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Foreign Aid and the Quest for Growth

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ABSTRACT

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This paper examines fungibility as a possible explanation for the "missing link" between foreign aid and economic growth. The composition of aid plays a crucial role in determining the composition of government spending and, consequently, the magnitude of fungibility and its impact on growth. Embedding fungibility as an equilibrium outcome in an endogenous growth framework, we show that the substitution away from domestic government investment is higher than from government consumption. This leads to a reduction in domestic productive public spending and completely offsets any positive impact that aid might have on growth. The main predictions of the model are tested using a panel dataset of 67 countries for 1972-2000. We find strong evidence of fungibility at the aggregate level: almost 70 percent of total aid is fungible in our sample. We also find that investment aid is more fungible than other categories of aid. In the presence of fungibility, there is no statistically significant relationship between foreign aid and economic growth.

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1 Introduction

The apparent inability of foreign aid in affecting economic growth and development in the Third World has emerged as a challenging puzzle to both economists and policy-makers. A growing empirical literature since the mid-1990s has gradually changed the initial enthusiasm and optimism surrounding aid programs into concern and skepticism.[1]

In this paper, we examine the problem of fungibility, a behavioral aspect of aid-recipient economies that might potentially offset the positive impact that foreign aid is intended to have on growth and macroeconomic performance. Fungibility arises when the marginal dollar of aid ends up financing the provision of a good that it was not intended to finance. In other words, foreign aid relaxes a recipient government's budget constraint by substituting, rather than supplementing, domestic spending. This may lead to a reduction in domestic public spending or revenue generation in the recipient economy, thereby offsetting the positive impact of aid. This phenomenon typically arises in circumstances where monitoring the actual disbursement of aid in recipient countries is prohibitively costly for the donor.[2] Fungibility, while widely prevalent in the developing world, has scarcely been studied in an intertemporal context.[3] By embedding this phenomenon in a general equilibrium model of endogenous growth and then testing the resulting hypotheses, we seek to provide a better understanding of the "missing link" between foreign aid, growth, and development.

The contribution of this paper is two-fold. First, we analyze the mechanism through which fungibility might affect growth in a small open aid-recipient economy. We show

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[1]Notable among these is Boone (1996), who found that foreign aid has had no significant impact on the prominent indicators of development and quality of life. Easterly (1999) paints a much bleaker picture, reporting that an increase in foreign aid has actually led to a decline in growth rates in many recipient countries. The influential work of Burnside and Dollar (2000) argues that aid works only in economic environments that are characterized by "good" policy-making by recipient governments. Thus, their results call for greater selectivity from donors when designing aid programs. However, some recent papers, including Hansen and Tarp (2001), Dalgaard and Hansen (2001), and Easterly (2003) have argued that the Burnside-Dollar results are not robust to alternative definitions of aid, growth, and good policies.

[2]See Clements et al. (2004)

[3]There is a small theoretical literature which focuses on the diversion of aid away from its intended activities in developing countries. For example, Svensson (2000) and Lahiri and Raimondos-Moller (2004) focus on rent-seeking activities by special interest groups or lobbies which divert aid from its designated uses. On the other hand, Adam and O'Connell (1999) examine the role of lobby groups in forcing the government to use aid money for tax cuts. While all these mechanisms fall under the general category of fungibility, none focus on the impact of aid on the composition of government spending.

that the problem of fungibility is endogenous and arises when the aid-recipient government chooses to respond optimally to the inflow of foreign aid. We therefore derive a crucial link between the the composition of foreign aid and its consequences for the composition of government spending in the recipient country. This link is of critical importance since the composition of government spending is known to have an important bearing on economic growth; see Devarajan et al. (1996). We find that aid ear-marked for public investment is more fungible than that ear-marked for public consumption, thereby leading to a less-than proportionate adjustment of domestic spending in response to an increase in foreign aid. We further show that when the fiscal response to aid is characterized by fungibility, long-run growth is independent of foreign aid, a result that is consistent with recent empirical findings. The link between fungibility and the composition of aid has not been explored in previous studies, and thus provides us with a rich set of hypotheses that can be taken to the data. This aspect highlights our second contribution: an empirical test of our theoretical results. Using a panel of 67 countries over the 1972-2000 period, we first test whether total aid is fungible, by investigating how total government expenditures in recipient economies respond to changes in aggregate foreign aid. Our results indicate strong evidence of fungility: a one dollar increase in foreign aid leads to an increase of about $0.30 in total government spending (including aid), which implies that about $0.70 of every dollar of foreign aid is fungible. We then test the link between the composition of aid and the composition of government spending by examining whether specific aid types are used for the targeted categories of public expenditures that they are assigned to. Diaggregating total aid and government spending into the investment, non-investment, and social infrastructure categories, we find that consistent with our theoretical predictions, investment aid is indeed the most fungible among all aid categories: almost $0.90 of every dollar of investment aid is fungible. The corresponding degree of fungibility for social infrastructure aid is about $0.78. By contrast, we find no evidence of fungibility for the non-investment aid category. Finally, we confirm previous findings in the literature on the inability of aid to affect economic growth. The issue of causality is addressed in all our regressions and foreign aid is instrumented by interacting aid flows with indicators of the recipient country's geographical and cultural proximity to donors.

From an empirical standpoint, there have been a few attempts to examine the fungibility problem in aid-receiving countries. However, there is no consensus on the exact magnitude

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and importance of fungibility. Pack and Pack (1990, 1993) find that while foreign aid to Indonesia does not seem to be fungible, the opposite is true for the Dominican Republic, where they observe major shifts in public spending away from development expenditures into deficit reduction and debt service. Examining inter-governmental transfers in India, Swaroop et al. (2000) find evidence that foreign aid disbursements typically finance activities that are very different from the intentions of donors. Aggregate studies also differ in their conclusions about fungibility. For example, Feyzioglu et al. (1998), using annual data for 14 developing countries that span over 1971-90, find that foreign aid is not fungible and is also not associated with tax relief. On the other hand, a recent study by Gupta et al. (2003) finds that while concessional loans are not fungible and generate higher domestic resource mobilization, grants do indeed reduce revenue generation in recipient countries. None of these studies, however, examine the impact of the composition of aid on the composition of domestic government spending.

The empirical literature on foreign aid has been also severely constrained by the lack of a comprehensive theoretical framework within which one can understand the mechanism by which foreign aid might impact growth. A majority of the aid programs in the 1960s and 1970s were developed using the static "two-gap" approach of Chenery and Strout (1966), which had little, if any, intertemporal ramifications. Recently, in a series of papers, Chatterjee et al. (2003) and Chatterjee and Turnovsky (2007) have developed a general equilibrium endogenous growth framework within which the dynamic effects of aid can be analyzed. Their analysis suggests that the positive impact of aid depends crucially on (i) the restrictions imposed by the donor on how aid must be spent, (ii) the recipient's structural conditions, as embodied by the input-flexibility of the production sector, access to capital markets, the size of the government, and the choice between labor and leisure, and (iii) the duration of the aid program. However, these papers, by assuming a passive recipient government that honors any donor-imposed restrictions, do not account for fiscal responses to foreign aid flows in the recipient economy. We fill this gap in our model.

