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July 2001

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**Abstract**

It is clear from the implications of growth theory that the impact of aid depends on how it affects savings, investment and government behaviour. In respect of low-income countries, which are the principal aid recipients and the economies for which the issue of the impact of aid on growth is most important, it is government that is most important. This paper presents a review of studies that address the impact of aid on government fiscal behaviour. In particular, the focus is on fungibility and fiscal response studies. We argue that fungibility studies have been granted too much attention; these are narrowly focussed on the composition of government spending, and are not sufficiently informative about fiscal behaviour. Fiscal response studies are of greater relevance, as they attempt to address the effects of aid on behaviour regarding total spending, tax revenue and borrowing. Results show that the effects are complex and varied, but that aid tends to be associated with government spending increases in excess of the value of the aid, and can also have effects on tax effort and borrowing.

**Outline**

## I. INTRODUCTION

Perspectives on aid effectiveness have changed in recent years. At the theoretical level, endogenous growth theory has provided a new means to analyze the aid-growth relationship. Recent empirical work analyses the impact of aid on growth conditional on other variables (notably indicators of economic policy) and the results, on balance, suggest that aid is effective. However, the results appear sensitive to sample, specification of conditioning variables and choice of instrumental variables (compare Burnside and Dollar, 1997 to Hansen and Tarp, 2000a, b). In other words, results and policy implications in the aid effectiveness literature are very sensitive to the econometric approach used. It is essential to get the econometrics right if one is to be confident that the correct policy inferences are being made. This is equally true in respect of the literature on the fiscal effects of aid, which we address here.

The aim of this paper is to critically review the recent (mostly post-1990) theoretical and empirical literature on the impact of aid on government fiscal behaviour - public sector revenue and expenditure decisions. This literature is important on two grounds at least. First, most aid, conventionally defined, goes to the public sector and any impact on growth and poverty-reduction will be mediated by how this aid influences government behaviour (on policy generally, and fiscal policy in particular). Second, for many countries aid remains a principal source of revenue. For instance, aid inflows were roughly equal in magnitude to taxation, and constituted approximately half of all public expenditure, in low-income countries during the mid- to late-1990s (World Bank, 1996-99). It follows that any understanding of the broader impacts of aid, including those on growth and poverty, must start with an understanding of its usage by this sector. Is aid used for the purposes for which donors provided it? What are its impacts on various categories of public sector expenditure, including investment (fixed and human) and consumption? What are its impacts on revenue and financing decisions, including those relating to taxation and borrowing? Does aid cause reductions in public sector saving, and hence prolong a dependence on external financing?

A deficiency of the aid-growth literature is that it fails to explicitly recognize that aid is given primarily to the government, and that hence any impact of aid on the economy will

be mediated by government behaviour. Although the literature recognizes the importance of policy, the studies condition aid effectiveness on policy, rather than examining how aid affects policy. The latter issue, in terms of fiscal policy, has been addressed by two separate strands in the literature. First, studies of fungibility are concerned with identifying whether aid that is intended (by donors) to be spent on a particular expenditure item, such as health or education, is in fact allocated to that area. This is often referred to as categorical fungibility as the issue is the allocation of aid to expenditure categories and whether recipients allocate aid in the way donors intended when granting the aid. Second, the fiscal response literature explicitly models how the impact of aid is mediated by public sector behaviour. As such, these models are broader in coverage, considering not only categorical allocation but also the effects of aid on tax effort and public borrowing. We discuss both strands of the literature in turn.

### Table 1   Aid Relative to Government Consumption, 1997 selected countries

| Country | GGC % GDP | Aid %GDP | Aid % GGG |
|---------|-----------|----------|-----------|
| Bangladesh | 14 | 3.94 | 28.14 |
| India | 10 | 0.62 | 6.20 |
| Pakistan | 12 | 1.46 | 12.17 |
| Sri Lanka | 11 | 3.53 | 32.09 |
| *South Asia Average* | *11* | *1.14* | *10.36* |
| China | 11 | 0.38 | 3.45 |
| Indonesia | 7 | 0.52 | 7.43 |
| Philippines | 13 | 1.07 | 8.23 |
| *East Asia Average* | *10* | *0.65* | *6.50* |
| Cote d'Ivoire | 12 | 9.80 | 81.67 |
| Ghana | 10 | 10.19 | 101.90 |
| Kenya | 17 | 6.39 | 37.59 |
| Senegal | 10 | 12.63 | 126.30 |
| Tanzania | 13 | 15.37 | 118.23 |
| Uganda | 10 | 11.30 | 113.00 |
| *SSA Average* | *17* | *5.12* | *30.12* |
| **Average (income groups)** | | | |
| Low-income | 11 | 3.52 | 32.00 |
| Lower-middle | 13 | 0.74 | 5.69 |
| Upper-middle | 14 | 0.21 | 1.50 |

***Notes***:   Data on tax revenue and government spending are very patchy, so GGC (general government consumption) is used. In the source, general government consumption is expressed as a percentage of GDP whereas aid revenue is expressed as a percentage of GNP. Using the ratio of GDP to GNP for each country, the latter has been converted to a percentage of GDP. For regional and income group averages, the ratio of total GDP to GNP is used to convert average group Aid/GNP ratios to ratios of GDP.

Table 1 presents some indicative data on the importance of aid relative to government spending. For the selected countries, data on tax revenue or government spending as a percentage of GDP were not readily available so we use data on general government consumption (GGC). This will understate government spending. The aid data used are not comprehensive, i.e. not all aid to the government is covered, hence the aid/GDP ratio may well be understated. Although the figures are not very accurate, they are indicative (especially in relative terms). Unsurprisingly, for large countries such as China and India, the aid/GDP and aid/GGC ratios are quite low. Similarly, the ratios tend to be higher for low-income countries. In sub-Saharan Africa (SSA), the aid/GGC ratio is above 100% for highly aid-dependent economies, and is 30% on average. This ratio is also around 30% in the poorer South Asian countries, and 12% in Pakistan. Even in lower middle-income countries the aid/GGC ratio is over five per cent. This serves to demonstrate that aid is a significant share of government revenue and spending, especially in the poorest, aid-dependent countries.

Three main issues are addressed in this paper. The first concerns the theoretical and empirical approaches used in the relevant literature. A variety of approaches have been used, and the conclusions drawn are very sensitive to them. Different theoretical frameworks, data sets, behavioural assumptions and econometric methods often provide radically different results and hence different potential lessons and recommendations for policy.  The paper argues that some important caveats ought to be attached to the approaches of, and results reported by, a number of studies. In particular, we contend that the fiscal response literature, because it is broader in coverage, yields more reliable and informative policy implications than the fungibility literature. The second issue addressed by the paper concerns the results of these studies. What do these results tell us about aid's impact on the public sector aggregates? The third issue concerns the lessons one can draw from these results about aid's broader impacts, those for growth and poverty alleviation in particular.

The paper divides the relevant literature into two groups of studies. Section 2 looks at studies of how recipient governments allocate aid among specific categories of

expenditure, defined in terms of sector (agriculture, education, health, transport etc.). This is labelled 'categorical fungibility' and refers to whether aid is allocated, either wholly or partly, to the donor's intended categories. The studies covered in Section 3 look at the relationship between aid and broader fiscal aggregates encompassing public investment (capital expenditure), public consumption (recurrent expenditure), taxation and other recurrent revenue and domestic borrowing. Put more simply, this literature looks at the (broad) 'fiscal response' to aid inflows. Section 4 presents our conclusions, and addresses briefly some broader issues and approaches not covered by the studies that form the focus of this review.

## II. CATEGORICAL FUNGIBILITY STUDIES

Aid is said to be fungible if the recipient uses (or has the ability to use) aid for purposes other than those intended by the donors. This concept is well known, and we will not discuss the various interpretations in any detail (for a critical review of the literature see McGillivray and Morrissey, 2000a, b). In fact, as discussed below, much of the literature is concerned with whether spending on sectors to which aid is directed actually increases by the amount of the aid. For example, does spending on education increase by the amount that donors allocate for education? This relates to the composition of government spending. While this may be of valid concern to donors in terms of how their aid is spent, it is hardly a burning issue regarding how aid affects aggregate fiscal behaviour.

