Fiscal effects of foreign aid in a federal system of governance
The case of India

Vinaya Swaroop\textsuperscript{a,*}, Shikha Jha\textsuperscript{b}, Andrew Sunil Rajkumar\textsuperscript{a}

\textsuperscript{a}Development Research Group, World Bank, Washington, DC 20433, USA
\textsuperscript{b}Indira Gandhi Institute of Development Research, Mumbai 400 065, India

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Abstract

This paper models fiscal effects of foreign aid in a federal system of governance. Our main innovation is to incorporate the inter-governmental fiscal link in examining economic fungibility of foreign aid. The model is applied to the expenditure decisions of the central government of India. The two main findings are: (i) Foreign aid merely substitutes for spending that the government would have undertaken anyway; funds freed by aid are spent on non-development activities, and (ii) In passing earmarked external assistance to states, the central government makes a reduction in its transfers to states. These findings indicate that the central government’s expenditure choices are unaffected by external assistance. The implication for donors is that even though their development projects may be associated with very high rates of economic return, they could be assisting the central government in financing something very different at the margin. For the state governments, the finding indicates that they may not be reaping the full benefits of externally procured assistance.

Keywords: Foreign aid; Federal system; Fungibility; Development and non-development government expenditures; India

JEL classification: E62; O23

*Corresponding author.
E-mail address: vswaroop@worldbank.org (V. Swaroop)
1. Introduction

An important objective of foreign aid earmarked for development purposes is to improve development outcomes in the targeted area in the recipient country. If, however, the preferences of the recipient government are different from those of the donor agency, the former can make aid “fungible” by reducing its own resources going to the activity which receives aid and using it for other purposes. If the structure of government is federal in the recipient country, this fungibility may also take the shape of changes in inter-governmental fiscal transfers. For example, knowing that a subsidiary government is receiving external assistance, the federal government could reduce its fiscal transfers to that lower level of government. There are a number of studies that have looked at the issue of foreign aid fungibility. On the inter-governmental front an extensive literature has studied the fiscal effects of inter-governmental grant subsidy programs (see Gramlich (1977), McGuire (1978), Mieszkowski and Oakland (1979), Rosen (1988), Zou (1996) and others). However, no study has looked at the inter-governmental fiscal link in examining foreign aid fungibility. Our main innovation in this paper is to study the fungibility of foreign aid created through this link.

We model fiscal effects of foreign aid in a federal structure of government. The model is then applied to the expenditure decisions of India’s central government. In the past, several country studies have carried out econometric analyses of effects of aid on public expenditure, but in most cases the explanatory variables used are based on casual empiricism. Some researchers (e.g., Pack and Pack, 1996) have acknowledged that there is an economic behavior underlying their estimations, but they do not explicitly incorporate it in their analysis. In this paper, we develop a model of government behavior which yields estimable equations that can be compared with those in the literature. Using time-series data, we first estimate the influence of foreign aid on the level and composition of central government’s spending in India. Our main inquiry is: Assuming that aid is given for development purposes, has it been spent as intended? In India, almost all external assistance (including funds earmarked for state governments) accrues to

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1 In a mix of cross country and individual country experiences, Heller (1975), Cashel-Cordo and Craig (1990), Pack and Pack (1990, 1993, 1996), Gang and Khan (1991), Gupta (1993), Khilji and Zampelli (1994), and Feyzioglu et al. (1998), among others, have analyzed whether foreign assistance provided for specific purposes is shifted (contrary to the wishes of donors) by the recipient government. World Bank (1998) provides a good summary of the existing empirical studies on this topic.

2 One could argue that in some cases aid could be given for purposes other than development. Modeling the process of aid determination from the donor’s side is altogether a different exercise. In our analysis, we assume that donors to India provide aid for the purpose of facilitating economic and social development.
the central government, which is also liable for any repayments. Concerns have been raised that states that procure externally aided projects are not able to reap the full benefits; central-government transfers to states are reduced when foreign aid is secured for states. In tracing the fiscal effects of foreign aid in India, it is therefore important to analyze the fiscal link between the central and state governments. Using a panel of time-series data across different states, we next examine the impact of aid resources acquired for state governments, on fiscal transfers from the central to the state governments.

