	0.35	1.23	0.79	0.25
Sudan	-1.9	-0.24	-0.73	0.18
Syria	-0.34	-1.45	-1.13	-0.49
Tunisia	0.65	1.34	1.14	0.39
Turkey	-0.6	1.46	0.91	0.15
Yemen	-2.24	-0.55	-1.04	-0.23

As can be seen from Table 4, donor interest, as represented by the fixed effects coefficient, has a strong positive effect in the allocation of US aid to Israel and Jordan, two of the most strategically important US allies in the region, and a strong negative effect on US aid allocation to Iran, Sudan, and Yemen, countries traditionally hostile to US foreign policy in the region. Interestingly, a cursory glance at Table 3 also shows large positive fixed effects coefficients between the USA and a number of Central American and Caribbean Basin countries (Bahamas, Barbados, Belize, Costa Rica, Dominica, El Salvador, Grenada, Jamaica, Panama) again, not surprising given the past importance of such countries in the US fight against communism on her back doorstep.

As discussed in Section Two, there is often a middle-income bias in aid allocation. We now address this issue as well as the potential 'bandwagon effect', which describes the fact that when a recipient receives more aid from one donor, this may attract more from other donors as well. To do this we introduce the square term of GDP per capita (LGDPPC2) and other aid into the regressions and the results are reported in Table 5. The coefficients on other ODA are statistically significant and positive in all of the

regressions for the different donors. This lends support to the argument that a 'bandwagon effect' exists in the aid allocation process. The coefficients on the square term of GDP per capita are negative and significant in all the regressions apart from the regression for multilateral aid. This indicates that bilateral donors, unlike multilateral donors, display middle-income bias in the process of their aid allocation[18].

So far, our empirical work has only been concerned with the countries that receive a positive amount of aid. However, as Dudley and Montmarquette (1976) have pointed out, in reality the process of aid allocation entails two kinds of question: whether to allocate aid to given potential recipient, and in the case of a positive answer, how much to give to this recipient. Ignoring this (i.e. the truncated nature of the aid variable) may generate bias in the estimation. Responding to this comment, we further run the Probit and Tobit regressions with the random effects[19] using the same set of variables mentioned above; the results are given in Table 6 (corresponding to base regressions) and Table 7 (corresponding to middle income bias and bandwagon effect). The findings are quite consistent with the previous regressions, which only used the positive value of aid per capita.

[18] It should be noted however, that although the coefficient on the square term of GDP per capita is significantly negative for USA aid, this does not necessarily mean that the middle income bias exists in the USA aid allocation process since the coefficient on GDP per capita is not significant. The true meaning of this outcome is simply that there is a non-linear relationship between USA aid per capita and GDP per capita of recipient countries.

[19] Introducing fixed effects into Probit modle is not applicable, therefore, only random effects are considered here. We also estimate the Tobit fixed effects model, the results are similar to those with random effects. These results are available from the authors on request.

Table 5: Tests of 'middle-income bias' and 'Bandwagon effect'

	LUSMPC	LNUSMPC	LMULTPC[20]
Least Squares with Group Dummy Variables and Period Effects			
LPOP	0.3424 (0.2188)	-1.0578 (0.1822)***	-0.5037 (0.2169)**
LGDPPC	0.6661 (0.4348)	2.0535 (0.3621)***	-0.1417 (0.4321)
GDPGRAV	0.0101 (0.0036)***	0.0179 (0.0030)***	0.0164 (0.0036)***
LGDPPC2	-0.1002 (0.0312)***	-0.1755 (0.0260)***	-0.0095 (0.0311)
OTHER ODA	0.1468 (0.0232)***	0.1030 (0.0163)***	0.1917 (0.0247)***
ONE	-3.9641 (3.6024)	13.4861 (3.0063)***	11.0629 (3.5729)***
Adj. R Sq.	.657	.763	.671
Diagnostic Test Statistics (No. of Obs.=2484)			
LR1	2735.46***	2625.41***	1058.37***
LR2	245.44***	246.51***	124.18***
LM	10336.9***	8040.19***	1377.48***
HS	66.11***	43.08***	4.85

Notes:

1. Country and time effects are not reported here.
2. Standard errors are in parentheses, and values of degrees of freedom are in square brackets.
3. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5% and 10% levels respectively.
4. The likelihood ratio (LR1) statistic is applied to test the country and time fixed effects vs. OLS, high value favours two way effects over OLS.
5. The likelihood ratio (LR2) statistic is applied to test the country and time fixed effects vs. country fixed effects only, high value favours two-way effects over country fixed effects.
6. The Lagrange multiplier (LM) statistic is applied to test the country and time random (&fixed) effects vs. OLS, high value favours random (&fixed) effects over OLS.
7. The Hausman statistic is applied to test fixed effects vs. random effects, high value favours fixed effects model over random effects.