There are two reasons why we devote some attention to empirical studies of fungibility. First, and perhaps foremost, these are the only types of studies referred to in the discussion of the fiscal aspects of aid in World Bank (1998). In this sense, they have been unduly influential in policy debates regarding aid. Second, general fungibility can be quite important in terms of aid effectiveness. That is, if aid intended for investment is actually diverted into government consumption spending, then the potential growth impact of aid may be reduced. This assumes that government investment spending makes a greater contribution to growth than government consumption spending, which need not be the case. We return to this issue in the conclusion.

*Empirical Approaches*

The fundamental objective of the categorical fungibility studies is to detect the extent to which aid in practice is used in a fungible manner. That is, they attempt to model the actual extent to which aid, or some portion thereof, is used for purposes other than for which it was intended. Categorical fungibility studies can be divided into two groups. The first group includes Feyzioglu *et al.* (1998), Swaroop *et al.* (2000) and Khilji and Zampelli (1991, 1994). Each of these studies derives, from a utility maximising problem, and estimates a simultaneous linear expenditure system. The second group adopts a more *ad hoc* approach, in that it is not based on an explicit theoretical framework, but still estimates a set of simultaneous equations.

Probably the best known study belonging to the first group is Feyzioglu *et al.* (1998). This study posits that the aid receiving government buys $S$ public goods ($g_1$, ..., $g_s$) in the market to provide them for its citizens. It pays for these goods using the fungible portion of aid, ö ($0 \le ö \le 1$), and revenue from all other domestic and international sources, $R$. Citizens also consume goods that the government has to purchase with the non-fungible portion, $1 - ö$, of aid. Aid is earmarked by donors for the purchase of $K$ ($\le S$) specific goods so that $ö_k$ is the fungible portion of aid earmarked for good $k$. Feyzioglu *et al.* define a representative agent's utility function in terms of these $S$ goods and a single private good, $c_p$, as follows:

$$W = U\left[c_p, g_1, g_1^{NF}, ...., g_K, g_K^{NF}, g_{K+1}, ..., g_s\right]$$  (1)

where $g_k^{NF}$ ($k = 1,...,K$) is the quantity of the $K$-good that the government has to purchase from the non-fungible portion of the aid earmarked for good $k$, and $g_s$ ($s = 1,..., K, K+1,...,S$) is the quantity of the $s$th good purchased from fungible aid supplemented by other revenues. Feyzioglu *et al.* specify (1) in a Stone-Geary form as follows:

$$W = F(c_p) + H\left(\sum_{k=1}^{K} g_k^{NF}\right) + \prod_{s=1}^{S} (g_s - \boldsymbol{g}_s)^{\boldsymbol{b}_s}$$  (2)

where ãs are positive subsistence quantities of the public goods and the $\hat{a}_s$ sum to one. The recipient government is thought to maximise (2) subject to the following constraint:

$$p_1 g_1 + p_2 g_2 + ... + p_s g_s = R + \sum_{k=1}^{K} f_k a_k \qquad (3)$$

where $p_s$ are prices of the public goods, $a_k$ is aid for good $k$ and $R$ is revenue from all other sources, both domestic and foreign. As $p_s$, $ö_k$, $R$ and $a_k$ are assumed to be exogenous, the government chooses $S$ goods ($g_1$, $g_2$, ..., $g_s$) to maximise (2).

Maximizing (2) subject to the constraint, after some manipulation, yields the following system of linear expenditure equations:

$$p_s \overline{q}_s = p_s \boldsymbol{g}_s + \left( 1 - \boldsymbol{f}_s + \boldsymbol{b}_s \boldsymbol{f}_s \right) a_s + \boldsymbol{b}_s \left( G^N + \sum_{k \neq s}^{K} \boldsymbol{f}_k a_k - \sum_{j=1}^{S} p_j \boldsymbol{g}_j \right)$$

where

$$\overline{g} = g_s + g_s^{NF} = g_s + \left( \frac{1}{p_s} \right) \left[ \left( 1 - \boldsymbol{f}_s \right) a_s \right] \quad \text{and}$$

$$G^N = R = G - A = \sum_{s-1}^{S} p_s g_s + \sum_{k-1}^{K} p_k g_k^{NF} - \sum_{k-1}^{K} a_k$$

This equation, supplemented with a vector of control variables and similar equations derived from variants of (1) and (2) (with a single variable - aggregate public expenditure - and expenditure divided into current and capital expenditures, respectively) are then estimated econometrically. Feyzioglu *et al.* (1998) estimated 36 equations using cross-country data, for 14 aid recipients for the period 1971-80. Twenty-six of these equations were estimated individually using ordinary least squares (OLS) and 10 jointly using the generalised methods of moments (GMM) technique. Swaroop *et al.* (2000) followed a similar approach, estimating 20 equations individually using OLS and four equations simultaneously using two-stage least squares (2SLS), but using 1970-95 time series data for India. Khilji and Zampelli (1991) also used time series data, but for 1960-86 US aid to Pakistan. Rather than estimating a relatively large number of equations, this study estimated a single system, containing three equations, using the full information maximum likelihood (FIML) approach. Khilji and Zampelli (1994) followed the same

approach but used cross-country data for eight aid recipients. Results are discussed below.

Studies belonging to the second group looking at categorical fungibility include those by Pack and Pack (1990, 1993), Cashell-Cordo and Craig (1990) and Gupta (1993). Pack and Pack (1990, 1993), arguably the best known of these studies, assume that the government under consideration (or a 'collective decision making group') possesses a community indifference curve and is faced by a budget line. Various equations are then posited which represent the demand curves derived from the corresponding optimising decisions. For the Dominican Republic (Pack and Pack, 1993) these equations are:

$$
\begin{aligned}
D_{i,t} &= f\left(GDP_t, FA_{i,t}, OFA_{i,t}, DUM\right) \\
FI_t &= f\left(GDP_t, FAT_{i,}, DUM\right) \\
C_t &= f\left(GDP_t, FAT_{i,}, DUM\right) \quad \text{and} \\
R_t &= f\left(GDP_t, FAT_{i,}, DUM\right)
\end{aligned}
\tag{4}
$$

where $D_i$ denotes various categories of public development expenditures, $FI$ denotes financial and indirect investment (including transfers to state enterprises), $C$ denotes total public current expenditure, $R$ denotes total own source revenues (excluding aid), $GDP$ is current price gross domestic product, $FA_i$ is categorical foreign aid to expendtiture category $i$, $OFA_i$ is foreign aid to other expenditure categories, $FAT$ is total foreign aid and $DUM$ is a dummy variable capturing the presence of a structural adjustment program. Note that development expenditures typically include expenditure on such items as health and education, agriculture, infrastructure, and transport. Each of the equations in (4) are linked by and must satisfy the following budget constraint:

$$
D_{i,t} + FI_t + C_t + DS_t = R_t + FAT_t + DEF_t
$$

where $DEF$ is the size of the deficit (or surplus) and $DS$ is debt service, which is assumed to be exogenous. Recognising this link, and the joint determination of $D_i$, $FI$, $C$, $FA_i$ and

*R*, Pack and Pack (1993) estimate equations (4) simultaneously using the seemingly unrelated regressions (SUR) approach.

*Results*

A selection of results is shown in Table 2. Those reported by Pack and Pack (1990) for Indonesia are quite encouraging. Taken on face value, aid to this country has entirely been used for the purposes intended by donors. Aid seems to have caused increases in domestic revenue, has not caused increases in non-developmental or (recurrent) consumption expenditure, has caused a greater than proportional increase in both total and developmental expenditure and has led to higher expenditure on health and education. Gupta's results for India are also reasonably encouraging. Although a one unit increase in aid seems to lead to an uncomfortably large 0.73 unit increase in non-developmental expenditure, the increase in development expenditure of 0.96 units is greater; overall, total spending increases by significantly more than the amount of aid.

