

New Perspectives on Foreign Aid and Economic Development



B. MAK ARVIN

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This book is dedicated
to the memory of my late father,
Mansor Arvin.

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Preface

Foreign assistance has been the focus of considerable attention in recent years. Not coincidentally, it has also gone through significant changes. Major donors have been shifting their priorities in allocating aid since the end of the Cold War and have been attempting to redress past failure of aid. This volume presents a broad overview of these changes, focusing in particular on the issues of aid disbursement, equity, and efficiency.

Assembled with researchers, graduate students, and policy makers in mind, the volume is logically organized, starting with an examination of allocation of aid, then building on that foundation to treat the question of efficacy of aid. Based on the discussion of contributors, it appears that general consensus is within reach on the twin issues of allocation and effectiveness of aid and its role in the New World Order. It is hoped that the contributors' fresh look at these issues will lead to a better understanding of the role and scope of foreign aid and the policy debate on economic development in the new millennium.

I thank two anonymous referees for detailed comments, Cecilia Castillo for patient and superb editorial assistance, A & B Typesetters and Editorial Services for terrific copyediting, and Marisa Scigliano for useful comments on several parts of the manuscript as well as assistance with the production of the index. These individuals should not, however, in any way be held responsible for this volume's content.

To Marisa, my wife, I also owe special thanks for sustaining and loving me every day. To my son, Luciano, I am indebted for a new perspective on life.

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New Perspectives on Foreign Aid and Economic Development
ARVIN

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Introduction

B. Mak Arvin

In the past half-century, members of the Organization for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC) directed over a trillion dollars' worth of foreign assistance to developing countries, making aid the single most important factor in international relations and the national economy of many nations.¹ Even though, over the same period, many of the main indicators of well-being such as life expectancy, child health, and education have shown marked improvements, still today some three billion people (half the world's population) live in poverty, that is, on less than two dollars a day; about half of these live on less than a dollar a day—in other words, in absolute poverty.

Much has been written on the subject of foreign aid in the past fifty years. During this time, aid has collected its share of supporters and detractors. Notwithstanding those who condemn aid outright,² it is fair to say that the negative attitudes surrounding aid that are prevalent today underscore a perception that aid has failed. Some critics place the blame on recipient governments, citing corruption, aid fungibility,³ weak governance, or poor economic policies as culprits. Others point to donors' weakness in allocating limited aid funds. Thus, failure of aid has been attributed to a number of factors. These include directing technical assistance toward incorrect or insufficient types of capacity-building while ignoring the importance of institutions; providing aid when recipients are in the throes of serious upheaval or open conflict; giving aid when countries are debt-ridden with no ability to put aid to good use; affording recipients little chance or responsibility in identifying or contributing to aid projects; disbursing aid for political or strategic reasons in order to gain or preserve the loyalty of recipients, including sustaining good relations with former colonies and countries with other historical ties; and maintaining a commercial interest in the provision of aid, for example, as evidenced by the failure of donors to completely untie their aid. There are yet others

who attribute failure of aid to neither side, but to exogenous and stochastic factors such as harsh physical environments—as is the case in many parts of Africa. The complexities of aid and aid programs may be evident in this long list of factors. It suffices to say that foreign aid programs have always revealed a wide range of motivations.

The end of the Cold War provided an opportunity for donors, especially the United States, to place more emphasis on the soundness of recipients' economic policies and management rather than their politics. This means that, although geopolitical and commercial imperatives continue to play a significant role in the distribution of aid—as is evident, for example, by a continuing lion's share of U.S. aid being directed toward Egypt and Israel—today, there is greater concern that disbursement ought to be linked to the efficiency of use by the recipient. Thus, those countries with strong management and sound economic policies, and those who initiate trade liberalization and participate more effectively in the global economy appear to be earmarked to receive preferential treatment. After all, donors have not abandoned the economic growth of less developed countries (LDCs) as a main objective of their aid programs. Nonetheless, economic growth, by itself, is not enough if the majority of the citizens of these countries continue to suffer from the ills of poverty and poor health and deprivations in education, democracy, and other basic human needs.