The rest of the paper is organized as follows. Section 2 lays down the analytical framework and examines the consequences of fungibility. Section 3 contains the empirical analysis and section 4 concludes.

2   Aid and Fungibility

We consider a representative agent who maximizes intertemporal utility from a private consumption good, C, and a public consumption good, G_C, over an infinite horizon

$$U = \int_0^\infty \frac{1}{\gamma}(CG_c^\theta)^\gamma e^{-\beta t}dt, \quad -\infty < \gamma < 1, \; \theta > 0, \; \gamma(1+\theta) < 1 \tag{1}$$

θ denotes the relative weight of the public consumption good in the utility function. The agent produces output using her stock of private capital (an amalgam of physical and human capital), K, and the flow of services from a public investment good, such as infrastructure, G_I, through a neoclassical production function

$$Y = G_I^\eta K^{1-\eta}, \quad 0 < \eta < 1 \tag{2}$$

The accumulation of private wealth is subject to the following flow budget constraint

$$\dot{K} = (1-\tau)Y - C - T \tag{3}$$

where τ is the income tax levied by the government and T denotes lump-sum taxes. The government provides the two public goods G_C and G_I, and finances their provision using domestic tax revenues and a flow of foreign aid, F. We will assume that the government maintains a balanced budget at all points of time:

$$G_c + G_I = \tau Y + F + T \tag{4}$$

In order to maintain an equilibrium of sustained growth, all variables must be tied linearly to the scale of the economy, given by the flow of output, Y. The provision of both public goods are co-financed, using a mix of domestic resources and foreign aid:[4]

$$G_I = G_I^d + \phi F = \left(g_I^d + \phi\varepsilon\right)Y \tag{5a}$$

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[4]Co-financing is an important ingredient of a majority of foreign aid programs. A recent example can be found in the European Union's Community Support Framework (CSF) and Agenda 2000 programs, which involved transfer (aid) programs for both its member countries as well as countries applying for membership to the Union. Most of these transfers were tied to infrastructure investment in the recipients and involved co-financing arrangements.

$$G_c = G_c^d + (1 - \phi)F = \left[g_c^d + (1 - \phi)\varepsilon \right] Y \qquad (5b)$$

where G_I^d and G_c^d represent domestic government spending on the public investment and consumption goods, respectively, while g_I^d and g_c^d are the corresponding domestic expenditure ratios. The foreign aid-output ratio is given by ε and the parameter ϕ $(0 \leq \phi \leq 1)$ denotes the *composition* of aid. In other words, a proportion ϕ of the total foreign aid flow is ear-marked by the donor for the public investment good and $(1 - \phi)$ is the corresponding allocation designated for the public consumption good. In that sense, $\phi\varepsilon$ can be thought of as "investment aid", while $(1 - \phi)\,\varepsilon$ can be thought of as "consumption" or "non-investment" aid. Note that the allocation parameter ϕ is exogenous to the recipient economy, as it is assumed to be determined by the donor.[5]

Combining (3) and (4), we get the economy's aggregate resource constraint:

$$\dot{K} = Y - C - G_c - G_I + F \qquad (6)$$

From the government's point of view, the equilibrium resource allocation in response to a foreign aid shock can depend on two potential scenarios. One possibility is that the government remains passive and does not alter its own expenditures rates. In this case, foreign aid is not fungible. This is the standard assumption in the existing theoretical literature. Another possibility is that the government responds to the foreign aid shock optimally, by adjusting its own expenditure ratios. In this case, aid is fungible. Our objective is to compare the equilibrium outcomes in the two scenarios and determine the relationship between the composition of foreign aid, government spending, and long-run growth.

2.1 Non-Fungible Aid

The representative agent maximizes (1) subject to (2) and (3), taking the expenditures on the two public goods, the foreign aid flow and its allocation, and the tax rate as given. The expenditure and tax parameters are arbitrarily set and do not change on the incidence of a foreign aid shock. The (balanced) growth rate ($\tilde{\psi}$) and the consumption-capital ratio

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[5]We employ a linear endogenous growth structure, as in Barro (1990), to keep the analysis tractable and derive refutable hypotheses that can be easily taken to the data.

($\tilde{\mu}$) in equilibrium are then given by

$$\tilde{\psi} = \frac{(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} - \beta}{1 - \gamma(1+\theta)} \tag{7a}$$

$$\frac{C}{K} = \tilde{\mu} = \frac{[\{1 - \gamma(1+\theta)\}(1 - g_I^d - g_c^d) - (1-\tau)](g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} + \beta}{1 - \gamma(1+\theta)} \tag{7b}$$

It is immediately evident from (7a) and (7b) that as long as $0 < \phi \leq 1$, an increase in aid (represented by an increase in ε) will increase both the equilibrium growth rate and the consumption-capital ratio:[6]

$$\frac{\partial \tilde{\psi}}{\partial \varepsilon} = \frac{\phi\eta(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1 - \gamma(1+\theta)]} > 0 \tag{8a}$$

$$\frac{\partial \tilde{\mu}}{\partial \varepsilon} = \frac{\phi\eta[\{1 - \gamma(1+\theta)\}(1 - g_I^d - g_c^d) - (1-\tau)](g_I^d + \phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1 - \gamma(1+\theta)]} > 0 \tag{8b}$$

Note that the effect of an aid shock is proportional to the allocation parameter ϕ. When $\phi = 0$, i.e., aid is completely tied to the public consumption good, it has no impact on the macroeconomic equilibrium. On the other hand, the larger is the proportion of investment aid ($\phi > 0$), larger is its positive impact on equilibrium growth and consumption. The intuition here is that investment aid, by increasing the allocation of resources to the public investment good (given that domestic spending ratios remain unchanged), enhances the productivity of private capital, thereby leading to higher private capital accumulation and growth in equilibrium. On the other hand, the public consumption good, being purely utility-enhancing in nature, has no effect on the equilibrium growth rate. This is the standard result in most of the theoretical literature, which argues in favor of tying foreign aid to investment spending; see Chatterjee et al. (2003).

However, even though the results in (8) are plausible and serve as a useful benchmark, they are usually not supported by empirical evidence. Given the high cost to donors of monitoring the implementation of aid programs and their allocation, it is entirely plausible that the recipient government treats the aid flow not as a supplemental source of financing public

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[6]Results (8a) and (8b) hold under the mild restrictions that $\gamma < 0$ and $[1 - \gamma(1+\theta)] < 1$.

goods, but rather as a *substitute* for domestic revenues, and adjusts its own expenditure parameters in response to the aid shock. In that case, the domestic expenditure ratios g_I^d and g_c^d are no longer exogenous. This is the idea of fungibility, to which we now turn.