In Section 2 of the paper we first define aid fungibility. We then develop an analytical framework in a federal system of governance that links foreign aid with various components of public expenditure and with inter-governmental transfers. In Section 3 we empirically examine the fiscal effects of foreign aid. Section 4 presents our concluding remarks.

2. A model of aid fungibility

To study the fiscal effects of foreign aid it is important to understand the concept of aid fungibility. Before formally developing the model, therefore, we briefly discuss what it means for aid to be fungible.

2.1. Foreign aid fungibility: A definition

Suppose a developing country spends its total resources on a single private good, \( C \), and two public goods, \( G_1 \) and \( G_2 \). All three goods are assumed to be normal (non-inferior). Spending on \( G_1 \) and \( G_2 \) are characterized as non-development (consumption type) and development (investment type). In addition to its own resources, the country receives earmarked assistance towards the purchase of good \( G_2 \) from a donor agency. This delineation of public spending reflects a functional distinction found in the budgets of most developing countries. Moreover, aid to developing countries is mostly earmarked for capital related investment type expenditure. Fig. 1 captures this scenario. \( BB' \) represents allocation choices that can be financed from domestic resources, and given the preferences of the recipient country, point \( A \) represents the preferred resource allocation.

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3 The average annual disbursement of aid – defined as grants and concessionary loans from all official bilateral and multilateral sources – to India in the 1990s has been close to 3 billion U.S. dollars, which is equivalent to roughly 4% of the combined spending of the central & state governments and public sector enterprises.

4 The concept of foreign aid fungibility has been described in detail, among others, in Feyzioglu et al. (1998) and Pack and Pack (1993).
suppose a foreign agency gives aid for the exclusive purchase of the development good, $G_2$, which at the given price would purchase an amount $F$. While the donor agency would like the aid funds to be spent on $G_2$ at the margin, for a variety of reasons, it is unable to determine the amount of good $G_2$ that the recipient would have purchased in the absence of aid (i.e., the donor agency does know the allocation represented by the point $A$). Upon receiving aid, therefore, the recipient country could make it fungible by changing the level and composition of its public expenditure program.

If the recipient country can treat the entire aid amount as a pure supplement to its domestic resources, then aid is fully-fungible. As illustrated in Fig. 1, the post-aid resource constraint is $B'C'C$; the horizontal segment, $B'C'$, indicates that at least the aid amount has to be spent on $G_2$. The new optimal resource allocation is given by the point $E$. The latter indicates that in spending the acquired aid resources on good $G_2$, the country diverts some of its own resources from $G_2$ to $C_p$ and/or $G_1$. A diversion to $G_1$ means that aid changes the composition of spending.
while an increase in \( C \) implies that aid has a level effect on the budget, i.e., it leads to a reduction in taxes and a commensurate increase in private sector consumption. Suppose, on the other hand, the recipient country does not divert any of its resources away from the aided good while spending the earmarked aid on it. This could be due to the donor agency’s effective public expenditure monitoring process particularly if the size of aid in relation to the country’s total domestic resources is large. In such a case, aid is fully non-fungible. The optimal allocation mix of the country’s own resources is not influenced by the aid amount and point \( A \) (in Fig. 1) continues to be the country’s preferred mix. More of \( G \) purchased from aid, however, increases the overall utility. The post-aid consumption point, \( D \), is on a higher indifference curve \( U \). Finally, if the country can treat a portion, \( \phi (0 < \phi < 1) \), of the aid as a resource supplement, then aid is said to be partially fungible and the fungible portion of the aid is given by \( \phi \). In such a case, the post-aid resource line (not drawn in Fig. 1) moves out by the fungible amount. In choosing the optimal resource mix, the country includes the fungible amount as an additional resource supplement to be spent but disregards the non-fungible portion, \( 1 - \phi \). Depending on the value of \( \phi \), the final consumption point lies between points \( E(\phi = 1) \) and \( D(\phi = 0) \) in Fig. 1. Thus, economic fungibility of aid is defined as the recipient’s ability to treat earmarked aid as if it was a pure supplement to its domestic resources.

2.2. Foreign aid in a federal framework

Consider an economy which has a federal system of governance: a central government and a number, \( S \), of state governments. At both levels, central and state, governments spend on each of the two categories of public good. As discussed above, spending on these goods can be characterized as non-development (consumption type) and development (investment type) spending at the national and state levels. Foreign aid enters the model in the form of earmarked donor funds given to the central as well as the state governments for development programs. All assistance including funds earmarked for state programs, however, goes through the central government. Funds received for state projects by the central government are expected to be passed-on to the respective state governments.