Development aid faces a daunting challenge in meeting the international development goals set out in the OECD's *Shaping the 21st Century: The Contribution of Development Cooperation*—a 1996 document that has been endorsed by the G-7, the World Bank, the United Nations, the International Monetary Fund (IMF), and seventy-seven developing nations.⁴ These sentiments are echoed in the World Bank's 2000 *World Development Report* that stresses the need to address not just the “economic” dimensions of poverty but also the “noneconomic” dimensions, which include lack of education, poor health, discrimination, powerlessness, vulnerability, fear, and violence.

Based on the foregoing discussion, two central issues in the recent aid discussion emerge: the allocation and the efficacy of aid. This volume is aimed at making a contribution in these two areas, discussing, inter alia, the optimal and the intertemporal allocation of aid, the role and accountability of nongovernmental organizations (NGOs) in the allocation process, the importance of “untying” aid, a new perspective on low levels of aid, and links between the allocation patterns of donors. Additional topics covered deal with the impact of aid on economic growth, democracy, wage inequality, and the role of governance and institutional capacity in aid effectiveness.

Although the issues of aid allocation and efficacy are not mutually exclusive, the contents of this volume are divided into two parts.

Part I, addressing allocation, comprises six chapters. Simon Feeny and Mark McGillivray (Chapter 1) provide a model of intertemporal aid allo-

cation. Determinants of the amounts of aid to developing countries have received considerable attention in the literature. Most research has been econometric, seeking to test a variety of hypotheses, often relating to the relevance of various recipient need or donor interest variables, using cross-country aid receipt data. A number of relatively recent studies have focused on time series data for individual aid recipients. While this approach is of significant appeal in a number of respects, these studies implicitly assume that aid to the recipient under consideration is determined independently of aid to other recipients. Such an assumption will almost always be wrong. Feeny and McGillivray address this and other weaknesses in previous studies by estimating an econometric model of intertemporal aid allocations to Papua New Guinea. Their results indicate that recipient need rather than donor interests determine the amount of aid to Papua New Guinea.

Earlier it was argued that the end of the Cold War has meant that certain strategic and political motivations for aid have become less important in determining allocation. At the same time, international regimes seem to have pushed donors into more coherent institutional arrangements, some of which constrain donors' foreign aid policies. Dane Rowlands and Ian Ketcheson (Chapter 2) examine the Canadian aid allocation, and those of nine other donors, in sub-Saharan Africa. They test for the presence of stronger links to the allocation patterns exhibited by the other donors, as well as to the activities of the IMF and the World Bank. Specifically, Rowlands and Ketcheson tackle the important question of how the degree to which aid flows from different donors became more closely aligned, or less, in the 1990s compared with the preceding decade. The question of aid coordination is especially critical for sub-Saharan Africa given the extent of poverty in the region, its debt, the fact that international capital flows have essentially bypassed it, and the operation of a large number of donor agencies (on average 40–50) in a single recipient country.

Mark McGillivray, Jennifer Leavy, and Howard White (Chapter 3) build on the notion that a range of factors that may be classified as commercial and political, as well as developmental, affect the allocation of aid among recipient countries. They develop a supply-side model to derive optimal aid allocations by maximizing an objective function containing these variables, subject to the constraint of the total aid budget. An index of donor performance is constructed for four donors—the United States, Japan, the United Kingdom, and France for the period 1977 to 1997—by comparing actual allocations with the optimal allocations by each donor. McGillivray, Leavy, and White find that, by this measure, France has the best performance and the United States the worst. The results confirm the importance of commercial and political considerations in aid allocations and show that these concerns conflict with development objectives.

During the past decade NGOs have become valued partners for aid donors in allocation of development aid. It is generally thought that

NGOs' flexibility, small size, and altruistic motivation make them more effective in attaining the social and humanitarian objectives set for aid. However, some development specialists have argued that the features that make for greater flexibility and reach can also have a detrimental effect on those that aid is designed to assist. Lacking a formal means of ensuring that policies, schemes, and programs are actually meeting their stated objectives, poor people can be highly disadvantaged when dealing with foreign or non-local NGOs. Exacerbating these factors, it has been argued that NGOs are often highly dependent on international donors, whose program priorities may overlook or misunderstand the needs and aspirations of their intended beneficiaries. Under such conditions, it has been feared the gap between local priorities and NGO accountability can be wide. Drawing on primary field research, Craig Johnson (Chapter 4) shows how villagers in southern Thailand were able to influence the terms on which an internationally funded NGO prioritized and allocated aid within their community. He argues that the village's ability to shape the terms on which the NGO intervened in their community was dependent on a number of factors. Among these were the organizational ability of the recipient community, limited resources of the NGO, and donor stipulations regarding group formation and public participation. Johnson's findings suggest that poor people can influence development policy and, more fundamentally, that stipulations aimed at encouraging and demonstrating public participation can improve accountability between NGOs and their intended beneficiaries.