2.2 Fungible Aid

When aid is fungible, the government optimally adjusts its own expenditure parameters in response to the aid shock. The government's problem then is to maximize (1) subject to (2), (3), its own budget constraint (4) and the financing constraints (5a) and (5b). The government takes the private allocation decisions in (7) as given, and chooses the domestic expenditure rates, g_I^d and g_c^d, for the two public goods, respectively. Given the magnitude of the aid shock, ε, and lump-sum taxes, T, the optimal tax rate is automatically determined from (4).

The optimal rates of domestic expenditure on the public investment and consumption goods, $\hat{g}_I^d$ and $\hat{g}_c^d$, are given by

$$\hat{g}_I^d = (1 - \tau)\eta - \phi\varepsilon \tag{9a}$$

$$\hat{g}_c^d = \frac{1}{1+\theta}\Big[\frac{\theta\{1 + \alpha - \eta(1-\tau)\}}{1 - \gamma(1+\theta)} - \{1 - \phi(1+\theta)\}\varepsilon\Big] \tag{9b}$$

where $\alpha = \beta\{\eta(1-\tau)\}^{\eta/\eta-1} - (1-\tau)$.

From (9a) we see that aid ear-marked for investment is indeed fungible. Domestic spending on the public investment good declines in proportion to the inflow of investment aid (as long as $\phi > 0$), thereby indicating that aid allocated for investment merely substitutes for domestic investment spending:

$$\frac{\partial \hat{g}_I^d}{\partial \varepsilon} = -\phi < 0$$

On the other hand, the change in domestic spending on the public consumption good in response to a foreign aid shock is less clear:

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = \phi - \frac{1}{1+\theta}$$

The response of domestic spending on the public consumption good to an aid shock depends on the relationship between the marginal contribution of investment aid, ϕ, and the relative importance of the public consumption good in utility, θ. Consumption aid is fungible too, but only partially. To see this, consider the case when the entire aid is tied to the public consumption, i.e., $\phi = 0$. Now,

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = -\frac{1}{1 + \theta} < 0$$

The increase in foreign aid leads to a reduction in domestic spending on the consumption good, but less than proportionately, i.e., $|\partial \hat{g}_c^d| < |\partial \varepsilon|$. The partial fungibility of consumption (non-investment) aid is due to the fact that the public consumption good yields direct utility benefits to the representative agent as opposed to the public investment good, whose benefits are realized only indirectly (through higher output). This prevents a one-for-one decline in public consumption spending. On the other hand, if $\phi = 1$, (aid is ear-marked only for the investment good), the inflow of aid, being fully fungible, finances an increase in the spending on the public consumption good on the margin, but less than proportionately, as $0 < \frac{\partial \hat{g}_c^d}{\partial \varepsilon} < 1$. When aid is allocated to both public goods ($0 < \phi < 1$), spending on the public consumption good rises only if $\phi > 1/(1 + \theta)$, i.e., if the allocation of aid to public investment increases the valuation of public consumption on the margin.

The obvious question that comes up at this juncture is how does an increase in foreign aid affect total government spending in an economy? To see this, we begin by defining total public expenditures (as a fraction of aggregate output), which include domestic spending on the two public goods, given by (9a) and (9b), as well as foreign aid:

$$\bar{g} = \hat{g}_I^d + \hat{g}_c^d + \varepsilon \tag{10}$$

Differentiating (10) with respect to the foreign aid parameter, ε, while taking into account (9a) and (9b), we get

$$\frac{\partial \bar{g}}{\partial \varepsilon} = \frac{\theta}{1 + \theta} < 1 \tag{10a}$$

The result in (10a) is a formal statement of fungibility. It states that when aid is fungible, total public expenditures (including foreign aid) rise less than proportionately. This indicates that foreign aid *substitutes* for domestic spending, rather than supplementing it. Note

that when aid is not fungible, i.e., g_I^d and g_c^d are constant, then $\partial \bar{g}/\partial \varepsilon = 1$, implying that if the government does not reallocate domestic expenditures in response to the aid flow, total expenditures should increase one-for-one with foreign aid.

Finally, to examine the effect of aid on the equilibrium growth rate when it is fungible, substitute for $\hat{g}_c^d$ and $\hat{g}_I^d$ in (7a):

$$\tilde{\psi} = \frac{(1-\tau)[(1-\tau)\eta]^{\frac{\eta}{1-\eta}} - \beta}{1 - \gamma(1+\theta)} \tag{11}$$

From (11), we see that when foreign aid is fungible, the equilibrium growth rate is *independent* of foreign aid and its allocation. Therefore, an aid shock, irrespective of whether it is targeted for investment or consumption (or both) will have no impact on long-run growth. On the contrary, given the government's allocation decisions in response to the aid flow, it can easily be shown that the consumption-capital ratio increases, indicating that the decline in domestic spending on public goods is, in some way, rebated back to the private sector in the form of higher private consumption. This rebate could take the form of a lump-sum transfer or a cut in taxes, both of which would lower government revenues. Many empirical studies such as Pack and Pack (1993) and Gupta et al. (2003) document a similar result.

3   Empirical Analysis

In this section, we use an unbalanced panel dataset of 67 countries over the 1972-2000 period to test the main predictions from the theoretical model in the previous section. Specifically, we test the following three hypotheses: (i) aggregate aid flows are fungible, (ii) there is a link between the composition of aid and that of government expenditure in aid-recipient countries, with investment aid being more fungible than other categories of aid, and (iii) in the presence of fungibility, foreign aid does not affect economic growth.

3.1 Data Description

We use the following dependent variables: annual total and sectoral government expenditures and the annual GDP growth rate.[7] Our data on government spending are from the International Monetary Fund's Government Financial Statistics. Data on the GDP growth rate are from the World Bank's World Development Indicators Online (WDI) and Global Development Finance Online (GDF).

The main explanatory variable in our analysis is foreign aid. Data on foreign aid is available from the Organisation for Economic Co-operation and Development's (OECD) International Development Statistics (IDS) online databases. These databases cover bilateral and multilateral donors' aid and other resource flows to developing countries and countries in transition. We use two different aid data, provided by the Creditor Reporting System (CRS) and Development Assistance Committee (DAC) databases.[8] The DAC report consists of aggregated data for Net Official Development Assistance (ODA), while the CRS report presents sectoral and geographical information on aid. Further, the data on total foreign aid from DAC show disbursements whereas data from CRS show commitments. To test whether the composition of aid matters for fungibility, we need data on the composition of aid and government spending, as the theoretical model makes predictions on how total and sector-specific expenditures respond to changes in total and sector-specific foreign aid.[9] Although the DAC report presents more data on disbursements, it does not provide as detailed a sectoral allocation of aid as the CRS report does. These two databases may show some differences for some years and sectors due to their underlying information gathering systems and tools. However, using the CRS database has become more feasible recently because of its increased coverage, especially starting from 1990s.[10] To check for robustness, we use total

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[7]Note that total expenditures do not include defense expenditures, which on average exceed 10 % of the total expenditure for the recipient countries. We exclude defense expenditures as it is unlikely for that type of expenditure to be affected by the social and economic indicators that are included in our model.