2.2.1. Resource allocation choice of the central government

The central government buys the two public goods – non-development \( (G_1) \) and development \( (G_2) \) – at prices \( p_1 \) and \( p_2 \), respectively, and provides them to all of its citizens. In addition, it transfers to state \( s \) \( \{s = 1, 2, \ldots, S\} \) an amount \( p_s G_2^s \) earmarked for the purchase of \( G_2 \). This constitutes the total spending of the central government. In making these resource allocation decisions, it takes the prices, \( p_1 \) and \( p_s \), as given.

Earmarked for development spending, let \( a^c \) and \( a^t \) be the amounts of foreign
aid given to the central government and the \( s \)-th state government, respectively. Using our definition of fungibility, the central government can make foreign aid fungible by treating a portion \( \phi^c (0 \leq \phi^c \leq 1) \) of \( a^c \) as its own revenue supplement and spending the proportion accordingly. Similarly, the central government can treat a portion \( \phi^s (0 \leq \phi^s \leq 1) \) of \( a^s \) as fungible by making adjustments in the amount of earmarked transfer it gives to state \( s \) for the development good. The choices of \( \phi^c \) and \( \phi^s \) are determined by some strategic behavior of the central government which takes into account the penalty of being “caught” redirecting funds. We, however, do not model this strategic behavior in this paper and take the \( \phi^c \)'s as given. Thus, the central government finances its total purchases by the fungible portion of foreign aid as well as its own domestically generated revenue, \( R \). The budget constraint faced by the central government can be written as

\[
p_1 G_1 + p_2 G_2 + \sum_{s=1}^{S} p_s G^s_2 = R + \phi^c a^c + \sum_{s=1}^{S} \phi^s a^s \tag{1}
\]

The left-hand side of Eq. (1) is total spending of the central government. The right-hand side is its total fungible funds. As explained above in Section 2.1, the non-fungible portions of aid, \( (1 - \phi^c) a^c \) and \( \sum (1 - \phi^s) a^s \), do not augment government’s discretionary resources, but are used to purchase \( G_2 \). Also, while \( G_2 \) – purchased from the non-fungible part of aid – increases overall utility, it does not affect the marginal choices of the central government. Subject to its budget constraint, the central government chooses \( G_1, G_2 \) and \( G^s_2 \) to maximize the social welfare given by

\[
W = W(U^1, U^s_1, \ldots, U^S_1), \tag{2}
\]

where \( U^s_1 \) is the utility of the representative agent living in state \( s \). In considering the resource allocation choice, we assume that the fiscal effects of foreign aid, if any, are restricted to changes in the composition of the government’s expenditure program but there are no level effects, i.e., aid has no impact on \( R \). We later relax this assumption and model the level effects of aid through changes in \( R \).

The utility, \( U^s_1 \), is defined on the single private good, \( C^s_1 \), two categories of central (national) public goods and the two public goods \( (g^s_1 \) and \( g^s_2 \)) provided by state \( s \).

\[
U^s_1 = U^s_1(C^s_1, G_1, G_2, g^s_1, g^s_2, G^s_2) \tag{3}
\]

In choosing \( G_1, G_2 \) and \( G^s_2 \), the central government takes as given \( R, g^s_1 \) and \( g^s_2 \). Maximization of the social welfare function, \( W(.) \) subject to the budget constraint yields the first-order conditions, which with simple manipulation can be written as:

\[
U_{G_1}^s = \left( \frac{p_1}{p_2} \right) U_{G_2}^s \tag{4}
\]
\[ U^m_{G_1^n} = \left( \frac{\alpha_n^m}{\alpha_n^a} \right) U^a_{G_2^n} \quad \forall m,n \in S \]  (5)

where

\[ \alpha^s = (\partial W/\partial U^s) > 0 \quad \text{and} \quad \sum_{s=1}^{S} \alpha^s = 1 \]

\( \alpha^s \) is the weight of state s’s utility in the social welfare function. Condition (4) implies that in determining the choice of \( G_1 \) and \( G_2 \), the marginal rate of substitution between the two public goods must be the same as the economic rate of substitution (given by the price ratios). On the other hand, condition (5) equates at the margin, across states, the change in social welfare due to the change in the utility of the representative agent that results from a unit increase in centrally provided assistance towards the purchase of \( G_2 \).