An important issue in the question of allocation and effectiveness of aid is the extent of "tying" by donors. Tying practices are at odds with local ownership and are viewed by many as incompatible with the promotion of effective development partnership. Developing countries, in particular, have long argued that aid tying is undesirable because it limits choice; that is, it reduces their ability to make their own decisions on how to allocate the resources available to them.⁵ It is also argued that tied aid undermines aid effectiveness because aid is aimed at supporting commercial interests rather than focusing on poverty reduction and sustainable development. Thus, willingness to untie aid is often seen as a measure of donor countries' commitment to aid effectiveness. In 1998, DAC members agreed to work toward a recommendation to untie bilateral aid to the least developed countries. OECD ministers and G-7 leaders endorsed this initiative. Negotiations have been underway since then, and an agreement was reached in April 2001.⁶ Siegfried Schönherr and Kurt Vogler-Ludwig (Chapter 5) demonstrate that the economic benefits on the German economy of giving tied aid are overestimated and those of untied aid are underestimated. They maintain that the same is likely to be true for other donors, that is, giving untied aid does not "cost" as much as it is commonly believed. The policy implication of the analysis of this chapter is, of

course, that donors should direct their efforts to further reduce the tying requirements in their aid allocations.⁷

Allocation of foreign aid by DAC countries rose steadily since 1950, reaching a peak in 1992. Aid experienced a general decline between 1992 and 1997, increased slightly in 1998 and 1999, and sustained a decline in 2000 when it stood at \$53.1 billion. Clearly, as a percentage of donors' gross domestic product (GDP), aid has experienced a steady decline in recent years. The recent fall in aid flows has been attributed to a number of factors introduced earlier, among them the end of the Cold War, less positive public sentiments toward foreign assistance in the presence of growing domestic challenges, and fungibility of aid. Sajal Lahiri and Pascalis Raimondos-Møller (Chapter 6) provide another possible explanation for the low levels of aid. According to their analysis, the culprit can be the free-riding behavior of other donors. They then explain how the presence of international terms of trade can reduce the extent of such free riding. In order to arrive at their conclusions, they develop a two-donor, one-recipient model of international trade. Representative consumers in both donor countries are altruistic toward the citizens of the recipient country. Each benevolent donor government decides on the level of aid by maximizing the welfare of its respective consumer, taking the behavior of the other donor as given. The authors compare the outcome of this "Nash equilibrium" with the equilibrium when the two donor governments coordinate their aid decisions in the case of both exogenous and endogenous terms of trade. Coordination of aid decisions, of course, mitigates free riding.

Overall, the contributors in Part I show that although recipient need plays a role in the allocation of aid, commercial and political imperatives remain strong—acting in conflict with development objectives. Furthermore, donor aid coordination in general, and in the untying of aid in particular, is ultimately in the interest of both sides, benefiting the recipients and reducing long-term dependency on aid.

The four chapters in Part II deal with efficacy of aid. In Chapter 7, Rukmani Gounder attempts to understand whether foreign aid can promote economic growth. Many studies in the past have examined the relationship between aid and growth in developing countries. Some have argued that aid has had a positive effect on growth by augmenting domestic resources or enabling the import of necessary commodities. Others have pointed to the disappointing growth record of aid recipients, suggesting that aid has reduced these countries' savings and investment efforts. Empirical studies have been inconclusive, providing a mixed body of evidence. It is therefore clear from both the theoretical and empirical literature that the aid–growth relationship is controversial. In one of the only contributions to this literature that deals with an island economy, Gounder presents an empirical analysis of the aid–growth relationship for the Solomon Islands. Foreign aid flows have become an important feature

for most island economies in terms of being a major source for foreign exchange and resource needs. The question is whether, on the whole, the Solomon Islands has benefited from these flows. Gounder employs a neoclassical production function to estimate the aid–growth nexus. An autoregressive distributed lag approach is utilized to estimate the model using time series data for the period 1975–1997. Gounder tests the extent to which foreign aid flows and how investment, labor force savings, and exports affect growth. In addition, various components of total aid, such as grant aid, loan aid, and technical cooperation grants, as well as bilateral and multilateral aid, are used to measure the disaggregated impact of aid. The results indicate that the various integrants of aid, as well as aid in total, have a significant impact on economic growth.