[8]See Appendix B for further details.

[9]For this part of our analysis, we use the two distinct aid datasets obtained from the DAC and CRS database as described above. We compare the results obtained by using these two types of aid data to see if data source selection affects the results considerably. The tables are designed in a way that the reader can see and compare results with these aid data.

[10]We examined the correlation between the two series in our panel in each year starting from 1973 (which is the initial year of the CRS data). In our sample, the correlation between the two series increases as we approach the present time. The correlation between the two measures is 0.6574 in 1973, 0.8057 in 1990 and

aid data from both the CRS and DAC databases and find that the results are practically unchanged.

We classify domestic government expenditures and foreign aid into three categories: investment, non-investment and social infrastructure. Since there are no precise definitions of these categories in our databases, we use the following strategy: in the CRS (commitments) dataset, we define investment aid as the sum of economic infrastructure aid and aid to the production sector. Then we use the corresponding spending amounts listed under the Economic Affairs and Services Section in the IMF's Government Financial Statistics (GFS) to construct government investment expenditures for the recipient country. We create social-infrastructure aid by using aid to social infrastructure and services in the CRS data. General public services, education, health, social security, housing and recreational and cultural expenditures in the GFS data are then used to construct the corresponding domestic government expenditure on social infrastructure. The remaining components in both the aid and expenditure datasets are used to construct the non-investment categories. Total and sectoral aid and expenditures are expressed as a share of the aid-recipient's GDP.[11]

The control variables for the fungibility analysis include agricultural value-added, literacy rate, infant mortality rate, the dependency ratio (the fraction of population 65 years and above), exports plus imports as a percentage of GDP and real per-capita GDP. Agricultural value-added, the dependency ratio, and the literacy rate are obtained from the WDI and GDF. Data on infant mortality rates and real per-capita GDP are obtained from the U.S Census Bureau's International databases (IDB) and the Penn World Table, respectively. The list of the recipient countries and the descriptive statistics for the variables of interest are presented in Tables A1 and A5 in Appendix A, respectively. In the growth regressions, we have included population growth, inflation rate, and FDI in addition to some of the control variables used in the fungibility analysis.[12]

0.9289 in 2000. The overall correlation in our panel between the two series is 0.8355.

[11]We provide the complete aid (CRS) and expenditure classification charts from our data sources in Appendix A (Table A3 and Table A4).

[12]The additional variables come from the WDI and the GDF databases.

3.2 The Composition of Foreign Aid and Fungibility

We begin by examining the sensitivity of total and sector-specific (as defined above) expenditures to changes in total and sector-specific foreign aid in a panel of 67 countries, using annual data for the 1972-2000 period.[13] The following specification is estimated:

$$GovExp_{it} = \alpha_0 + \alpha_1 Aid_{it} + \alpha_2 X_{it} + \epsilon_{it}$$

where $GovExp_{it}$ represents total government expenditures as a share of GDP, Aid_{it} measures total aid as a fraction of GDP, and X_{it} is a set of controls, including variables that are considered standard determinants of government expenditure in the literature. Specifically, we include the recipient's infant mortality rate and the dependency ratio as proxies for healthcare and social security spending. The literacy rate and agricultural value-added are used to control for spending in the education and agriculture sectors. Finally, we include trade dependence (imports plus exports as a percentage of GDP) as international exposure could increase government expenditures (see Alesina and Wacziarg, 1998) and real per capita GDP (to control for the size of the government) as a proxy for income.[14] We use lagged values of the above controls to minimize concerns about simultaneity. To address the potential for omitted country-level variables, we include country fixed effects. The time component that is common to all countries in a given period is addressed by including time effects. We also cluster the standard errors by country.

The effect of foreign aid on total government expenditures is presented in Table 1. The results confirm our theoretical predictions (see eq. 10a) and indicate that foreign aid is indeed fungible for both the DAC and CRS measures: from columns 1 and 2 in Table 1, we see that a $1 increase in foreign aid leads to an increase of about $0.35 in total government spending when the DAC aid data is used, and about $0.29 when the CRS data is used. Both coefficients are statistically significant at the 1% level. Table 1 provides strong evidence of

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[13]The list of aid-recipient countries used in our sample is provided in Appendix A (Table A1). No specific selection method was adopted for the countries included in our study. Rather, it was the availability of the data that determined the panel.

[14]Real GDP per capita of the recipient countries is included as an indicator of development levels which is likely to affect the size of the government, as Feyzioglu et al. (1998) have suggested, based on Wagner's Law. Wagner's law states that the development of an industrial economy will be accompanied by an increased share of public expenditure in GNP.

fungibility at the aggregate level: since total goverment expenditure already *includes* foreign aid spending, we see that on average (depending on which aid data is used), about \$0.70 from every dollar of total aid is fungible.

The evidence presented in Table 1 supports the prediction that total aid is fungible, but it does not identify how and if the composition of aid matters. One of the main predictions of the theoretical model in section 2 is that aid designated for public investment is unambiguously fungible, while fungibility from non-investment aid is lower than that from investment aid (see equations 9a and 9b). To shed light on the link between fungibility and the composition of aid, we split our sample into three categories of government expenditures and three corresponding categories of foreign aid. Our dependent variables are now the recipient government's investment expenditures, non-investment expenditures, and social infrastructure expenditures. The independent variables are the corresponding categories for foreign aid, while the control variables remain the same as in Table 1.

The effects of the composition of aid on the composition of government spending are reported in Table 2. The strategy we adopt for this part of our empirical analysis can be described as follows. For example, the first column of Table 2 regresses government investment expenditure on investment and social infrastructure aid. This strategy is adopted for two reasons. First, we not only want to determine whether a particular category of government expenditure is influenced by the corresponding category of foreign aid, but also whether it is affected by other categories of aid as well. Second, since the three categories of aid sum up to total aid, only two of these categories are independent. We therefore can regress only two categories of foreign aid on any one category of government expenditure. Equation (9a) in section 2 predicts that a \$1 increase in investment aid will lead to an equal and proportionate decline in domestic government investment expenditure. The empirical results in Table 2 are very close to this theoretical prediction: a one dollar increase in investment aid is associated with approximately a \$0.10 increase in total government investment expenditure (significant at the 5% level), indicating that about \$0.90 of every dollar of investment aid is fungible (since government investment expenditure also includes spending from investment aid). In comparison, we see that social infrastructure aid is less fungible than investment aid, with a corresponding crowding out of about \$0.78. By contrast, there is no evidence of fungibility for non-investment aid. We also find no evidence of substitution between aid categories

and expenditure categories (for example, social infrastructure aid has no significant effect on government investment expenditure).[15] Therefore, the empirical results reported in Table 2 confirm our theoretical predictions, i.e., investment aid appears to be the most fungible category of aid.