By specifying the functional form of the utility, Eqs. (1), (4) and (5) can be solved to obtain demand equations for \( G_1 \), \( G_2 \) and \( G_3 \). Given data, the parameters of the demand function and fungibility (included in the budgetary constraint relationship) can then be estimated to assess the impact of foreign aid on the budget composition. Moreover, we can estimate the impact of foreign aid on the level of the central government’s budget by letting \( R \) to be a function of aid (see below).

In the next sub-section, we discuss an econometric application of this model.

2.3. Econometric application of the model

We shall now use the fungibility model outlined above to derive equations to estimate the fiscal impact of foreign aid in a federal framework. The degree of difficulty in estimation depends mainly on two things: (a) the availability of data; and (b) the specific form of the utility function.

Budgetary data in most developing countries are available on non-development and development spending (i.e., on \( p_1G_1 \) and \( p_2G_2 \) in our model), but not separately on prices and quantities. Similarly, information is available on central transfers (development grants) to states, i.e., data on \( p_2G_2 \). Thus, data constraints require that the demand equations for the development and non-development goods derived from the fungibility model be transformed and estimated as expenditure equations. With most functional forms of utility function (e.g., a constant elasticity of substitution form), the associated demand equations are non-linear in both parameters and variables, and/or the key parameters of interest, \( \phi^c \) and \( \phi^f \), are not identifiable. One utility function, the Stone–Geary form, however, yields estimable linear expenditure functions with identifiable parameters. We take this functional form for our empirical analysis. Our results will not be sensitive to the specification of the utility function so long it leads to linear
demand functions. Appendix A provides the linear expenditure functions derived from maximizing the Stone–Geary specification of the utility function given in Eq. (3), subject to the budget constraint in Eq. (1).

In modeling the effect of aid on the central government’s optimal mix of spending we have taken $R$, the domestically generated revenue, as fixed. We now allow the possibility that foreign aid could have revenue effects too. Let $R$ be a linear function of the country’s gross domestic product (GDP) and foreign aid. It then can be written as

$$R = \mu_0 + \mu_1 GDP + \mu_2 a \quad \text{where} \quad a = \sum_{s=1}^{S} a^s$$

Using data, the linear expenditure functions (derived in Appendix A) can be estimated along with Eq. (6) to examine the fiscal effects of foreign aid in a federal system.

3. An empirical analysis of fungibility of foreign aid to India

In an empirical application of the model developed in Section 2, we first estimate the impact of foreign assistance given to India on its central government’s development and non-development spending. As stated in one of the official documents (External Assistance, Ministry of Finance, Government of India), the external assistance made available by the donor countries/institutions is mainly used for financing development projects which involve capital investment of a high magnitude. To inquire whether such assistance has funded specific non-development spending categories (e.g., defense, interest, general administrative services), we examine the link between foreign aid and the various non-development spending activities of the central government. The impact of earmarked sector-specific aid on sectoral components of development spending is estimated next. Finally, we examine whether central assistance to states on account of foreign aid crowds out other types of central assistance, i.e., do states have any real incentives to seek external funding?

3.1. Data and analysis

The method of ordinary least squares is used to estimate the following two regression models:

$$G_{c,t} = \pi_{c,0} + \pi_{c,1} GDP_t + \pi_{c,2} Aid_t + \nu_{c,t}$$

where $c$ in $G_{c,t}$ denotes central government’s spending categories.
\[ F_{t,s}^d = \omega_0 + \omega_1 g_{t-1,s}^d + \omega_2 \text{Aid}_{t,s} + \omega_3 \left( \sum_{j \neq s}^S [S_{t-1,j} + F^d_{t,j}] \right) + \omega_4 \sum_{j \neq s}^S \text{Aid}_{t,j} + \eta_{t,s} \]  

(8)

Eq. (7), in a simplified and estimable form, is derived from Eqs. (A.3), (A.4) and (A.6) described in Appendix A. It estimates the impact of foreign aid on the budget composition, taking into account that aid could also affect domestic revenue, \( R \). The latter effect has been incorporated through Eq. (A.6). Eq. (8) is a variant of Eq. (A.5) described in Appendix A. It looks at how the fiscal transfers from the central government to the states, another component of the central budget, are affected by earmarked foreign aid given to states.