[20] Though the Hausman test favours random effects over fixed effects in the estimation of LMULTPC, there is no significant difference on estimated coefficients. The coefficient on each explanatory variable are -0.3749, 0.0305, 0.0164, -0.0255, 0.2004, and 8.6212 respectively, and the significance keeps the same as it reported in the table.

Table 6: Probit and Tobit Estimation Based on Eq.(8)

	LUSMPC		LNUSMPC		LMULTMPC	
	PROBIT	**TOBIT**	**PROBIT**	**TOBIT**	**PROBIT**	**TOBIT**
ONE	5.3440 (0.5471)***	5.4761 (0.1475)***	6.7650 (1.0793)***	9.6049 (0.1483)***	6.8993 (1.2722)***	11.4608 (0.2433)***
LPOP	0.0648 (0.0267)**	-0.0396 (0.0074)***	-0.0999 (0.0476)**	-0.3544 (0.0074)***	-0.0953 (0.0556)*	-0.4001 (0.0119)***
LGDPPC	-0.6523 (0.0311)***	-0.5364 (0.0113)***	-0.2667 (0.0524)***	-0.2167 (0.0103)***	-0.3447 (0.0553)***	-0.4434 (0.0127)***
GDPGRAV	-0.0003 (0.0049)	0.0029 (0.0021)***	-0.0343 (0.0077)***	-0.0002 (0.0018)	-0.0400 (0.0060)***	0.0044 (0.0019)**
Rho	***0.6404*** ***(0.0210)******		***0.6828*** ***(0.0298)******		***0.6077*** ***(0.0271)******	
Sigma(v)		***0.9341*** ***(0.0038)******		***0.7660*** ***(0.0030)******		***0.8283*** ***(0.0039)******
Sigma(u)		***1.0449*** ***(0.0103)******		***0.6797*** ***(0.0125)******		***0.6233*** ***(0.0193)******

Notes:

1. Standard errors are in parentheses, and values of degrees of freedom are in square brackets.
2. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5% and 10% levels respectively.
3. No. of Observation is 3543 for all the regressions listed above.

Table 7: Probit and Tobit Estimation including Middle Income Bias and Bandwagon Effects

	LUSMPC		LNUSMPC		LMULTMPC	
	PROBIT	**TOBIT**	**PROBIT**	**TOBIT**	**PROBIT**	**TOBIT**
ONE	-18.8033 (1.7360)***	-1.6854 (0.4020)***	15.8911 (3.9485)***	2.9615 (0.2623)***	-9.3298 (3.8150)***	8.1168 (0.4331)***
LPOP	0.2357 (0.0208)***	-0.0359 (0.0077)***	-0.1769 (0.1071)*	-0.3278 (0.0064)***	-0.0239 (0.0749)	-0.3059 (0.0131)***
LGDPPC	3.7945 (0.4372)***	1.0674 (0.1089)***	-3.4191 (1.4672)**	1.5137 (0.0745)***	2.5207 (0.8360)***	-0.3976 (0.0995)***
GDPGRAV	0.0100 (0.0064)	-0.0046 (0.0023)**	0.0102 (0.0184)	0.0017 (0.0017)	-0.0418 (0.0091)***	0.0023 (0.0020)
LGDPPC2	-0.2935 (0.0295)***	-0.1049 (0.0077)***	0.2450 (0.1068)***	-0.1253 (0.0051)***	-0.1837 (0.0550)***	0.0026 (0.0067)
OTHER ODA	5.5116 (0.2934)***	0.4699 (0.0087)***	5.1573 (0.4393)***	0.2570 (0.0054)***	4.4089 (0.3267)***	0.4512 (0.0053)***
Rho	***0.6466*** ***(0.0256)******		***0.8656*** ***(0.0371)******		***0.1508*** ***(0.1075)***	
Sigma(v)		***0.8923*** ***(0.0034)******		***0.7426*** ***(0.0029)******		***0.7628*** ***(0.0036)******
Sigma(u)		***0.9862*** ***(0.0125)******		***0.7458*** ***(0.0096)******		***0.5171*** ***(0.0180)******

Notes:

1. Standard errors are in parentheses, and values of degrees of freedom are in square brackets.
2. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5% and 10% levels respectively.
3. No. of Observation is 3543 for all the regressions listed above.