3.3   Implications for Economic Growth

Having demonstrated the fungibility of foreign aid and the effect of its composition, we now turn to the impact of aid on growth. According to our model, when aid is fungible, the equilibrium growth rate should be independent of aid and its composition. This prediction is tested in Table 3, by running a standard growth regression, where we regress the annual growth rate of GDP on total and investment aid, using lags of real GDP per capita, imports plus exports, the annual population growth rate, inflation rate, foreign direct investment, gross domestic fixed investment and the literacy rate as controls. Although Table 3 shows positive relationships between total aid, investment aid and growth, none of these results are statistically significant. Therefore, consistent with our theoretical predictions (and the sizable empirical literature), foreign aid does not seem to have any effect on economic growth.

3.4   Instrumental Variable Regressions

OLS estimations of the relationship between fungibility and foreign aid might be biased due to the potential endogeneity of foreign aid distributions (foreign aid can be sent where governments fail to provide public goods to their countries; these same countries could be characterized by corruption, weaker institutions and lower preferences for public goods). A similar problem exists for growth, since countries that have high growth rates may tend to receive more aid. In this section, we test the robustness of our earlier results by employing instrumental variable regressions.

Following Tavares (2003), we use a combination of geographical and cultural ties between major donors and recipient countries as instruments for aid, which in turn are interacted

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[15]This regression strategy leads to six possible pairs of aid categories. For the purposes of clarity and space, we report results for only three such pairs in Table 2. The results for the other three pairs are available upon request. However, the pattern of results reported in Table 2 remain virtually unaffected for the three other pairs.

with aid outflows from donors. These interaction terms serve as instrumental variables, determining foreign aid inflows to each recipient country. The procedure we adopt can be described as follows. For each country in our sample, we construct an instrument for aid which captures the exogenous component of the aid sample. We use the inverse of bilateral distance and a contiguity dummy (the presence of a common land border) for geographical proximity, and common language and religion as measures of cultural affinity. For each country in our sample, we sum the product of aid outflows from 22 donor countries (listed in Table A2 of Appendix A) after multiplying each of them by the bilateral exogenous measures described above.[16] We consider the interaction of the aid variable and instruments for two main reasons: First, since we use country fixed effects in our regressions and the instruments are time-invariant, we are not able to observe their individual effects on foreign aid distributions. Second, the instruments under consideration exist only between donors and recipients on bilateral basis. Since we use total aid from all donors in our empirical study, this method allows us to link bilateral comparisons to total aid.

In the first stage of the instrumental variable regression, we regress aid inflows for each developing country on the four exogenous instruments above. The predicted value of the dependent variable in that regression is then used in the second stage regression to examine the link between fungibility and growth. The results of our first stage regressions are presented in Table 4. All the exogenous variables have the expected signs (an increase in distance reduces the amount of aid received whereas common borders, religion and official language increase the amount of aid). Three of the instruments (distance, language, and religion) are statistically significant for the total foreign aid variable from the DAC data and two of them (distance and religion) are statistically significant for the total foreign aid variable from the CRS data. Our specification passes the Anderson (1984) canonical correlations likelihood-ratio test for identification and instrumental variable relevance, the Cragg-Donald F-statistic for weak identification and the Hansen J-statistic for over-identification tests for all instruments. As for the second stage regression, Table 5 presents the impact of total aid on total government expenditures when aid is instrumented. Our earlier results still

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[16]The instrumental variable for aid is constructed in the following manner:

$$Instrumental\ Variable(Aid * Inst)_{i,t} = \sum_{j=1}^{22} Aid_{i,j,t} * Instrument_{i,j}$$

where i : recipient country, j :donor country, t : year.

remain valid (the coefficients are now slightly lower than the ones in Table 2), even after instrumenting foreign aid: a \$1 increase in total aid is associated with approximately a \$0.33 increase in government spending for the DAC variable, and a \$0.21 increase for the CRS variable. Finally, Table 6 uses an IV regression for the aid-growth link and, as before, we are unable to find a statistically significant relationship between the two.

To summarize, we examine the effect of foreign aid and its composition on government spending and its composition. At the aggregate level, we find that foreign aid is fungible. We also find that investment aid is more fungible than other categories like social infrastructure aid, while there is no evidence of fungibility for non-investment aid. Our results also indicate that foreign aid, when fungible, does not have any impact on growth. All our empirical findings are consistent with our theoretical predictions.

4   Conclusions

In this paper, we examine the phenomenon of fungibility as a possible explanation for the "missing link" between foreign aid and economic growth. Fungibility arises out of an aid-recipient government's reallocation of domestic resources in response to foreign aid. We show how the composition of aid, often determined by donors, plays a crucial role in determining the composition of government expenditures and, as a consequence, the magnitude of fungibility and its impact on growth.

This study contributes to the literature on foreign aid and growth in two important directions. First, by embedding fungibility as an equilibrium outcome in an endogenous growth framework, we highlight the mechanism through which an injection of foreign aid might affect domestic resource allocation, especially with respect to public expenditures. Specifically, we show that when aid is fungible, the substitution away from domestic government investment is higher than from government consumption. This leads to a reduction in domestic productive public spending on part of the recipient government and completely offsets any positive impact that aid might have on growth. Our theoretical framework generates some interesting hypotheses which we then confront with data. The second contribution of this paper thus lies in testing the main implications of the theoretical model using a panel dataset

of 67 countries for the period 1972-2000. The empirical findings are consistent with our theoretical predictions: we find strong evidence of fungibility at the aggregate level, with almost 70 percent of total aid being fungible in our sample. When aid and government spending are disaggregated into different categories, we find that investment aid is the most fungible type of aid. Finally, we confirm that in the presence of fungibility, there is no statistically significant relationship between foreign aid and economic growth. We address the issue of causality in all our regressions, and our results remain robust to the instrumentation of foreign aid.

Both our theoretical and empirical analyses provide useful insights for policy with regard to the design and implementation of foreign aid programs. Given that more than two-thirds of all aid flows to the developing world are tied to investment (e.g. infrastructure), our findings regarding the fungibility of investment aid serve as a caution to donors imposing specific tying restrictions on recipients. On the other hand, the fact that non-investment and social infrastructure aid are less fungible also provides insights on how the disbursement of foreign aid can be designed more effectively. Finally, our theoretical framework highlights the mechanism through which fungibility might impact on domestic resource allocation by characterizing the link between the composition of aid and the incentives for public spending.

This paper is not ambitious enough to explain away the "missing link" between foreign aid and growth. However, we have attempted to explain a piece of this complicated puzzle. We therefore end with a caveat which might be useful for future research: the problem of fungibility is also a political economy issue and is probably intricately linked with factors such as rent-seeking, corruption, the institutional environment of recipients and their strategic relationships with donors. We believe that our results will provide insights into how the above factors can be integrated into a more comprehensive analysis of foreign aid and its impact on macroeconomic performance.