Measured in per capita 1995 rupees, the variables in the above two equations are:

- \( G_{t,s} \): Categories of central government’s expenditure at time \( t \);
- \( GDP_t \): Gross domestic product;
- \( \text{Aid}_t \): Total foreign aid;
- \( \text{Aid}_{t,s} \): Central assistance passed on to state \( s \) on account of foreign aid;
- \( F_{t,s}^d \): Central government transfers (net of assistance on account of foreign aid) to state \( s \) for development purposes;
- \( g_{t,s}^d \): Development spending of state \( s \) financed from its own sources;
- \( \nu \) and \( \eta \): White noise error terms for the two sets of equations.

At both levels of government (federal and state), total expenditure is divided into two broad groups: development and non-development expenditures, with each having components of capital and revenue (recurrent) categories. Within the development expenditure category, classification is done on account of economic and social services. The non-development expenditure includes general services, defense expenditure (for central government only), interest payments and transfers to subsidiary governments. Our main aid variable, \( \text{Aid}_t \), is the total disbursement of grants and concessionary loans by all bilateral and multilateral sources, reported in the Government of India’s publication Economic Survey. To analyze fungibility at the inter-governmental level, we use the data on transfers from the central to state governments on account of external assistance. In Indian public finance statistics this is labeled as ‘Additional Central Assistance (ACA).’

To estimate the impact of foreign aid on central government’s development and non-development spending, we use annual time-series data from 1970 through 1995. The choice of the time period is based on data availability for all the relevant variables in the analysis. In addition, a panel database was constructed over the period 1980–1992 on 16 major states of India to look at the inter-governmental fiscal links. (Details on data are provided in Appendix B).
3.2. How does foreign aid affect the level and composition of central government’s budget?

During the period 1970 through 1995, the central government spent, on an average annual basis, roughly 18% of the country’s resources (GDP). The total was equally divided between the non-development and development categories. Moreover, the country, on average, received aid from all foreign sources amounting to a little over 1.5% of its GDP with a range from a little over one to 2.7%. All in all, during this period, foreign aid financed roughly 8.3% of the central government’s budget.

Table 1 has the estimates of Eq. (7). Estimated in first differences, the first two regressions reported in this Table examine the link between total foreign aid and the central government’s spending on non-development and development categories, respectively.

Eq. (1.1) shows a positive and statistically significant relationship between non-development expenditure and foreign aid. A unit increase (measured in per-capita real rupee) in external assistance increases the share of non-development expenditure by 0.9. On the other hand, Eq. (1.2) suggests that there is no relationship between aid and development related spending of the central govern-

Table 1
OLS regressions: central government expenditure on foreign aid

<table>
<thead>
<tr>
<th>Equation</th>
<th>(1.1)</th>
<th>(1.2)</th>
<th>(1.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Non-development expenditure</td>
<td>Development expenditure</td>
<td>Revenue receipts</td>
</tr>
<tr>
<td>Constant</td>
<td>243.4</td>
<td>151.9</td>
<td>94.75</td>
</tr>
<tr>
<td>GDP</td>
<td>0.08</td>
<td>0.06</td>
<td>0.07*</td>
</tr>
<tr>
<td>Foreign aid</td>
<td>0.90</td>
<td>-0.36</td>
<td>-0.30</td>
</tr>
<tr>
<td>Fiscal crisis (1991) dummy</td>
<td>-993.5</td>
<td>-1733.8</td>
<td>518.95</td>
</tr>
<tr>
<td>R-square</td>
<td>0.35</td>
<td>0.37</td>
<td>0.15</td>
</tr>
<tr>
<td>D–W statistic</td>
<td>1.77</td>
<td>1.88</td>
<td>1.96</td>
</tr>
</tbody>
</table>

Notes: (a) To correct for autocorrelation the regressions are done in first differences, and are based on 25 annual observations from 1970 to 1995. Applying the AR (1) correction (in levels) also gives similar estimates. Given the small size of the sample, however, the estimate of \( \rho \) is subject to sampling errors. In such cases, a recommended alternative (see Maddala, 1992) is to run the regressions in first differences. (b) The foreign aid variable is total disbursement of external assistance, concessionary loans and grants from all sources, bilateral and multilateral. All variables are in per-capita 1995 rupees. (c) \( t \)-statistics in parentheses; * significant at 10%.