The remaining results shown in Table 2 are generally less than encouraging, again taken on face value. Cashel-Cordo and Craig (1990) report surprisingly large aid-induced incremental increases in domestic revenue and in the case of African countries a large incremental increase in total expenditure. In contrast to Gupta (1993), Swaroop *et al.* (2000) find that aid has no impact on revenue or on expenditure categories except non-developmental expenditure, defined in this case to include spending on defense, interest and general administrative services. Khilji and Zampelli (1991) and Pack and Pack (1993), for Pakistan and the Dominican Republic respectively, find that aid is highly fungible and has led to lower revenue in both countries. The extent of fungibility reported by Feyzioglu *et al.* (1998) is puzzling, as it is negative. In Table 2 this is simply the average of a number of statistically significant individual fungibility parameters, each relating to various categories of government expenditure (see Table 7 of Feyzioglu *et al.*). These parameters range from -3.96 to 1.90 (encapsulating one problem with their study – the highly heterogeneous nature of the countries included in the sample).[1] One

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[1] The main sample of 14 countries included such diverse economies as Bangladesh, Costa Rica, Egypt, Malaysia, Mexico, Turkey and Zaire. Only five of the 14 are low-income.

would question how the extent of fungibility can be negative, or for that matter greater than one. Surely the range should be between zero and one, indicating zero and full fungibility respectively?

# Table 2: Results of Selected Categorical Fungibility Studies

| Study | Sample | Extent of Fungibility | Incremental Impact of Aid on: | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Domestic Revenue | Total Expenditure | Developmental Expenditure | Non-developmental Expenditure | Health and Education Expenditure | Investment Expenditure | Consumption Expenditure |
| Pack & Pack (1990) | Indonesia | 0.00 | 0.29 | 1.37 | 1.37 | 0.00 | 0.19 | n.r. | 0.00 |
| Cashel-Cordo & Craig (1990) | 48 LDCs | n.r. | 10.36[a] 4.25[b] | 12.82[a] -2.79[b] | n.r. | n.r. | n.r. | n.r. | n.r. |
| Khilji & Zampelli (1991) | Pakistan | 1.00 | -0.01 | 0.26 | n.r. | 0.74 | n.r. | n.r. | n.r. |
| Gupta (1993) | India | 0.04 | 0.01 | 1.69 | 0.96 | 0.73 | n.r. | n.r. | n.r. |
| Pack & Pack (1993) | Dominican Republic | 0.79 | -0.39 | -0.27 | -0.05 | -0.31 | 0.002 | n.r. | 0.08 |
| Feyzioglu *et al.* (1998) | 14 LDCs | -0.57 | n.r. | 0.95 | 0.23 | n.r. | 0.13 | 0.29 | 0.72 |
| Swaroop *et al.* (2000) | India | n.r. | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | n.r. |

*Notes:* n.r: not reported (or cannot be inferred). a: African countries. b: non-African countries.

Given the variation in results, there are few obvious conclusions from the fungibility literature. Clearly, aid is used in a fungible manner, although one cannot make any general comment regarding the extent of fungibility. Not only do the results vary (from zero in Indonesia to complete fungibility in Pakistan) but it is also true that in none of these studies is it known with any great precision how much aid was actually intended to finance specific types of spending. As shown in Table 2, the studies also imply mixed conclusions regarding the incremental impact of aid on spending: in some cases total spending increases by more than the amount of aid, and often development spending increases by more (or falls by less) than non-developmental spending. Some unwarranted conclusions have been drawn, notably that fungibility 'helps explain why large amounts of aid have had no lasting effect in highly distorted environments' (World Bank, 1998: 82). Aid ineffectiveness is as likely to be due to low productivity of aid-financed investments as to aid being diverted to unintended uses. What the literature does suggest is that donors would be rather naï ve if they tried to target aid accurately to specific expenditures, a point recognized in World Bank (1998). This does not mean that donors cannot influence how aid is used, rather that the influence will be less than complete (McGillivray and Morrissey, 2000a).

*Limitations of Categorical Fungibility Studies*

Empirical studies of categorical fungibility have been the basis of much of the recent literature on the impact of aid on government spending behaviour. Indeed, these are the only types of studies cited as evidence in World Bank (1998). Unfortunately, the available studies are subject to a number of limitations. We concentrate on the two most recent, and sophisticated, studies - Feyzioglu *et al* (1998) and Swaroop *et al* (2000). Both are based on the same underlying theoretical model and although the country focus differs are essentially similar in the empirical approach. We here highlight four major concerns.

First, the model is based on two distinct types of expenditure headings: type-*k* to which aid is allocated (some of which is non-fungible) and others to which no aid is allocated (these are funded out of fungible aid and other revenue). The model of fungibility is only strictly valid if these two types of expenditure are separable in the government's utility function. This requires that 'aid affects the government's choice [over all public goods] only through the fungible portion; public goods purchased from the non-fungible part do not affect this choice' (Feyzioglu *et al,* 1998: 34). There is no reason for this to be so. Governments will have some expectation regarding the total amount of aid they will receive. They will also have a perception of the extent

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to which the aid can be used in a fungible manner. It is reasonable to posit that aid receipts will potentially affect expenditure allocations under all headings. One would wish to allow for the possibility that, for example, if education is funded from non-fungible aid then spending on defence can be higher than otherwise. Swaroop *et al* (2000: 326) acknowledge this problem in stating that the choice of the Stone-Geary utility function comes at a cost.

The second problem relates to the data, and tends to compound the first. It is necessary to determine how much aid the donors intended should be spent on various headings. World Bank data on concessionary loans is used for this purpose. This provides good coverage for the Swaroop *et al* (2000) study, but is less satisfactory for the heterogeneous set of countries in the Feyzioglu *et al* (1998) study.[2] As recipient governments make the decisions being modelled, it is essential to use local data sources to identify the aid received in the government budget. Swaroop *et al* (2000) do use Indian data on aid, but Feyzioglu *et al* (1998) use a donor measure (the DAC data, or alternatively a series constructed by the World Bank). The latter will not correspond closely to the aid that goes through recipient public sector accounts.[3] Some proportion of DAC aid data, for instance, will include expenditure allocated entirely within donor economies. The upshot is measurement error in the value of aid allocated to specific headings (as would be perceived by the recipients). This is unlikely to have a significant effect on the Swaroop *et al* (2000) results, but casts doubt on the reliability of the Feyzioglu *et al* (1998) estimates (and may help to explain why so often they find negative fungibility).

Third, as already mentioned, both studies rely heavily on the OLS method of estimation; all of the Feyzioglu *et al* (1998) results reported in *Assessing Aid* (World Bank, 1998) are obtained using OLS. The use of OLS (and 2SLS) is questionable if the components of total government spending are not determined independently of one another; in which case the method yields inefficient estimates of the regression coefficients (that is, they will not exhibit minimum variance) and the corresponding *t* ratios are biased. The practical consequence of this is the possibility of

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[2] See footnote 1. Furthermore, for many of the countries, especially the low-income ones, concessionary loans are a relatively low share of total aid receipts.

[3] Feyzioglu *et al* (1998) could claim that they required a cross-section to draw general conclusions, and so had to use a donor measure of aid. However, if the aid variable is an inaccurate measure of the choice variable perceived by governments, one can question the relevance of the results as information on government behaviour. In this context it is worth noting that most studies implicitly assume that fungibility is an *action* by recipient governments (for a critique, see McGillivray and Morrissey, 2000b).

erroneously not rejecting null hypotheses relating to these coefficients. In reality one would tend to expect that expenditure components would be determined jointly; indeed the budget constraint on which these studies is based (equation (2) above) tells us that they are determined this way and therefore one questions their results. More appropriate estimation methods in this context are either FIML, SUR or three-stage least squares (3SLS), as have been employed in other fiscal response or fungibility studies.

This criticism does not apply to Tables 7-9 in Feyzioglu *et al* (1998), but the results in these tables appear quite different. This highlights a general point that many results are not robust (and, as shown in Table 2, are varied). The use of contemporaneous aid is also unfortunate, as one might anticipate dynamic (or simply lagged) effects. Given the measurement error in the sector aid variable, the slow process by which donors disburse aid, and the many implementation problems that will occur in spending agencies (see McGillivray and Morrissey, 2000b), it is perhaps not surprising that studies find a weak, if any, correlation between sector aid and sector expenditure in any given year.

Fourth, and most importantly, these studies treat tax (and other non-aid) revenue as a residual, and do not explicitly allow for the fact that aid can influence tax effort (and indeed borrowing). More generally, and related to the point above, no attempt is made to estimate the impact of aid on the dynamics of spending in total or on specific sectors. It may well be the case that in any given year expenditure outcomes by sector do not correspond closely to aid allocations. If, over time, spending on the headings favoured by donors do increase, then how much of a concern is fungibility? Unfortunately, the studies do not address this directly. One may respond that fungibility studies are, however, informative regarding the impact of aid on the composition of government spending. This may be an important issue if donors are concerned with how aid is used, although it is not at all clear that this is informative regarding the fiscal impact of aid.