According to Freedom House’s latest survey *Freedom in the World*, over 55 percent of the world’s population in 2001 live in societies that are considered only “partly free” or “not free.” Specifically, 35.35 percent of the world’s population, representing 2.17 billion people, fall within the latter category—living in countries where basic political rights are absent and basic civil liberties are widely and systematically denied. Despite the fact that over the years there has been a strong trend toward democratization in the developing world and in Central and Eastern Europe, the benefits of democracy have been shared unevenly. In particular, substantial challenges remain in Africa where democracy remains fragile. In light of this, a relevant question is whether aid, distinct from other tools such as trade and diplomatic sanctions, has the power to promote democracy where needed. Obviously, democratization cannot be achieved simply by pointing foreign aid to support and hold elections. The main task of foreign aid is to bring about conditions that would allow democracy to flourish and be sustained. These conditions include improving the education of the citizens and building and supporting a civil society. Although many countries’ policies now include promotion of democracy as an objective of their foreign aid programs,⁸ empirical research on the relationship between aid and democracy is quite a new undertaking. In Chapter 8, B. Mak Arvin, Francisco Barillas, and Byron Lew ask whether the level of democracy in developing countries is responding to the level of foreign aid and/or whether the pattern of aid flows is dictated by the level of democracy in LDCs. Their findings suggest that aid has a positive effect on democracy in only a few countries and that donors typically do not take democracy into account when allocating their aid.

A very clear trend during the past decade has been the growing concern for improving aid effectiveness across the donor community. A number of recent influential publications, such as the 1998 World Bank research report *Assessing Aid: What Works, What Doesn’t, and Why*, provide evidence that aid works best in those countries with strong institutions, sound policy environments, and good governance. These results have not

gone unchallenged. Key issues include the fragility of the underlying econometric analysis in these studies. A comprehensive and critical review of these results and the issues surrounding aid effectiveness is the subject of Chapter 9 by Jonathan Beynon in which he draws a set of policy conclusions for a more efficient allocation of aid around which there can be a broad consensus.

Michael Benarroch and James Gaisford (Chapter 10) turn to one aspect of foreign aid that has not received attention in the aid literature, namely, the effect of foreign aid on wage inequality between skilled and unskilled labor in recipient as well as donor countries. They treat labor's decision to acquire skills as endogenous and allow a continuum of vintages within the skill-intensive high-tech sector. In their model, experience in producing more advanced vintages gives rise to learning spillovers that enhance sectorwide productivity. The traditional sector, on the other hand, is intensive in unskilled labor. Whenever there is either home bias in consumption or real resource costs associated with aid, a pure unilateral transfer will reduce both wage inequality and skill formation in both sides in the short run, and will still cause overall reductions for at least one side in the long run. In particular, Benarroch and Gaisford's analysis suggests that over time, aid that facilitates technology transfer typically increases wage inequality and skill formation in the recipient country, but has the opposite effect in the donor country. Hence, using aid to hasten the pace of technology transfer to the Third World may have serious repercussions that need to be kept in mind.

Several key issues discussed in this book are related. For instance, the argument that untying of aid is useful to recipients and costless to donors is linked to the notion that, in the interest of better allocation and efficacy, donors need to coordinate their aid efforts—acting in concert with like-minded donors. Another suggests that there is a good chance that improved governance in LDCs is linked to democratization and that both are linked in some way to aid. Other findings indicate that development projects have improved success rates if they are firmly integrated into a larger strategy for a country or region, one that is shared by other aid donors, with full participation by both recipient countries and NGOs alike, rooted in a sound understanding of the country or region and its development situation and needs. Moreover, although aid can be a necessary condition for spurring economic growth, it is not always sufficient to bring real prosperity: access to capital and technology and proper integration into the global economy also matter, but their impact has to be fully examined and monitored to check for possible undesirable side effects.