See Appendix B for details.
ment; the coefficient is negative but insignificantly different from zero. In both equations, the coefficient on the variable GDP indicates how much of an additional resource unit to the country is spent on goods and services provided by the central government. In Eq. (1.1), the coefficient on this variable is positive and statistically significant. It shows that at the margin, 8% of an extra unit of country’s GDP is spent on non-development related activities of the central government. However, the relationship between GDP and the central government’s development spending is unclear; the estimate is positive but statistically insignificant. One reason for the statistical insignificance could be that a number of structural shifts took place in this spending category during the sample period. Also included in the two regressions is a dummy variable for the 1991 fiscal crisis in the country when government spending was cut across the board. The coefficient on the fiscal crisis dummy is negative and statistically significant in both the equations though reduction in development spending was much more than in non-development spending. Separately, in Eq. (1.3) we report whether foreign aid is associated with any tax relief effect. The results indicate that the data for the sample period do not support any link between aid and the country’s revenue receipts.

What do these results indicate? The documents of the Indian Ministry of Finance assert that external assistance is used for financing development related projects. This may certainly be the case. But what we see is not always what happens. The true effect of external aid depends on whether the recipient country is able to reallocate its other expenditure. Our findings suggest that external assistance to India, at the margin, is not being spent on purposes intended by the donors; instead, the money is being used to finance non-development related activities of the country.

How do these results compare with the rest of the literature on aid fungibility? Most studies indicate that foreign aid finances the government in general and not the development expenditures that donors typically target. In a sample of 14 countries, Feyzioglu et al. (1998) find that a dollar in foreign aid typically results in 29 cents of public investment (or development expenditures as listed in the country budgets). In this sample 29 cents was the exact amount of a typical dollar of government spending from all sources (aid and non-aid) that goes into investment. Thus, Feyzioglu et al. conclude that an aid dollar has exactly the same effect on public investment as one from any other source of government revenue. Examining the fiscal behavior of 11 African countries, Heller (1975) found that while foreign aid increases public investment, it also facilitates a reduction in the level of domestic taxes and borrowing. In a study of the Dominican Republic, Pack and Pack (1993) find that contrary to donor objectives, an additional dollar of foreign aid stimulates no net development expenditures. In a separate study of Indonesia (Pack and Pack, 1990), however, they found that a dollar’s worth of aid raised total public spending by $1.58, of which development expenditures accounted for 89 cents. A quite plausible explanation, offered by Pack and Pack,
of such divergent behavior is that the size of foreign aid (in relation to the budget) matters. As the share of aid in budgetary finance increases, it becomes difficult for the country to make aid resources fungible. In the fully-fungible case of the Dominican Republic, foreign aid was roughly 8% of the budget. In Indonesia, where the evidence suggests that aid stimulates development expenditures, it was nearly 20% of the budget. If one believes that the size of aid matters for fungibility, then our result in the Indian context has a perfect explanation. Foreign aid to India during the sample period was quite small; it financed roughly 8% of the central government’s budget!

What specific activities in the non-development budget are being financed from foreign aid? Fig. 2 shows the composition, the main sub-categories, of non-development expenditure over the sample period.

To inquire which activities among the non-development category could be benefiting from foreign aid, we regress these sub-categories – interest and principal payments, defense spending and other general services – on the aid variable. The results are reported in Table 2.

Upon receiving foreign aid, if the Indian government was diverting its own resources from development related activities – for which most of the assistance is earmarked – to fund its debt related spending, one could argue that this may not be a totally undesirable outcome. The average annual interest spending and principal repayment on all domestic and foreign debt over the sample period was 3.4 and 0.84% of GDP, respectively. Eq. (2.2) reported in Table 2, however, indicates no discernible relationship between foreign aid and interest spending. Similarly, no such link seems to exist with the principal payments on loans (Eq. (2.3)).