The fundamental deficiency of the fungibility approach is that it pays insufficient attention to the broader fiscal impacts of aid over time, especially on tax effort and borrowing. In fact, as we have argued by citing the limitations, fungibility studies tell us very little of relevance to fiscal impact. Furthermore, overt concern with fungibility may serve to distract attention away from the more fundamental issue of how aid impacts on recipient fiscal behaviour in general, including the interaction of expenditure and revenue variables (McGillivray and Morrissey, 2000a, b). To gain

a deeper understanding of the fiscal impact, we consider the evidence from fiscal response models in Section 3.

*Policy Implications*

It is certainly true that there is compelling evidence of fungibility; recipients do, at least in any given year, tend to allocate some aid for purposes not intended by donors. It is less obvious that there are any valid policy implications. World Bank (1998) tends to imply that fungibility is a result of 'malicious' intent by recipients, and that there is little donors can do to prevent it. McGillivray and Morrissey (2000a) demonstrate that fungibility is easily explained if donors and recipients simply have different preferences regarding the allocation of public expenditure; 'malicious' intent is not required. This is an important point, although it may appear minor. If recipients are only interested in securing funding from donors, and have no intention of responding to donors' wishes (regarding aid allocation or policy reform) – malicious intent – then it is tautological that fungibility will be exploited and conditionality will be limited if not ineffective. This is probably the rare case. More commonly, recipients do want funds from donors but are not totally averse to donors' wishes or suggestions regarding policy and expenditure. In general, preferences (on aid allocation and policy) differ and one should not presume that one party (donor or recipient) is completely right. As Addison and Murshed (2000) argue, donors may be fully justified in trying to prevent aid from being used for military spending but otherwise are no better informed than recipients regarding which components of expenditure are best for promoting growth or reducing poverty. Thus the outcome (spending allocation) will be somewhere between the two diverse positions, depending on respective bargaining powers and the ability of recipients to effectively implement expenditure plans.

McGillivray and Morrissey (2000b) go further and argue that concern with fungibility is misleading; the relevant issue is not fungibility *per se* but how aid affects fiscal behaviour generally and how spending plans are implemented. They present an analytical framework in which there may be forms of 'aid illusion' such that officials implementing expenditure plans misperceive the intentions of the policy officials who set expenditure plans. All that is necessary for such misperceptions to arise is that information flows and public expenditure management systems are weak, and there is ample evidence for this in aid recipients (Fozzard and Foster, 2000). The principal aim is to shed light on the empirical finding that aid leads to greater than proportional increases in total public expenditure in recipient countries. Illustrative scenarios are

presented in which this finding results from misperceptions or illusions regarding either the real or nominal value of the aid inflow, and the spending conditions attached. Specifically, they show that even where the intention and conditions for fungibility are present this does not necessarily imply that spending on the items donors want to support will increase by less than the value of the aid. Conversely, they also illustrate a case where there may be no intended fungibility yet spending on the items targeted by donors decreases. In a nutshell, the argument is that preferences differ and implementation is an imperfect process, therefore some fungibility may be observed, but this in itself is not an important issue. What is important is the policy/expenditure direction in which countries are moving, and whether aid can influence this.

## III.  FISCAL RESPONSE MODELS

Mosley *et al* (1987) and Gang and Khan (1991), picking-up on an earlier paper by Heller (1975), model the public sector fiscal response to foreign aid inflows. The Heller (1975) approach is predicated on the observation that a basic task facing public sector decision-makers in all countries is to allocate revenue among various expenditure categories subject to budget constraints. To keep the exposition simple we can distinguish two categories of public expenditure: recurrent expenditure or government consumption ($G$) and capital expenditure or public sector investment ($I_g$). Government revenue is obtained from domestic sources in the forms of taxation and other recurrent revenue ($T$) and borrowing ($B$). In these models, aid ($A$) is treated as exogenous; aid is an external source of revenue that enters the budget constraint. The utility function of public sector decision-makers can be represented as:

$$U = U(I_g, G, T, B) \qquad (5)$$

Public sector policymakers are assumed to act in a rational, utility-maximising manner. In the standard approach, contributors have assumed that governments set targets for various expenditure headings and set revenue targets for tax and borrowing. Governments maximize their utility by attaining these revenue and expenditure targets. Following Mosley *et al* (1987) and Binh and McGillivray (1993), the utility function in (5) can be represented as a quadratic loss function:

$$U = a_0 - \frac{a_1}{2}\left(I_g - I_g*\right)^2 - \frac{a_2}{2}(G - G*)^2 - \frac{a_3}{2}(T - T*)^2 - \frac{a_4}{2}(B - B*)^2 \qquad (6)$$

where the asterisks denote exogenous target levels of the endogenous variables and $a_i > 0$ for $i = 1, ..., 4$. It is clear from (6) that government maximises its utility if it achieves all targets, the maximum unconstrained value being $a_0$. Also, as $a_i > 0$ the principle of diminishing marginal utility is ensured for all levels of $I_g$, $G$, $T$ and $B$.[4] What the government now wants to do is maximize $U$ subject to the budget constraint that expenditures cannot exceed (all) revenues. In the standard Heller-type analysis the utility function given by equation (6) is maximized subject to the following constraints:

$$I_g = (1 - r_1)T + (1 - r_2)A + B \qquad (7)$$

$$G = r_1 T + r_2 A \qquad (8)$$

where $(1 - r_1)$ represents savings from the recurrent budget and $r_2$ represents the proportion of aid allocated to consumption spending. Equations (7) and (8) are of course a decomposition of the overall public sector budgetary constraint:

$$I_g + G = T + A + B \qquad (9)$$

Standard fiscal response studies maximized (6) subject to (7) and (8). There are two significant problems with this approach.[5] The first is the interpretation given to $r_2$, which is taken to represent the extent of fungibility of aid. In other words, it is implicitly assumed that donors grant aid for investment purposes only (and that all investment expenditures are captured in $I_g$) hence any aid allocated to $G$ (proportion $r_2$) is an *ex post* measure of fungibility (i.e., $r_2 = 0$ *ex ante*). As there are elements of $G$ which donors would be willing to support, notably various social

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[4] Note that this utility function is symmetric, in the sense that utility is reduced in the same proportion whether governments overshoot or undershoot a target. As Binh and McGillivray (1993) point out this may appear restrictive if one believes that governments would be more concerned with undershooting revenue targets than with overshooting. However, obtaining revenue has political costs, whether from public objection to paying taxes or concern with aid dependency, whilst a revenue shortfall imposes the political costs associated with a budget deficit (and/or the opportunity costs of reduced spending). There is no reason, *a priori*, why a revenue shortfall generates more disutility than a revenue overshoot. A similar argument applies to expenditures, as the opportunity cost of overspending is in raising the revenue.

[5] Note that (7) and (8) do not allow for the not uncommon practice in developing countries of financing recurrent expenditure from domestic borrowing. This can easily be overcome by rewriting (7) with $(1-r_3)B$ and adding $r_3 B$ to the left hand side of (8). McGillivray (1999) observes that failing to account for this practice leads to misleading conclusions when attempting to model fiscal response.

sector expenditures, $r_2 > 0$ *ex ante* and the estimated value of $r_2$ is a measure of maximum fungibility.

The second problem is that this representation over-constrains the model, not necessarily allowing the government to reach $a_0$ even in the case where aid revenues are sufficient to meet all targets. The problem arises because although total revenue may be sufficient to meet (9), the $a$ s constrain allocation so that specific expenditure targets in (6) cannot be met. One possible solution is to use a single budget constraint like that in equation (9), which will always ensure that the model can attain $a_0$ when revenues are sufficient to meet each target. This solution does, however, result in intuitively unrealistic structural equations (McGillivray, 2000).