V. Conclusion

Our results indicate that both bilateral and multilateral donors respond to recipient need in their allocation of foreign aid i.e. poorer countries (in terms of GDP per capita) get more aid. All donors also respond to a good policy environment in recipients. However, compared to other donors the USA puts less emphasis on recipient need – only about 12 per cent of US aid is allocated on the basis of recipient need (and bilateral donors care less about recipient need than multilateral donors). The USA also places more emphasis on its own donor interest (as represented by

donor-recipient specific linkages) than others do and in this respect behaves quite differently from other donors. Donor interest seems to be a particularly important aspect in the allocation of US aid to the Middle East and North Africa, Central America and the Caribbean Basin - all of which have long been regarded by the US as geopolitically strategic regions. In short, the US seems to be a more selfish donor than the rest in that it pays less attention to recipient need and more attention to its own interests when allocating its aid budget.

We feel that the above findings are important given the manner in which the US in the new millennium seems to be articulating a view whereby American interests are increasingly invoked as a justification for aid. An important aspect of these interests is likely to be the pursuit of the War on Terror. There is already evidence that the allocation of US aid in the Middle East and North Africa, as well as in other strategic regions, has been influenced by linkages between the US and recipients. Given this finding, there is reason to suspect that such a practice may well intensify in the future.

We also found a 'bandwagon effect' in aid allocation i.e. when a recipient receives more aid from one donor this may attract more from other donors as well. In addition, bilateral aid seems to display middle-income bias. Again, both of these findings might have important implications for future aid allocations give the current geopolitical climate. A skewing of US aid towards strategically important countries, such as allies in the MENA region, may have a similar effect on aid from other donors via the bandwagon effect, and given that many such countries are middle-income countries, this may reinforce the middle income bias of bilateral aid allocations. An important question, which deserves research, is whether such potential determinants of future aid allocations will significantly reduce the developmental impact of global aid flows. There is already evidence (Collier and Dollar 2002) that

sub-optimal geographic aid allocation has reduced the potential poverty alleviation impact of aid.

Appendix Table 1: Variable Definitions and Data Sources

	Definitions	**Source**
DACMPC	Total ODA commitment by DAC countries/Population (constant 2001 price, US$)	OECD –DAC ON LINE DATA BASE
NUSMPC	Total ODA commitment by non-US DAC countries/Population ("")	
USMPC	ODA commitment by US/Population ("")	
MULTMPC	Total ODA commitment by multilateral organizations/Population ("")	
GDPGRAV	Three year Average GDP Growth Rate	WDI Indicators CD-ROM
POP	Population	
GDPPC	GDP per capita (constant 1995 Price, US$)	

Appendix Table2: Descriptive Statistics

	Mean	Std.	Min.	Max
LDACMPC	2.08	1.78	0.00	7.18
LNUSMPC	1.88	1.68	0.00	7.18
LUSMPC	0.91	1.21	0.00	6.95
LMULTMPC	1.52	1.54	0.00	6.78
GDPGRAV	3.80	4.99	-40.49	57.92
LPOP	15.25	1.86	10.64	20.96
LGDPPC	6.99	1.22	4.34	10.70
LGDPPC2	50.29	17.65	18.83	114.40

Appendix Table 3: Correlation Matrix for Listed Variables

	LDACMPC	LNUSMPC	LUSMPC	LMULTMPC	GDPGRAV	LGDPPC	LPOP	LGDPPC2
LDACMPC	1.00							
LNUSMPC	0.95	1.00						
LUSMPC	0.65	0.44	1.00					
LMULTMPC	0.68	0.68	0.44	1.00				
GDPGRAV	0.03	0.05	-0.01	-0.02	1.00			
LGDPPC	-0.13	-0.16	-0.08	-0.24	0.11	1.00		
LPOP	-0.41	-0.41	-0.18	-0.40	-0.03	-0.27	1.00	
LGDPPC2	-0.15	-0.17	-0.09	-0.24	0.11	1.00	-0.27	1.00

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