All in all, the inability to eradicate poverty and other problems of the Third World are bound to haunt the developed nations, crossing their borders in the form of disease, illegal drugs, conflicts, refugees, and environmental degradation.

NOTES

1. In the last decade of the twentieth century alone, DAC countries gave \$50–60 billion of aid to other nations every year.
2. As a matter of fact, some extremists on the right maintain that aid does more harm than good. An equally cynical view on the extreme left is that aid is merely an instrument of exploitation used by donors for their own selfish advantages.
3. Fungibility refers to redirecting aid received for development purposes to other uses including military or transfers from one budget item to another—transfers that would not have taken place without aid and which may be wasteful or suboptimal.
4. Goals outlined in this document include reaching certain thresholds by 2015. For example, they involve reducing by one-half the fraction of people living in extreme poverty, achieving universal primary education, improving access to primary health care, and reducing child and infant mortality rates by two-thirds.
5. In a well publicized 1991 OECD study, *The Tying of Aid*, Catrinus Jepma estimates that the direct cost of tied aid ranges between 15 and 30 percent. This means that developing countries pay on average 15–30 percent more for goods and services procured under tied aid requirements than they would if they could buy from other suppliers.
6. This entailed untying aid in a limited number of categories to the least developed countries, but excluded food aid and capacity-building technical cooperation.
7. The United Kingdom, as announced in its December 2000 “White Paper,” has already unilaterally untied its aid as of April 1, 2001.
8. For example, Canada’s 1995 foreign policy statement, which set priorities for its development program, included promoting human rights, democracy, and good governance.

Part I

Allocation of International Aid

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1

Modeling Intertemporal Aid Allocation to Papua New Guinea

Simon Feeny and Mark McGillivray

INTRODUCTION

There exists a reasonably large literature seeking to explain the amounts of aid allocated to developing countries. Various models and econometric modeling procedures have been used. The “recipient need” and “donor interest” modeling approach has been dominant, especially since the publication of the well-known and influential paper of Maizels and Nissanke (1984).¹ This approach involves separate estimation of two regression equations: one containing indicators of recipient need and the other solely containing indicators of donor interest. The recipient need model assumes that donors are motivated purely for humanitarian reasons and hence seek to allocate aid on the basis of relative development need. The donor interest model is premised on the assumption that donors are motivated purely by commercial, political, and strategic self-interests. Each model is fitted to sample data and conclusions are based primarily on the respective explanatory power of each model. Most studies reject recipient need as a determinant of aid allocation. McKinlay and Little (1979), for example, concluded that there are “no grounds for asserting that humanitarian criteria have any significant direct influence” (243) on aid allocation.

Recipient need/donor interest studies of aid allocation have estimated their econometric models using cross-country data. A number of relatively recent studies have used individual, country-specific time series data. Gang and Khan (1990), Gounder (1999), and Gounder and Sen (1999), for example, have looked at the cases of India, Papua New Guinea and Indonesia, respectively.² The use of these data as opposed to cross-country data is appealing both on econometric and informational grounds. Econometrically, it avoids the typically restrictive assumption that the regression coefficients are fixed across all countries in the sample employed and more

easily avoids specification bias by allowing for explanatory variables to be chosen on the basis of country-specific criteria. The reliability of information conveyed by all econometric analyses is subject to the appropriateness of the econometric techniques employed. In terms of information provided, the econometric analysis of time series data can tell us whether aid allocation is sensitive to the needs of individual developing countries over time. This is at least as important as whether aid allocation is sensitive to the relative needs of countries at particular points in time.

This chapter extends the time series literature on aid allocation in two respects. It is partly an attempt to improve on the econometric methods used by previous time series studies of aid allocation and partly an attempt to provide information on aid allocation to a particularly interesting case study—Papua New Guinea (PNG). PNG is of interest because it has received more aid than any other South Pacific country. Unlike many of these countries, PNG has experienced significant economic and social decline over recent decades and has received almost all of its aid from a single donor: Australia. Because of this, it is possible to provide a comprehensive analysis of the determinants of aid to a given recipient and, at the same time, provide direct information on the allocative behavior of a given donor (as opposed to drawing rather speculative inferences about this behavior from aggregate, multi-donor data).