Gang and Khan (1991), unlike Mosley *et al* (1987) whose regressions were in the aid-growth tradition, actually estimated the model, using time series data for India. This work has stimulated a debate on the appropriate basis on which to model public sector behaviour in the presence of aid inflows (Binh and McGillivray, 1993; Gang and Khan, 1993, 1994, 1999; McGillivray, 1999; Khan, 1994; White, 1994). Recent papers endogenize aid (Franco-Rodriguez *et al*, 1998; McGillivray and Ahmed, 1999): governments have a target for aid revenue, and this expected revenue is incorporated into their fiscal planning. That is, when determining revenue and expenditure allocations, anticipated aid revenue is taken into account. Making aid endogenous does not require the assumption that recipients have control over the aid they are allocated by donors; instead it requires that they have effective control over the amount that is actually spent. The models with endogenous aid overcome many of the problems inherent in the standard fiscal response models (those earlier papers with exogenous aid). In Franco-Rodriguez *et al* (1998) the loss function (6) is replaced by:

$$U = a_0 - \frac{a_1}{2}\left(I_g - I_g *\right)^2 - \frac{a_2}{2}\left(G - G*\right)^2 - \frac{a_3}{2}\left(T - T*\right)^2 - \frac{a_4}{2}\left(A - A*\right)^2 - \frac{a_5}{2}\left(B - B*\right)^2 \qquad (10)$$

The specification in (10) differs from standard fiscal response models by treating aid as a choice variable for the recipient, and hence endogenous. The general justification for treating aid as exogenous from the perspective of recipients is that the level is determined by donors purely on the basis of supply-side criteria. In practice, however, donors commit a certain amount of aid to recipients each year, and it is ultimately up to recipients to determine how much of that commitment is disbursed (actually spent) in the year. Recipients do have large degrees of choice

over the amount disbursed, and hence allocated among expenditure categories. Consequently, it is appropriate to treat disbursed aid as an endogenous variable.

Given this reasoning, $A$ is disbursements while the target $A^*$ can be represented by commitments. Under-spending an aid commitment in any given year is undesirable as it implies an inability to utilise all aid (limited absorptive capacity) and may result in decreased commitments in subsequent years. Overspending is also undesirable as, in practice, if disbursements exceed commitments it means either delayed spending of past commitments (suggesting limited absorptive capacity) or, more often, that emergency aid was granted during the year (thus, it is a proxy for an adverse shock, such as famine).

In principle, (10) is maximized subject to the constraints (7) and (8) with the attendant problems outlined above. One possible option may be to maximize subject to (9). However, (9) alone implies no constraints on how revenues are allocated thus implicitly aid is completely fungible; this may not be a realistic representation of public sector fiscal behaviour. Public sector fiscal decisions are subject to pressures from a number of quarters: politicians, pressure groups and donors all seek to influence the allocation of revenues (and electoral considerations will be important if democratic institutions are effective). These pressures are likely to culminate in outcomes which are sub-optimal in terms of the government's own preferences. Such constraints on public sector fiscal behaviour can be incorporated by replacing (7) and (8) with:

$$G \leq \boldsymbol{r}_1 T + \boldsymbol{r}_2 A + \boldsymbol{r}_3 B \qquad (11)$$

The rationale for the inequality is that there are *external* constraints that limit the manner in which the public sector in developing countries allocates revenues. The actions of donors or domestic interests cause the values of the $\boldsymbol{r}$s in (11) to be imposed on those involved in setting targets and allocating revenue, with there being no guarantee that targets can be met even though revenues may satisfy (9). In other words, on the assumption that (11) is binding (the possible value of $G$ is upper bound), these external constraints prevent the attainment of $\boldsymbol{a}_0$ (because at least one expenditure target cannot be met). The analysis of Franco-Rodriguez *et al* (1998) is premised on this assumption. If (11) is not binding the government is not prevented from reaching specific expenditure targets, utility is maximised subject to (9) only and the government can attain $\boldsymbol{a}_0$ if revenues are sufficient.

In sum, the fiscal response model allows governments to set revenue and expenditure targets, and to attempt to raise and allocate the revenues required to meet these targets so as to maximize utility. Aid, like tax and borrowing, is treated as one of the forms of revenue. If for some reason they fail to raise adequate revenue, for example a fall in commodity prices reduces export tax revenue, then clearly utility is not maximised. Similarly, if their discretion to allocate alternative revenues across different expenditures is constrained, such that (11) is binding, utility will not be maximised (more strictly, in both cases, there is constrained maximization and $a_0$ is not attained). To analyse the impact of aid, in a model where governments expect to receive aid, one can derive the structural equations from maximising (10) subject to (9) and (11), assuming (11) to be binding, and then derive the reduced form equations. These can then be estimated (and results are reported below).

It is worth noting that, at least conceptually, fiscal response models can be viewed as encompassing categorical fungibility. In principle, if adequate data were available, expenditure headings could be disaggregated in (10), with (11) becoming a set of equations for different expenditures, and the $r$s in (11) would provide estimates of (maximum) fungibility. In practice, this would place too great a demand on the data (in fact, the nature of (11) implies that ideally one would use regime-switching models). Fiscal response models, in effect, sacrifice the detail on categorical fungibility so as to focus on the time series impact of aid on fiscal aggregates. As such models typically distinguish investment (or development) from recurrent (or consumption or non-development) expenditures, they do capture 'general' fungibility. In terms of aid effectiveness, this general fungibility is more important than categorical fungibility (which is most relevant to donor monitoring). But fiscal response models offer more as they attempt to identify the impact of aid on tax and borrowing in addition to spending. Such aggregate fiscal effects over time are likely to be important determinants of aid effectiveness.

*Results and Estimation Problems*

Heller (1975) estimated the fiscal response model using two-stage least squares (2SLS) and cross-section data. This was appropriate to the extent that the equations contained endogenous regressors. Subsequent applications use time series data and the more efficient three-stage least squares (3SLS) method, which recognises cross-equation error term correlations and accommodates the cross equation restrictions. On the other hand, 3SLS estimation can pose

degrees of freedom problems by requiring more data points. This is, of course, a tremendous problem for empirical research on developing countries as time series are inevitably quite short (and of questionable quality). The shortness of many time series also leads one to question seriously the results of a number of fiscal response studies. This is the principal reason why, to date, there have been so few attempts to estimate fiscal response models.

Many studies report estimates of structural equations only and base all conclusions regarding the impact of aid on these estimates. However, the parameters of these equations show direct effects only and ignore feedback effects operating within the entire system of structural equations. Total (direct and indirect) effects are shown by reduced form parameters obtained by solving the system for each endogenous variable. Worse still, in some instances the impact of aid is judged purely on the basis of the constraint equation parameters. White (1994) makes both points with respect to Gang and Khan (1991) and McGillivray (1994) makes the second with respect to Khan and Hoshino (1992). In both cases rather different interpretations of the impact of aid were drawn, than in the original studies, given that the direct impacts were quite different to the total impacts.

There are two other econometric problems with applications of Heller-type models. The first concerns the estimates of the $r$s. Those reported by a number of studies are not within the positive range of zero to unity. For example, Gang and Khan (1991) report a $r_1$ of 1.08 and Heller (1975) reports a $r_2$ of -0.15 (although the estimate may not be significantly different from zero). The interpretation given to a negative $r$ is that it indicates that the relevant revenue has pulled revenue from another category out of the consumption budget. The interpretation given to a value greater than one is that the corresponding revenue has pulled funds out of the investment budget. Yet these interpretations would seem to be in error: one cannot allocate more than 100 percent of a given revenue to some activity, nor can one allocate a negative proportion of some revenue to a given activity. This is not to say that a category of revenue cannot pull other funds away from another activity. For example, it is often the case that recipients are required to supplement aid money with their own funds. But the effect of this on the particular expenditure category would be observed from a combination of structural parameters and not a single $r$. Of course, the studies would have not drawn such interpretations had they in estimation sought to restrict the relevant parameters within the range of zero and unity.

Arguably the greatest problem studies applying Heller-type models have faced concerns the target variables. None of these studies have used actual values for these variables due to the unavailability of data. Instead they have rather crudely estimated these variables or, in the cases of Heller (1975) and Khan and Hoshino (1992), substituted equations representing them into the structural equations prior to estimation. Both approaches are problematic. The second effectively treats the target equations as identities, which is surely unrealistic. It essentially invokes an 'errors in variables' problem if the function fit obtained in estimating the targets is not one, and therefore adversely effects the accuracy of the estimates of the structural equations. It also requires the estimation of many more parameters and this can be problematic given the typically limited number of time series observations available.