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TABLE 1. The Effect of Foreign Aid on Total Government Expenditures

Variable	Dependent Variable	
	Total Expenditure (% of GDP)	
Aid DAC (% of GDP)	0.347 (6.02)***	
Aid CRS(% of GDP)		0.288 (5.28)***
Real GDP per capita	-0.0000 (0.18)	-0.0001 (0.40)
Infant mortality rate, lag (-1)	-0.103 (2.16)**	-0.095 (2.01)**
Agricultural value added (% of GDP), lag (-1)	-0.227 (2.91)***	-0.252 (3.31)***
Literacy rate, lag (-1)	-0.213 (1.24)	-0.235 (1.36)
Import plus export (% of GDP), lag (-1)	-0.037 (1.57)	-0.038 (1.61)
Dependency ratio (65+), lag (-1)	-0.883 (0.96)	-0.726 (0.73)
Constant	52.878 (4.10)***	53.684 (3.93)***
Observations	620	620
Adj. R-squared	0.90	0.90
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Cluster (by country)	Yes	Yes

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2. The Effects of Composition of Foreign Aid on the Composition of Government Expenditures

Variable	Investment expenditure (% of GDP)	Non investment expenditure (% of GDP)	Social infrastructure expenditure (% of GDP)
	Dependent Variable		
Investment aid (% of GDP)	0.100 (2.27)**		
Non investment aid (% of GDP)		0.158 (1.57)	0.121 (1.00)
Social infrastructure aid (% of GDP)	0.030 (0.45)	0.064 (0.70)	0.221 (2.73)***
Real GDP per capita	0.0003 (1.58)	0.00002 (0.08)	-0.0003 (0.81)
Infant mortality rate, lag (-1)	-0.015 (0.66)	-0.104 (4.00)***	-0.011 (0.44)
Agricultural value added(% of GDP), lag (-1)	-0.043 (1.60)	-0.080 (1.31)	-0.086 (1.17)
Literacy rate, lag (-1)	-0.052 (0.64)	0.028 (0.40)	-0.181 (1.58)
Import plus export (% of GDP), lag (-1)	0.019 (1.95)*	-0.008 (0.61)	-0.043 (2.45)**
Dependency ratio 65, lag (-1)	-0.329 (0.53)	-0.736 (1.08)	-0.315 (0.54)
Constant	9.172 (1.43)	17.907 (2.09)**	29.799 (4.00)***
Observations	591	571	609
Adj. R-squared	0.82	0.72	0.93
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 3. The Effects of Foreign Aid and its Composition on Economic Growth

Variable	Dependent Variable		
	GDP growth rate (annual)	GDP growth rate (annual)	GDP growth rate (annual)
Aid DAC (% of GDP)	0.038 (0.71)		
Aid CRS (% of GDP)		0.036 (0.73)	
Investment aid (% of GDP)			0.161 (1.54)
Real GDP per capita, lag (-1)	-0.001 (4.18)***	-0.001 (4.34)***	-0.001 (5.18)***
Population growth (annual), lag(-1)	0.341 (2.17)**	0.359 (2.30)**	0.444 (3.11)***
Import plus export, (% of GDP) lag (-1)	0.050 (3.29)***	0.052 (3.40)***	0.052 (3.36)***
Literacy rate, lag (-1)	-0.150 (2.13)**	-0.184 (2.59)**	-0.225 (3.37)***
Gross fixed capital formation of gdpf, lag (-1)	-0.071 (1.99)*	-0.081 (2.15)**	-0.082 (2.12)**
Inflation consumer prices annual, lag (-1)	-0.001 (3.59)***	-0.001 (3.60)***	-0.001 (3.89)***
Foreign direct investment net inflow, lag (-1)	0.208 (2.68)***	0.220 (2.81)***	0.235 (2.87)***
Constant	13.880 (3.77)***	15.936 (4.43)***	22.667 (4.34)***
Observations	1360	1354	1305
Adj. R-squared	0.20	0.18	0.21
Country Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 4. First-stage IV Regressions

Variable	Dependent Variable	
	Aid DAC (% of GDP)	Aid CRS (% of GDP)
Aid/Distance	1865.634 (2.38)**	2714.921 (1.78)*
Aid*Border	10.2954 (1.05)	10.9746 (0.85)
Aid*Language	0.8379 (3.77)***	0.0333 (0.07)
Aid*Religion	0.8468 (4.86)***	0.8032 (1.75)*
Real GDP per capita	-0.00038 (-1.72)*	-0.00043 (-1.40)
Infant mortality rate, lag (-1)	0.0326 (0.65)	-0.0381 (-1.62)
Agricultural value added, lag (-1) (% of GDP)	-0.0871 (-2.48)**	0.0595 (1.53)
Literacy rate, lag (-1)	-0.0212 (-0.32)	-0.0542 (-0.67)
Total trade, lag (-1) (% of GDP)	0.0096 (1.52)	0.0114 (1.37)
Dependency ratio 65, lag (-1)	0.7265 (1.35)	0.8573 (1.76)*
Observations	613	596

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 5.   Instrumental Variable Regressions for Total Aid

Variable	Dependent Variable	
	Total Expenditure (% of GDP)	Total Expenditure (% of GDP)
Aid DAC (% of GDP)	0.329 (4.72)***	
Aid CRS (% of GDP)		0.212 (2.47)**
Real GDP per capita	-0.000 (0.23)	-0.000 (0.58)
Infant mortality rate, lag (-1)	-0.104 (2.23)**	-0.106 (2.35)**
Agricultural value added (% of GDP), lag (-1)	-0.226 (2.94)***	-0.242 (3.20)***
Literacy rate, lag (-1)	-0.216 (1.28)	-0.232 (1.43)
Total trade, lag (-1)	-0.037 (1.61)	-0.030 (1.24)
Dependency ratio 65, lag (-1)	-0.863 (0.98)	-1.083 (1.12)
Observations	613	596
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Cluster (by country)	Yes	Yes
Anderson canonical correlations test (p value)	0.0000	0.0000
Cragg-Donald F statistic	313.628	108.054
Hansen J statistic (p value)	0.8303	0.1377

Robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 6. Foreign Aid and Economic Growth (Instrumental Variable Regression)