The other major item in the central government’s non-development spending is

![Fig. 2. Composition of non-development spending (central government).](image-url)
Table 2
OLS regressions: central government non-development expenditure on foreign aid

<table>
<thead>
<tr>
<th>Equation</th>
<th>(2.1)</th>
<th>(2.2)</th>
<th>(2.3)</th>
<th>(2.4)</th>
<th>(2.5)</th>
<th>(2.6)</th>
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<td>$G_{r}$</td>
<td>$G_{d}$</td>
<td>$G_{t}$</td>
<td>$G_{r}$</td>
</tr>
<tr>
<td>Constant</td>
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<td>144.2</td>
<td>140.8</td>
<td>28.7</td>
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<td>6.25</td>
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<tr>
<td>GDP</td>
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<td>0.01</td>
<td>−0.006</td>
<td>0.03</td>
</tr>
<tr>
<td>Foreign aid</td>
<td>0.90</td>
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<td>−0.10</td>
<td>0.22</td>
<td>0.22</td>
<td>0.74</td>
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<tr>
<td>Fiscal crisis (1991) dummy</td>
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<td>134.7</td>
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<td>−428.9</td>
<td>−448.5</td>
<td>−742.0</td>
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<td>War dummy (1971)</td>
<td>(−1.83)</td>
<td>(1.13)</td>
<td>(0.53)</td>
<td>(−1.83)</td>
<td>(2.21)</td>
<td>(−2.48)</td>
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<tr>
<td>Pakistan’s defense expenditure</td>
<td>141.0</td>
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<td></td>
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<tr>
<td>$R^{2}$</td>
<td>0.37</td>
<td>0.40</td>
<td>0.14</td>
<td>0.17</td>
<td>0.48</td>
<td>0.34</td>
</tr>
<tr>
<td>$D-W$ Statistic</td>
<td>1.77</td>
<td>2.23</td>
<td>2.16</td>
<td>1.99</td>
<td>1.94</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Notes: (a), (b) See Table 1. & (c) (d) $G_{d}$, Non-development expenditure; $G_{t}$, Interest expenditure; $G_{r}$, Principal payments on all debt; $G_{d}$, Defense expenditure and $G_{t}$, Non-development expenditure – interest expenditure – principal payments on all debt – defense expenditure. Data on Pakistan’s defense expenditure are from US Arms Control and Disarmament Agency (various issues).

defense. The donor community is increasingly concerned that assistance to developing countries is directly or indirectly financing military expenditures. Could India have maintained the level of its defense spending in the absence of development assistance? Over the sample period, 1970 through 1995, of our analysis, the share of India’s defense expenditure in GDP averaged 3.3%. The statistical analysis reported in Eq. (2.4) shows a positive but statistically insignificant relationship between defense spending and foreign aid. Landau (1994) has argued that an important determinant of a country’s defense spending is the defense spending of its neighboring countries. Since 1947, India and its neighbor, Pakistan, have fought three major wars and the last one in 1971 led to the creation of Bangladesh. Lately, there has been an arms race between the two countries. To control for any such effects, we include in our regression model a dummy variable for India’s 1971 war with Pakistan. Moreover, we add Pakistan’s defense expenditure as an explanatory variable. Even with this new specification (see Eq. (2.5)), we do not find any (statistically significant) association between India’s defense spending and foreign aid. Finally, in Eq. (2.6) we report the link between foreign aid and the remainder of non-development related spending which is mostly general service and administration. This equation indicates that at the margin, almost three-quarters of the foreign aid given to India finances its administrative and general service expenditures.

Our analysis of the impact of earmarked sector specific aid on development spending components is restrictive due to non-availability of data. First, data are
available on sector specific concessionary loans but not on grants. Moreover, while
grants were roughly 15% of the total aid on an aggregate basis during the sample
period, no systematic information is available on the mix of loans and grants by
sectors. Yet another limiting factor in this analysis is that data on sector specific
central transfers (on account of foreign aid) to the states are only available for the
period 1970 through 1988. Finally, consistent time-series data on sectoral spending
are only available from 1974 onwards. Fig. 3 shows the major components of
development spending of the central government. Fig. 4 shows the composition of
earmarked concessionary loans given to support these activities.

Table 3 reports the regressions of these sub-categories of the development
expenditure on sector specific earmarked concessionary loans. Among the seven
sub-categories of development expenditure ± agriculture, irrigation, energy,
industry, transport and communication, social sectors, and others ± that we
examine, we find that in all of the sectors we can reject the null hypothesis that the
coefficient on the aid variable is different from zero. Notwithstanding the data
limitations, these results are not altogether surprising for we also do not find any
statistically significant relationship between the overall development expenditure
and total foreign aid.