White (1994) criticizes the first approach on three general grounds. First, there is no guarantee that the resulting targets will be consistent with the constraint equations. Second, if the functional fits of the regressions used to obtain the targets is high and in particular close to one, then each regressor in the structural equations estimation will in effect be regressed on itself. The coefficient attached to each target will thus be either one or close to one, and each other coefficient will be insignificant. Third, if these functional fits are low, then it is difficult to meaningfully interpret the fitted values as valid approximations of the targets. White (1994) makes a fourth point specifically with reference to Gang and Khan (1994), but which also applies to a number of other studies. A number of the target equations contain lagged dependent variables. This introduces an implicit dynamic element into Gang and Khan (1994) which is suppressed in estimation.

Franco-Rodriguez *et al* (1998) try to address some of these problems in their study of Pakistan, using data for 1956-95. In terms of the estimates for the $r$s in (11), the results suggest that both aid and borrowing are allocated fairly evenly (about 50-50) between consumption and investment, whereas only some 15 per cent of tax revenue is allocated to investment. The direct effects of aid (inferred from the coefficients in the structural equations) suggest that the reduction in $G$ more than offsets the reduction in tax revenue, so that less borrowing is needed. However, when the overall effects of aid are traced through the fiscal response model (by interpreting the reduced form coefficients), it appears that aid induces a slight overall increase in investment but a significant decrease in tax revenues that is more than offset by reduced consumption expenditures. Increased borrowing is needed to compensate for the loss of tax revenue (Table 3). In the case of Pakistan, therefore, aid seems to increase investment, but to encourage reduced tax effort and greater borrowing.

**Table 3        Selected Results of Fiscal Response Studies**

| Study | Sample | Incremental Impact of Aid on | | | |
|---|---|---|---|---|---|
| | | $T$ | $Ig$ | $G$ | $B$ |
| Heller (1975) | Cross-section (Africa) | -0.4 | 1.1 | -0.1 | |
| Gang & Khan (1991) | India | 0.0 | 0.0 | 0.0 | |
| Khan & Hoshino (1992) | Cross-section (Asia) | 1.2 | 1.2 | 0.3 | |
| Rubino (1997) | Indonesia | -1.4 | -0.8 | -0.7 | |
| Iqbal (1997) | Pakistan | 0.0 | 0.0 | 1.6 | |
| Franco-Rodriguez *et al* (1998) | Pakistan | | | | |
| | Direct effects | -2.9 | 0.1 | -2.0 | -1.1 |
| | Total effects | -3.6 | 0.1 | -2.4 | 0.9 |
| McGillivray & Ahmed (1999) | The Philippines | -0.1 | -0.02 | 0.02 | -1.81 |
| Franco-Rodriguez (2000) | Costa Rica | | | | |
| | Direct Effects | 1.1 | -0.36 | 2.47 | -1.27 |
| | Total effects | 0.05 | -0.02 | 0.07 | -0.08 |

*Notes*: Figures are the total effect (incremental impact) of a unit of aid on public investment, public consumption spending, tax revenue and, where reported, borrowing (measured in the same units). Sources as indicated. We can note that Iqbal (1997) had a very short time series.

Table 3 reports selected results from a number of fiscal response studies. The earlier studies provide mixed results. For example, there is no significant impact in India but consistently adverse aggregate fiscal effects in Indonesia (contrary to Pack and Pack, 1990, who only consider fingibility). We are inclined to attach greater weight to the findings of the last three studies cited as they use the model based on (10) and (11), have longer time series data and report full results for the incremental impact of aid. Aid does appear to discourage tax effort, although this is only clearly so for Pakistan and is not the case for Costa Rica. The evidence that aid is primarily spent on consumption rather than investment (an implication of fungibility studies) is not compelling, although there is little encouraging evidence that aid induces significant increases in investment spending. In Pakistan, the incremental impact on investment is positive and the significant reduction in tax effort seems to bear on consumption spending (and borrowing needs). In Costa

Rica, and to a lesser extent the Philippines, investment spending falls and the increased tax effort seems to be used to fund consumption spending and a reduction in borrowing.

We can not draw general conclusions from so few studies of fiscal response. However, we can make some observations, emphasizing that these studies focus on the incremental impact of aid (incorporating the time dimension). First, the evidence from fiscal response models does not lend clear support to the more limited fungibility studies. It is not evident that aid increases consumption spending by more than it increases investment spending although, of the more robust studies, this is true for Costa Rica and the Philippines but not for Pakistan. Second, fiscal response models highlight that aid can have important effects on tax revenue, and the tendency is that tax effort is reduced. We consider the implications of this below. It may be that the expectation of aid reduces the incentive for governments to raise tax revenue. It may also be that aid is associated with policy reforms (such as trade liberalisation) that reduce tax revenue (tariff reductions). Third, there is evidence that aid has effects on borrowing; aid is associated with reductions in borrowing in Costa Rica and the Philippines, but with increased borrowing in Pakistan. In these models borrowing is effectively a residual, and the implications of this result are explored in some detail below. Finally, it is evident that the impact of aid varies by country. At the least, this cautions against attaching too much weight to cross-country studies. Fundamentally, it suggests the need for more time series country studies.

*Limitations of Fiscal Response*

Fiscal response models are no panacea, and many of the inherent problems have already been referred to. They are notoriously difficult to estimate, and highly sensitive to (and demanding of) the quality of the data. Frequently, as identified above, studies yield inconsistent estimates of $r$'s and rarely can the underlying $a$'s be recovered (Franco-Rodriguez, 2000, provides a critical discussion). One inherent empirical problem is that it is necessary to estimate the targets, but there is no accepted theory regarding how governments form revenue and expenditure targets. Persson and Tabellini (2000) provide a range of contending models applicable to multi-party democracies, and there is no solid basis to accept any one (although none are actually inconsistent with the loss function representation provided above). In an ideal world it may be possible to trawl government plans and budgets to obtain stated targets, but in practice this is not possible and target values are estimated econometrically (normally using actual values in some way). Another problem is that the structural equations are typically estimated using non-linear least squares, which is not very

robust. A third problem lies in the theoretical framework: a loss function such as (6) may not be a good representation of government behaviour (and is not directly derived from a utility optimizing framework). This latter problem is exacerbated as the targets are often estimated in an *ad hoc* manner.

Perhaps the most important problem, and probably also the most insoluble, is that the behavioural relationship being estimated is assumed fixed over the period. In practice, we would expect the impact of aid on fiscal behaviour to change over time. Indeed, the rationale for attaching policy reform conditions to aid is to alter behavioural responses. Addison and Osei (2000) provide evidence of a fiscal-electoral cycle emerging in Ghana; to the extent that a country 'democratizes' during the period of study, one should anticipate a change in the behavioural response to aid. In estimating an impulse response function for Ghana, Osei (2001) finds that aid is associated with a reduction in domestic borrowing, consistent with donor admonitions for stricter fiscal management. In econometric terms, one would expect structural breaks in many, if not all, of the series in the simultaneous equation framework. Furthermore, the way in which series co-move will change. However, given the problems inherent in estimating fiscal response identified above, it would not be possible to address these problems.

A final general problem, in the context of the aid-growth literature mentioned in the Introduction, is that the fiscal response models do not relate aid and fiscal behaviour to growth. For example, Gang and Khan (1991) and Franco-Rodriquez *et al* (1998) estimate only the fiscal response model. Mosley *et al* (1987), in contrast, use fiscal response theory to derive an equation relating aid to growth, but then only estimate the aid-growth relationship (using cross-country regressions). In principle, there is no reason not to include both approaches in one study, and such models offer a mechanism through which to explore how policy is conditional on aid. In practice, however, it would be a challenging exercise and very demanding of the data.

*Policy Implications*

Fiscal response models can enhance our understanding of the way in which aid influences government behaviour, especially by highlighting the complex linkages and variations by country. Aid may increase investment (relative to what might otherwise have been the case), especially if donors are able to constrain the ability of recipients to reallocate aid to unintended consumption uses, i.e. to ensure that (11) is binding. If, however, recipients are able to increase borrowing they may be able to allocate such funds to consumption (which may be undesirable in terms of the

overall impact on growth). In this context, a finding that aid is associated with increased borrowing becomes very important. Such a result does not reflect an estimated impact on borrowing *per se*, but rather suggests that aid tends to be associated with an increasing fiscal deficit (and the implied borrowing is mostly domestic).