Variable	Dependent Variable		
	GDP growth rate (annual)	GDP growth rate (annual)	GDP growth rate (annual)
Aid DAC (% of GDP)	-0.060 (1.35)		
Aid CRS (% of GDP)		-0.051 (0.77)	
Investment aid (% of GDP)			-0.680 (1.34)
Real GDP per capita, lag (-1)	-0.001 (4.54)***	-0.001 (5.20)***	-0.002 (4.00)***
Population growth (annual), lag(-1)	0.375 (2.50)**	0.340 (2.01)**	0.174 (1.10)
Import plus export, (% of GDP) lag (-1)	0.058 (3.62)***	0.059 (3.94)***	0.078 (3.52)***
Literacy rate, lag (-1)	-0.202 (2.52)**	-0.202 (2.39)**	-0.306 (4.06)***
Gross fixed capital formation of gdpf, lag (-1)	-0.085 (2.41)**	-0.086 (2.39)**	-0.090 (1.69)*
Inflation consumer prices annual, lag (-1)	-0.001 (3.16)***	-0.001 (3.46)***	-0.000 (1.32)
Foreign direct investment net inflow, lag (-1)	0.180 (2.36)**	0.184 (2.30)**	0.191 (1.79)*
Observations	1304	1309	949
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes

Robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix A

Table A1. List of Recipient Countries Included in Our Panel Data

Argentina, Bahrain, Barbados, Belarus, Belize, Bolivia, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Chile, Colombia, Congo - Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Dominican Republic, Egypt, El Salvador, Estonia, Ethiopia, Guatemala, Honduras, Hungary, India, Indonesia, Iran, Jamaica, Kazakhstan, Kuwait, Latvia, Lesotho, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Mongolia,   Morocco, Nepal, Nicaragua, Niger, Pakistan, Panama, Paraguay, Peru, Romania, Russia, Rwanda, Senegal, Singapore, Slovenia, Sri Lanka, Syria, Tajikistan, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uruguay, Venezuela.

Table A2. List of Donor countries included in the IV regression

Australia, Austria, Belgium, Canada, Denmark, Finland, Japan, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Table A3.   CRS/Aid Activities (these activities include all commitments)

DAC name	Definition
XII.TOTAL	
I.SOCIAL INFRASTRUCTURE & SERVICES	I.Total
I.1 Education, Total	Includes general teaching and instruction at all levels; as well as construction specifically to improve or adapt educational establishments. Training in a particular field, such as agriculture, is reported against the sector concerned.
I.1.a) Education, Level Unspecified	Includes education sector policy and research, as well as buildings and teacher training when level of education unspecified.
I.1.b) Basic Education	Includes primary, basic life skills for youth and adults and early childhood education.
I.1.c) Secondary Education	Includes vocational training.
I.1.d) Post-Secondary Education	Includes higher education and advanced technical and managerial training.
I.2 Health, Total	Covers assistance to hospitals, clinics, other medical and dental services, public health administration and medical insurance programmes.
I.2.a) Health, General	Includes health policy, medical education and research, laboratories, hospitals and specialised clinics, ambulances, dental services, mental health, rehabilitation, non-infectious disease control, drug and substance abuse control (excluding narcotics traf
I.2.b) Basic Health	Basic health care provision, training of basic health personnel and development of basic health infrastructure; nutrition, infectious disease control, public health campaigns.
I.3 Population Programmes	Covers all activities in the field of reproductive health, family planning and research into population problems.
I.4 Water Supply & Sanitation	Covers assistance given for water supply and use, sanitation and water resources development (including rivers).
I.5 Government & Civil Society	Includes assistance to strengthen the administrative apparatus and government planning, and activities promoting good governance and strengthening civil society.
I.5.a) Government and civil society - general	
I.5.b) Conflict, Peace and Security	
I.6 Other Social Infrastructure & Services	Covers assistance to employment, housing, other social services and cultural development. Includes also research when sector cannot be identified.
II.ECONOMIC INFRASTRUCTURE	II.Total
II.1Transport & Storage	Covers road, rail, water and air transport and storage, whether or not related to transportation.
II.2Communications	Includes all communications (post and telecommunications, radio, television, print media).
II.3 Energy	Covers both the production and distribution of energy. Assistance towards the peaceful use of nuclear energy is reportable as ODA. This includes the construction and decommissioning of nuclear power reactors for civilian power supply, the development or
II.4 Banking & Financial Services	Covers assistance to finance and banking in both formal and informal sectors.
II.5 Business & Other Services	Includes business development and activities aimed at improving the business climate; privatisation.

III.PRODUCTION SECTORS	III.Total
III.1 Agriculture - Forestry - Fishing, Total	Including agricultural sector policy, agricultural development and inputs, crops and livestock production, agricultural credit, co-operatives and research.
III.1.a) Agriculture	Including agricultural sector policy, agricultural development and inputs, crops and livestock production, agricultural credit, co-operatives and research.
III.1.b) Forestry	Includes forestry policy, planning and programmes, fuelwood and charcoal projects, forestry education, research and development.
III.1.c) Fishing	Includes fisheries policy, planning and programmes as well as fisheries research and education.
III.2 Industry - Mining - Construction, Total	Covers assistance to manufacturing industries of all kinds, technological research and development, extractive industries, and construction when sector cannot be identified.
III.2.a) Industry	Industrial policy, small business and craft development; all types of manufacturing, including agro-processing, chemicals and fertilisers, gas liquefaction and petroleum refining, fuel wood production, textiles and leather.
III.2.b) Mining	Includes mining and minerals policy and programmes, geology, and extraction of metals, minerals and fuels.
III.2.c) Construction	Construction sector policy and planning; excluding construction activities within specific sectors (e.g., hospital or school construction).
III.3 Trade Policy and Regulations	Covers trade and export promotion; hotels and other tourist facilities.
III.4 Tourism	Tourism policy and administrative management.
IV. MULTISECTOR	IV.Total
IV.1 General Environment Protection	Covers activities concerned with conservation, protection or amelioration of the physical environment without sector allocation.
IV.2 Women In Development	Covers activities concerned with advancement of women in development without sector allocation.
IV.3 Other Multisector	Covers urban and rural development projects and other multisector activities
V.TOTAL SECTOR ALLOCABLE (I+II+III+IV)	Sum of amounts on lines 100, 200, 300 and 400.
VI. COMMODITY AID / GENERAL PROG. ASS.	This main heading includes contributions for general development purposes without sector allocation, with or without restrictions on the specific use of the funds (and irrespective of any control by the donor of the use of counterpart funds). Funds suppl
VI.1 General Budget Support	Non-sector allocable programme assistance whose provision is explicitly linked to agreed policy packages, in particular those implementing recommendations made by the World Bank and the IMF.
VI.2 Developmental Food Aid/Food Security Assistance	Supplies and transport of food, cash for food, and intermediate products (fertilisers, seeds etc.) provided as part of a food aid programme.
VI.3 Other Commodity Assistance	Includes import, budget and balance-of-payments support.
VII. ACTION RELATING TO DEBT	This main heading groups all actions relating to debt (forgiveness, swaps, buy-backs, rescheduling, refinancing).
VIII. EMERGENCY ASSISTANCE AND RECONSTRUCTION	This main heading groups emergency and distress relief in cash or in kind, emergency food aid, humanitarian aid including aid to refugees, and assistance for disaster preparedness.
VIII.1 Emergency Food Aid	Food aid for population groups affected by emergency situations.
VIII.2 Other Emergency and Distress Relief	All emergency, distress relief and humanitarian aid except food aid.
VIII.3 Reconstruction relief	
IX. ADMINISTRATIVE COSTS OF DONORS	Administrative costs as defined in paragraphs 1.26 to 1.30.