The attempted econometric advances of this chapter are twofold. Like many previous studies it seeks to explain aid allocation to PNG in terms of donor interest and recipient need variables. But it does not estimate separate recipient need and donor interest equations. This approach might well be an interesting one to take, but it is inherently problematic econometrically if one posits *a priori* that both recipient need and donor interests influence aid allocation.³ It is reasonable to assert that almost all forms of aid, from most donors, will be influenced by both recipient needs and donor interests.⁴

If this is the case one must accept *a priori* that both models are misspecified due to the omission of relevant variables. The relevant variables omitted from the recipient need variables are the donor interest variables and vice versa. Unless it can be shown that none of the donor interest variables omitted from the recipient need model are orthogonal with the recipient need variables omitted from the donor interest model, which is unlikely in the extreme, then it in turn follows that the error terms of both models are not independent of their respective explanatory variables. The *t* ratios, *F* tests and *R*²s resulting from separate estimation of the models are therefore invalid and the conclusions based on these statistics are likely to be misleading.

This is especially problematic in the case of recipient need variables. That donors might pursue their own self-interests in aid allocation is neither surprising nor probably terribly important; many might argue that

the pursuit of these interests is self-evident. However, from development and equity perspectives, it is important that aid be allocated on the basis of relative need; and it is not self-evident that it is. We need, therefore, more incisive estimates of the relationship between need and aid allocation. In this chapter, we avoid the problems inherent in previous studies by estimating a hybrid model of aid allocation, containing both recipient need and donor interest variables.⁵ In essence, we test the relevance of recipient need to aid allocation while controlling for the influence of donor self-interests. We are still interested in whether a group of recipient need variables and a group of donor interest variables are relevant to aid allocation, but we judge this by using likelihood ratio tests based on restrictions to the hybrid model.

The second attempted econometric advance of this chapter relates to a questionable assumption implicit to all previous time series analyses of aid allocation: that aid flows to each country are determined independently of such flows to all other countries—an assumption at best brave and at worst highly dubious. All aid allocations are determined in the context of a broader budgetary constraint. Increasing aid to one country, for a given total aid budget, must lead to decreases in aid to at least one other country. The econometric approach of this chapter allows for a situation in which aid allocations are jointly determined, but is not invalidated if these allocations are determined independently of aid to other countries.

MODELING INTERTEMPORAL AID ALLOCATION

The literature on aid allocation has been dominated by the recipient need–donor interest approach. While we question, on the grounds previously outlined, the approach of separately estimating recipient need and donor interest equations, we have no reservations with the general hypothesis that aid is a function of recipient need and donor interest. The following general equation is therefore posited:

$$A_{i,t} = \beta_0 + \beta_1' RN_{i,t-j} + \beta_2' DI_{i,t-j} + \mu_{i,t} \quad \begin{matrix} i = 1, \dots, n \\ j \geq 0 \end{matrix}$$

(1)

where $A_{i,t}$ is aid from some donor or donors to country i in period t , $RN_{i,t-j}$ is a column vector of indicators of recipient i 's need lagged j periods, $DI_{i,t-j}$ is a column vector of indicators of donor interest in recipient i lagged j periods, β_0 is a constant, β_2' are row vectors of slope coefficients and $\mu_{i,t}$ is an error term. The lagging of the recipient need and donor interest indicators is due to the presence of informational time lags in the determination of aid allocations (McGillivray and White 1993).

Our fundamental point of departure from other time series studies relates to the context in which aid allocations are determined, and in turn

the properties of $\mu_{i,t}$. If $A_{i,t}$ is measured in absolute terms, and we think this appropriate, its allocation will be subject to the following adding-up constraint:

$$(2) \quad B_t = \sum_{i=1}^n A_{i,t}$$

where B_t is the total bilateral aid budget in year t , and hence the total amount of funds available for allocation among i recipient countries. This amount of funds will be allocated to the donor aid administrative agency, which has responsibility for allocating aid among recipients, by the donor's finance ministry, and is typically predetermined or exogenous with respect to the inter-recipient aid allocation process. It follows that aid allocations among i recipients, in any one year, are jointly determined. Increasing aid to one country must result in a decrease in aid to at least one other. Moreover, as agencies typically want to spend the entirety of their budgets, decreasing aid to one country results in increasing aid to another. It follows that the error term for an equation explaining aid to one country will be correlated to those explaining aid to others.⁶ Therefore, $\mu_{i,t}$ will not have an expected value of zero, which is what previous time series studies have assumed, and equation (1) must therefore be estimated using a procedure that allows for this. Failure to do this results in inefficient estimates of the beta coefficients (i.e., they will not exhibit minimum variance) and the corresponding t ratios are drawn into question. The practical consequence of this is the possibility of erroneously not rejecting null hypotheses relating to these coefficients. Given that the recipient need and donor interest indicators are exogenous because of their lags, an appropriate procedure is seemingly unrelated regressions (SUR) wherein a system of equations is estimated simultaneously.⁷ We discuss this issue in the next section.

ESTIMATION PROCEDURE AND DATA

Estimation Procedure

It follows from the above that equation (1) belongs to a system of equations that may be written as follows:

$$(3) \quad \begin{aligned} A_{k,t} &= \beta_{0,k} + \beta'_{1,k} RN_{k,t-j} + \beta'_{2,k} DI_{k,t-j} + \mu_{k,t} \\ A_{i,t} &= \beta_{0,i} + \beta'_{1,i} RN_{i,t-j} + \beta'_{2,i} DI_{i,t-j} + \mu_{i,t} & k = 1, \dots, i-1 \\ &\vdots & i = k+1, \dots, n \\ &\vdots & j \geq 0 \\ A_{n,t} &= \beta_{0,n} + \beta'_{1,n} RN_{n,t-j} + \beta'_{2,n} DI_{n,t-j} + \mu_{n,t} \end{aligned}$$

where $A_{k,t}$ and $A_{i,t}$ are aid allocations to countries under specific consideration (i.e., those countries whose aid determinants are under question). There may be numerous aid recipients, each represented by a separate equation up to $A_{n,t}$

Estimating equation (3) is a daunting task because it involves obtaining data for a large number of recipient countries. More than 150 countries receive development aid, and most donors individually provide aid to more than 100 recipients. For example, Australia provided aid to over 108 recipients in 1998. Some compromise, as is typically the case in applied research, is warranted. In this chapter we consider only one country: PNG. The following system of equations is therefore posited:

$$\begin{aligned}
 A_{k,t} &= \beta_{0,k} + \beta'_{1,k} RN_{k,t-j} + \beta'_{2,k} DI_{k,t-j} + \mu_{k,t}, & k &= 1, \dots, i-1, \\
 & & i &= k+1, \dots, n. \\
 \sum_{i=k+1}^n A_{i,t} &= \beta_{0,i} + \beta'_{1,i} \sum_{i=k+1}^n RN_{i,t-j} + \beta'_{2,i} \sum_{i=k+1}^n DI_{i,t-j} + \mu_{i,t}, & j &\geq 0 \\
 \text{cov}(\mu_{k,t}, \mu_{i,t}) &= \sigma_{i,j,t}
 \end{aligned}$$

(4)

The first equation in equation (4) describes aid to PNG, and the second equation describes aid to all other countries. Clearly, the second equation will be subject to a number of econometric issues, arguably the most serious being aggregation bias. Estimates of its parameters should therefore be treated with more than the usual degree of caution. However, its role is purely econometric: to provide efficient estimates of the parameters of the first equation in equation (4).

The assumption $\text{cov}(\mu_{k,t}, \mu_{i,t}) = \sigma_{i,j,t}$ indicates that there is contemporaneous correlation. That is, the error terms of the two equations are, at the same point in time, correlated. Zellner (1962) refers to such equations as “seemingly unrelated.” Although on the surface the equations might seem to be unrelated, the additional information that the error terms are correlated implies that joint generalized least squares estimation is better than single-equation least squares. The system of equations warrants the use of the SUR method of estimation to allow for correlation between the error terms of the equations. Zellner’s SUR method of estimation transforms the error terms of the two equations so that they have the same variance and are uncorrelated. Estimation of the system of equations is carried out using the maximum likelihood approach.

Like McKinlay and Little (1977, 1978a, 1978b, 1979), Gounder (1999), Gounder and Sen (1999), Maizels and Nissanke (1984), and McKinlay (1978), as well as other similar studies comprising the literature on aid allocation, are still interested in whether a vector of recipient need variables and a vector of donor interest variables determines aid allocations. Therefore, we test