There are a number of possible explanations for why this may occur. The most obvious is that the knowledge that a government is in receipt of aid allows it to increase borrowing, as creditors perceive that it has the ability to service debts. Another explanation is that certain aid expenditures require matching spending by the recipient (and this is likely to appear as recurrent spending). This is consistent with the evidence that total spending increases by more than the value of aid (and is also consistent with consumption spending rising). If spending rises by more than revenues (assuming constant tax effort), the deficit will rise and borrowing is implied. If tax effort is reduced, the need for borrowing may be greater. Another explanation is that spending officials may misperceive their budget constraint, the aid illusion referred to above (McGillivray and Morrissey, 2000b), which, especially in an environment of poor public expenditure management, can induce excess spending. The important policy implication can be expressed in simple terms. Even if recipient governments do not have 'malicious' intentions, aid can be associated with expenditure increases in excess of the aid itself, and this may lead to the need for borrowing to finance the deficit. As recognised in World Bank (1998, chapter 4) and elaborated in Fozzard and Foster (2000), the system of public expenditure management is central to the fiscal effects of aid.

The contrary finding, that aid is associated with reductions in domestic borrowing, is equally important and may be evidence of effective conditionality. Donor conditions on macroeconomic management often include measures to reduce domestic borrowing, and to reduce the fiscal deficit. In situations where it is difficult to raise tax revenue, these objectives can conflict. This would be signalled, in fiscal response models, by the finding that borrowing increases (as discussed above). Aid associated with reduced borrowing is suggestive of improved fiscal discipline. If tax revenue is increased, total spending may increase by at least the value of the aid. If tax revenue is not increased, the adjustment must be borne by spending. Total spending will increase by less than the aid, and it is likely that some fungibility will be observed.

How to interpret the effect of aid on tax effort is more ambiguous. The logic of fiscal response models is that it is undesirable that aid encourage reduced tax effort, as less funds are available for

net additional investment. The underlying intention is that aid is a net addition to government revenues, so that aid can be a net addition to investment (or consumption where appropriate). Fiscal response shows how this additional effect can be diluted. If taxes are interpreted as a measure of distortion, as in some growth theories, lower taxes would appear beneficial. Such reasoning is erroneous: growth theory is concerned with the distortionary effects of tax revenue, rather than the amount of revenue collected, i.e. the tax/GDP ratio is a poor proxy for government distortions (see Gemmell, 2000; Heady, 2000). In this sense, fiscal response analysis complements growth theory by permitting a more informed interpretation of government behaviour.

Developing countries, especially the poorer aid-dependent ones, have traditionally been heavily reliant on trade taxes, arguably the most distortionary of taxes (Greenaway and Milner, 1991). Liberalisation of trade, notably reducing tariffs, has been a cornerstone of economic policy reform associated with conditional aid since the 1980s (Greenaway and Morrissey, 1993). Although countries can liberalise trade in a revenue neutral manner, this would not uniformly be the case. It follows that conditional aid could well be associated with policy reforms that have the effect of reducing tax revenue (at least during the adjustment period), and the aid may even be partly intended to compensate for this revenue loss. In principle, fiscal response studies could address this by considering the policy reforms implemented during the period of analysis (in practice none have done so). Nevertheless, there is a policy implication: donors should take note not only of the potential fiscal effects of aid, but also the fiscal implications of policy reforms associated with conditional aid.

Notwithstanding these ambiguities, fiscal response models offer important insights into how the impact of aid on growth is mediated by the response of government to aid receipts. When the results of such models are contrasted with those of fungibility, a number of implications emerge. First, and foremost, the final outcome in terms of total spending, and its allocation, is quite different when one solves the system of fiscal interactions compared to when one looks at the partial, contemporaneous relationship. Second, and elaborating on this, aid does have effects on tax effort *and* borrowing, and the interaction of these determines the ultimate effect on total spending. Fungibility studies miss this important potential effect of aid. In summary, other things being equal (such as private savings, human capital and macroeconomic policy as identified from growth theory), aid is more likely to be growth-promoting if:

- Aid intended for investment (in physical *or* human capital) ultimately increases spending in those areas. This may arise because aid is actually allocated to such investment uses, or because aid stimulates increases in other revenues.

- Aid receipts do not encourage reduced tax effort (interpreted independently of how distortionary the tax system is). In general, the tax/GDP ratio is low in aid-dependent economies, and a core feature of mobilizing domestic resources is to increase that ratio. There may, of course, be disagreement on the optimal level. Adam and Bevan (2000) suggest that there is a consensus that the optimal tax/GDP ratio is 15-20%, although they do not consider if this is also the optimal expenditure/GDP ratio.

- Aid receipts do not encourage the diversion of tax revenues to consumption spending (subject to the proviso that pro-poor consumption spending may be a policy objective in its own right).

- Aid receipts do not encourage increased borrowing to finance consumption. If borrowing is used to finance productive investment, then in principle there is no reason to be concerned if aid induces increased borrowing. Furthermore, in this case, one may be less concerned to observe that aid is redirected to consumption.

The value of fiscal response models is that they permit one to trace through these linkages. In this sense they are more informative regarding the effects of aid on government fiscal behaviour than are fungibility studies (as the latter are really only concerned with the allocation of expenditure). Further refinement and development of fiscal response models is warranted. In particular, to date the potential impact of aid on borrowing (a possibility that fiscal response modeling deserves credit for highlighting) has not been explored in any detail, nor have subsequent effects on fiscal behaviour. Another issue, discussed in the final section, is regarding the definition of consumption spending, or equivalently of distinctions between developmental and non-developmental spending. In many studies the definitions are imprecise, and the treatment of spending on health and education is often problematic. This represents a criticism of fungibility studies that tend to assert that 'consumption' spending is not intended to be supported by aid, whereas in fact it often is (and increasingly so as donors attach more emphasis to health and education). Furthermore, one of the major elements of government recurrent (consumption) spending is interest payments (debt servicing). It may often be intended, implicitly if not explicitly, that aid can be used for this purpose. This may help explain many of the results in fungibility studies. However, if aid increases borrowing, and indeed if the aid itself is debt-creating, this has future implications for interest

payments (there may be a positive effect if the need for borrowing encourages the development of deeper domestic financial markets).

## IV. OTHER ISSUES AND CONCLUSIONS

The focus of this review has been on how governments respond to aid, or how aid impacts on government fiscal behaviour (taxing, spending and borrowing decisions). As described in the previous two sections, research in this area has tended to concentrate on either fungibility (a rather narrow concern with the composition of spending) or fiscal response (that, warts and all, attempts to address the broader dimension). Whilst other studies (for reviews see Adam and Bevan, 2000; Gemmell, 2000; Heady, 2000) have considered fiscal policy and fiscal structure, especially tax structure, these have rarely had any specific concern with aid. In fact, excepting the literature reviewed here, there have been remarkably few attempts to study specifically the links between aid and fiscal behaviour in developing countries.

*Miscellaneous Issues*

CGE modeling is a commonly used technique to analyze the effects of tax policy and structure (e.g. Levin, 2000; Perry *et al*, 2000), but it has rarely been employed to address the impacts of aid. Collier and Gunning (1992) use a prototype CGE model to simulate the interactions between trade liberalization and aid receipts in terms of their effects on relative prices of tradables and non-tradables. This is an example of aid and policy inter-relatedness. An innovative approach is to use a stylized general equilibrium model of the economy with government, subsistence and one or more productive sectors, and then demonstrate how aid to particular sectors and/or in the form of capital goods can alter relative prices (Hansson, 1995; Falck, 1997). All of these studies are trying to explore effects of aid on relative prices, for which the essentially structural CGE framework is appropriate. The CGE approach, however, is not so well suited to exploring how aid may alter government behaviour, as the (assumed) behavioural relationship is incorporated in the structure of the model. This is one reason why it has not been employed to examine the fiscal impacts of aid. One could, in principle, use a CGE model to estimate the tax revenue implications of aid, where aid is an input to sectors either in the form of investment or demand (consumption spending). We are not aware of any studies that have attempted this.

There is, however, a broader dimension regarding the impact of aid on behaviour – the issue of conditionality, structural adjustment and the use of aid for policy leverage. Conditional lending, specifically through structural adjustment loans, became the standard of donor aid policy in the

1980s. The motivation was to use aid as leverage to entice, cajole or encourage recipients to implement the types of economic policy reforms that the donors believed were necessary and essential to stabilize the economy and establish the foundations for sustained growth. Early evaluations of adjustment loans were critical (see McGillivray and Morrissey, 1999), and it proved easy to demonstrate that conditional lending could not be an effective way to ensure policy reform (White and Morrissey, 1997).