X. SUPPORT TO NGO'S	This main heading refers to official funds paid over to national and international non-governmental organisations for use at the latters' discretion. Official funds made available to NGO's for use on behalf of the official sector, in connection with purp
XI. UNALLOCATED/UNSPECIFIED	Amounts should be reported under this heading only for forms of aid which cannot be assigned to another part of the table, and also, in the case of project or sector assistance, to record contributions for which sectoral destination remains to be specifie

Table A4. Government Financial Statistics (IMF)

Government Finance

Revenue Classification	Source
80. OVERALL DEFICIT/SURPLUS	IMF, GDF
81. TOTAL REVENUE & GRANTS	IMF, GDF.
81A. TAXES ON INCOME, PROFITS, & CAPITAL GAINS	IMF, GDF.
81B. SOCIAL SECURITY CONTRIBUTIONS	IMF, GDF.
81C. TAXES ON PAYROLL OR WORK FORCE	IMF, GDF.
81D. TAXES ON PROPERTY	IMF, GDF.
81E. DOMESTIC TAXES ON GOODS & SERVICES	IMF, GDF.
81F. TAXES ON INTL TRADE & TRANSACTIONS	IMF, GDF.
81G. OTHER TAXES	IMF, GDF.
81Y. TOTAL REVENUE	IMF, GDF.
81YA. TAX REVENUE	IMF, GDF.
81YB. NONTAX REVENUE	IMF, GDF.
81YC. CAPITAL REVENUE	IMF, GDF.
81YD. CURRENT REVENUE	IMF, GDF.
81Z. GRANTS	IMF, GDF.

Expenditure Classification	Source
82. TOTAL EXPENDITURE	IMF, GDF.
82A. GENERAL PUBLIC SERVICES	IMF, GDF.
82AC. PUBLIC ORDER & SAFETY (B3)	IMF, GDF.
82B. DEFENSE (B2)	IMF, GDF.
82C. EDUCATION (B4)	IMF, GDF.
82D. HEALTH (B5)	IMF, GDF.
82E. SOCIAL SECURITY & WELFARE (B6)	IMF, GDF.
82F. HOUSING & COMMUNITY AMENITIES (B7)	IMF, GDF.
82G. RECREATIONAL, CULTURAL, & RELIG AFFAIRS (B8)	IMF, GDF.
82H. ECONOMIC AFFAIRS & SERVICES (B9 TO B13)	IMF, GDF.
82HB. AGRI, FORESTRY, FISHING, & HUNTING (B10)	IMF, GDF.
82HC. MINING & MINERAL RESOURCES, MANUF, & CONSTRUCTION (B11)	IMF, GDF.
82HD. FUEL & ENERGY (B9)	IMF, GDF.
82HI. TRANSPORTATION & COMMUNICATION (B12)	IMF, GDF.
82HL. OTH ECONOMIC AFFAIRS & SERVICES (B13)	IMF, GDF.
82K. OTH EXPENDITURES (B14)	IMF, GDF.
82N. CURR EXPENDITURE ON GOODS & SERVICES (C1)	IMF, GDF.
82NA. WAGES & SALARIES; EMPLOYER CONTRIBUTIONS (C1.1 + C1.2)	IMF, GDF.

82NP. OTH PURCHASES OF GOODS & SERVICES (C1.3)	IMF, GDF.
82NX. EMPLOYER CONTRIBUTIONS (C1.2)	IMF, GDF.
82PA. INTEREST PAYMENTS (C2)	IMF, GDF.
82PJ. SUBSIDIES & OTH CURR TRANSFERS (C3)	IMF, GDF.
82PK. SUBSIDIES (C3.1)	IMF, GDF.
82PM. TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	IMF, GDF.
82PP. TRANSFERS ABROAD (C3.5)	IMF, GDF.
82PT. TRANSFERS TO NONPROFIT INSTS & HHLDS (C3.3 4 + C3.4)	IMF, GDF.
82R. CURRENT EXPENDITURE (C.III)	IMF, GDF.
82V. CAPITAL EXPENDITURE (C.IV)	IMF, GDF.
82VA. ACQUISITION OF FIXED ASSETS (C4)	IMF, GDF.
82Z. EXPEND & LENDING MINUS REPAYMENTS (C.I; OR C.II + C.V)	

Table A5. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
Total expenditure (excluding defense)	22.96231	9.929409	.0275524	56.08927	N = 1019
Investment expenditure	5.684408	4.034981	.0033656	25.72717	N = 1048
Non-investment expenditure	3.887969	3.568834	1.43e-06	23.37628	N = 988
Social infrastructure expenditure	13.81117	7.381383	.021869	55.66596	N = 1058
Aid DAC	4.963536	6.418934	-.5458025	48.14704	N = 1727
Aid CRS	3.922629	5.361861	4.30e-06	41.02941	N = 1618
Investment aid (CRS)	1.729454	2.525373	2.12e-06	22.93244	N = 1525
Non-investment aid (CRS)	1.481203	2.522273	9.31e-10	22.22922	N = 1566
Social infrastructure aid (CRS)	.9368216	1.608255	0	17.5981	N = 1484

APPENDIX B

All data on ODA are collected by the OECD/DAC Secretariat from its 23 members, then checked and aggregated by the OECD/DAC Secretariat. The DAC Secretariat collects two sets of data:

(i) Development Assistance Committee (DAC) Database: The DAC statistics provide comprehensive data on the volume, origin and types of aid and resource flows to over 180 aid-recipient countries. The data cover official development assistance (ODA), other official flows (OOF) and private funding (foreign direct investment, bank and non-bank flows) from members of the DAC, multilateral organizations and other donors. See *www.oecd.org/dac/stats/dac/guide* for further details.

(ii) Creditor Reporting System (CRS) Database: The objective of the CRS Aid Activity database is to provide a set of readily available basic data that enables analysis on where aid goes, what purposes it serves and what policies it aims to implement, on a comparable basis for all DAC members. The Aid Activity data are used to analyze the sectoral and geographical breakdown of aid for selected years and donors or groups of donors. But the database also permits to consider specific policy issues (e.g. tying status of aid) and monitor donors' compliance with various international recommendations in the field of development co-operation. See *www.oecd.org/dac/stats/crs/guide* for further details.

The Net Official Development Assistance (ODA) data comprises grants or loans to developing countries and territories on the OECD/DAC list of aid recipients that are undertaken by the official sector with promotion of economic development and welfare as the main objective and at concessional financial terms. This definition is from Milliennium Development Goals Indicators webpage.