This does not, and should not, imply that conditional lending has no effects. Rather, what researchers have shown is that conditional lending *per se* is not an effective instrument for ensuring relatively rapid policy reform. Perhaps these evaluations were too strict – evaluating implementation on fairly narrowly defined measures within a short time horizon (typically, the period of the relevant conditional loan) rather than taking a step back and considering the level of reforms attempted over a longer time frame. Economic reform, especially if it should be complemented by institutional and political reform, is an inherently slow process (Morrissey, 1999). There are few cases where reform was implemented quickly and dramatically (the 'big bang' approach), and these cases were almost all failures. A gradual implementation is the most common case, largely because reform is politically difficult, even if governments are convinced of the economic arguments (Morrissey, 1999). This is not the place to review that literature, but we will make some points regarding trade policy reform in sub-Saharan Africa (SSA), chosen because the principal reforms had potential tax revenue impacts. Rationalisation and reduction of tariffs may be revenue-reducing, but this can be of-set by the tariffication of quantitative restrictions and by devaluation (which increases the domestic currency price of imports).

Few SSA countries implemented significant trade reforms in the 1980s, the period when they were in receipt of conditional loans 'demanding' reform, but by the late 1990s significant trade policy reform had been achieved in many countries, often some ten years after the onset of conditional lending (Morrissey, 2001). A number of countries have achieved a significant and sustained degree of trade liberalisation, notably Ghana, Mauritius and Uganda, with Madagascar and Tanzania to a lesser extent. These countries reduced tariffs significantly, although the evidence on the impact on collected tariff revenues is mixed. It is plausible to argue that aid exerted policy leverage in encouraging trade reforms. These had a direct fiscal impact in that the degree of distortion associated with the (import) tax regime was significantly reduced, and may not have adversely impacted on tax revenue. To the extent that aid conditionality has policy

leverage, and it appears to have (even if it is a slow process), this represents another dimension of the impact of aid on fiscal policy. It is beyond the remit of this paper.

Some authors have attributed aid ineffectiveness to fungibility as aid funds are redirected from investment to public consumption. There are two elements to this argument. The first is that there is fungibility and, specifically, investment spending increases by less than the amount of the aid. The evidence for this is strong if one limits attention to categorical fungibility studies (World Bank, 1998) but much weaker if one considers evidence from broader fiscal response models (above). The second argument is that public consumption spending impacts negatively on growth (e.g. Burnside and Dollar, 1997). The evidence in this regard is not compelling. Results vary according to sample, analytical method and categorisation of public expenditures. In the latter regard the distinction usually made is between productive (investment) expenditures and non-productive (consumption) spending, with the assumption that only the former is growth-promoting. How these are actually measured (especially the treatment of spending on human capital) varies from study to study (see Gemmell, 2000).

The empirical evidence is mixed. Barro (1991) and Landau (1983, 1986) concluded that public consumption spending is negatively related to growth (although this result is not consistently found for the poorest countries). On the other hand, Ram (1986) and Grossman (1988) found a positive relationship between government spending and economic growth, regardless of the disaggregation of expenditures. Diamond (1989) argued that social expenditure exhibited a positive impact on growth in the short-run but capital expenditure had a negative effect on growth. Lin (1994) found that non-productive spending had an insignificant impact on growth for industrialized countries but a significant positive impact for developing countries. These are all cross-section studies. In the one time series study of a developing country that we are aware of, Kweka and Morrissey (2000) found that government consumption spending (excluding health and education) was positively related to growth in Tanzania, whereas public investment was negatively (or insignificantly) related to growth. This is quite a robust result in the study, the interpretation being that public investment was non-productive whereas consumption spending supported incomes (this could be generally applicable to poor countries, where the public sector is a major source of formal incomes, especially in post-conflict situations). While the evidence may be mixed, one certainly cannot generalize to claim that government consumption spending is growth-retarding in the poorest countries. This undermines the reasons to be concerned about

fungibility insofar as many studies in that literature implicitly assume that consumption spending is growth-retarding.

*Conclusions*

Growth theory helps to identify a number of positive features that aid should have to be effective. Aid should increase savings and productive investment, and it should support human capital and technology transfer such that factor productivity increases. The recent literature is also agreed that government policy is an important determinant of the impact of aid on growth. Less attention, however, is paid to how aid can itself influence policy. This paper addressed one aspect of this – how aid affects fiscal policy or, more accurately, fiscal behaviour. We argued that fungibility studies can be misleading. They focus narrowly on a partial, static analysis of the composition of spending, often making the empirically questionable assumption that government consumption spending has a negative impact on growth whereas investment spending has a positive impact when drawing policy implications.

Fiscal response models identify how aid may induce government behaviour that undermines or enhances the positive impact of aid. Aid may be diverted to non-productive uses, it may discourage tax effort or encourage increased borrowing. Alternatively, aid may increase tax effort, encourage increased spending on investment and development areas, and support improved fiscal management so reducing borrowing. In the light of the findings from these studies, we can return to the questions posed in the introduction.

*Is aid used for the purposes for which donors provided it?* Not necessarily, and in any given year expenditure on items to which donors allocate aid may not increase by the amount of the aid. But this is not the right question. Rather, does aid lead to an increase over time in expenditures that promote growth and poverty-reduction? As this question has not specifically been asked of the data, and one may be unsure what such expenditures actually are (see McKay, 2000), the strict answer is that we do not know. On balance, there is evidence for a positive answer, but this is an issue to pursue.

*What are the effects of aid on various categories of public sector expenditure, including investment (fixed and human) and consumption?* Here there is more evidence. In general, aid tends to increase total spending by more than the amount of the aid. How this is allocated across

different categories varies from country to country but, in principal, all categories of expenditure can increase. Furthermore, what is classed as consumption spending may be growth-promoting.

*What are the effects of aid on revenue and financing decisions, including those relating to taxation and borrowing?* The evidence here is decidedly mixed and there are only robust results for three countries. In Costa Rica, aid appears to have been associated with increased tax effort and reduced borrowing. In Pakistan, the reverse was the case. In the Philippines the net effects were quite small, but aid was associated with reduced borrowing. Nevertheless, the research highlights that aid can have significant effects on tax effort and borrowing needs, and these possibilities should be recognized.

*Does aid cause reductions in public sector saving, and hence prolong a dependence on external financing?* The fiscal response literature suggests the possibility that aid can be associated with increased borrowing. This is an important finding, and an issue not recognized in World Bank (1998), that warrants further research. On balance, however, there is no convincing evidence that aid promotes dependence on external financing.

What lessons can be drawn from these results regarding aid policy and the broader impacts on growth and poverty alleviation? We draw three conclusions. First, insofar as in response to aid government spending increases (and by more than the amount of aid), aid contributes to growth. The evidence is inconclusive regarding the growth impact of different categories of public spending. As a consequence, fungibility studies are largely irrelevant in this regard. Aid effectiveness may be even greater if aid provides leverage to promote policy reform, as appears to be the case (albeit a gradual process). Second, the downside is that the impact of aid on fiscal aggregates may increase the fiscal deficit, implying a need for increased borrowing, which may be a future burden that could constrain growth. This requires further research.

Third, and finally, the evidence reviewed here is not informative regarding the impact of aid on poverty reduction. Partly, this is because poverty reduction cannot clearly be linked to specific expenditures or fiscal policies. Partly, it is because the evidence is based on 'retrospective' studies when poverty reduction was not an explicit policy objective. In simple terms, researchers were not trying to identify the effect on poverty. Future studies may wish to address this issue. In fact, there is something incongruous about the emphasis on aid for poverty reduction and the discussion of fungibility in World Bank (1998) and related studies. The aid-growth link is

predicated on aid being used for investment, yet pro-poor expenditures are likely to include many categories of consumption spending and Poverty Action Funds are targeted on what would be defined as consumption spending. The categorical fungibility studies would suggest that donors are unable to accurately target aid on, for example, health or education. To some extent this argument is exaggerated – donors can ensure that spending in certain areas does increase, even if not by the full amount of the aid. Our principal point is that it is more important to consider the long term relationship between aid and the fiscal policy aggregates. This is especially true in the context of aid effectiveness, but is also relevant to the contribution of aid to poverty reduction.

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