3.3. Does foreign aid earmarked for state projects affect inter-governmental
fiscal transfers?

The Indian Constitution mandates that all external assistance, including funds
earmarked for state projects, accrue to the central government. In turn, these funds

![Fig. 3. Composition of development spending (central government).]
are pooled with a portion of domestic resources to finance ‘Plan Outlays,’ which are various developmental projects, programs and schemes included in the country’s annual plan. Part of this pool of resources is retained by the central government for its own plan expenditure and the remaining is allocated to the states in a mix of grants and loans to finance their plan outlays. Transfers through this channel are mediated by the country’s Planning Commission on the basis of the ‘Gadgil formula,’ which is a weighted average of population, per capita

Table 3
OLS regressions: central government development expenditure (sub-categories) on sectoral foreign aid*

<table>
<thead>
<tr>
<th>Equation</th>
<th>(3.1)</th>
<th>(3.2)</th>
<th>(3.3)</th>
<th>(3.4)</th>
<th>(3.5)</th>
<th>(3.6)</th>
<th>(3.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Agriculture</td>
<td>Irrigation</td>
<td>Energy</td>
<td>Industry</td>
<td>T&amp;C</td>
<td>SS</td>
<td>Others</td>
</tr>
<tr>
<td>Constant</td>
<td>15.80</td>
<td>13.41</td>
<td>11.50</td>
<td>40.93</td>
<td>14.59</td>
<td>44.42</td>
<td>136.81</td>
</tr>
<tr>
<td>(1.53)</td>
<td>(1.39)</td>
<td>(0.70)</td>
<td>(0.34)</td>
<td>(0.47)</td>
<td>(1.92)</td>
<td>(2.48)</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>−0.001</td>
<td>−0.003</td>
<td>0.01</td>
<td>−0.04</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>(−0.33)</td>
<td>(−1.21)</td>
<td>(2.51)</td>
<td>(−1.18)</td>
<td>(0.19)</td>
<td>(1.18)</td>
<td>(0.87)</td>
<td></td>
</tr>
<tr>
<td>Sectoral aid</td>
<td>−0.37</td>
<td>0.01</td>
<td>0.11</td>
<td>1.95</td>
<td>−0.79</td>
<td>1.52</td>
<td>−0.01</td>
</tr>
<tr>
<td>(−0.82)</td>
<td>(0.03)</td>
<td>(0.78)</td>
<td>(0.27)</td>
<td>(−0.51)</td>
<td>(1.31)</td>
<td>(−0.02)</td>
<td></td>
</tr>
<tr>
<td>Other aid</td>
<td>0.02</td>
<td>0.01</td>
<td>0.04</td>
<td>−0.30</td>
<td>−0.13</td>
<td>0.21</td>
<td>−0.40</td>
</tr>
<tr>
<td>(0.24)</td>
<td>(0.14)</td>
<td>(0.67)</td>
<td>(−0.67)</td>
<td>(−0.83)</td>
<td>(1.99)</td>
<td>(−0.95)</td>
<td></td>
</tr>
<tr>
<td>R-square</td>
<td>0.08</td>
<td>0.16</td>
<td>0.50</td>
<td>0.23</td>
<td>0.17</td>
<td>0.54</td>
<td>0.17</td>
</tr>
<tr>
<td>Observations</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

*Notes: (a) The regressions are in first differences and are based on 15 annual observations from 1974 to 88; The foreign aid variable is total disbursement of concessionary loans from all sources, bilateral and multilateral. (b) T&C, Transport and communication; and SS, Social sector expenditure.
income, fiscal performance and special problems of the states.\textsuperscript{6} The other important source of transfers from the center to states consists of tax shares and statutory grants recommended every five years by the Finance Commission, which is a constitutionally mandated body.

As mentioned by Bajaj (1992), a notable feature of this disbursement mechanism is that not all earmarked external assistance to the states is transferred to them in full.\textsuperscript{7} Moreover, the assistance on account of externally aided projects is given (excepting to the special category poor states) on the same terms as normal central assistance, i.e., 70\% in the form of loans and 30\% as grants. At the outset, this system of foreign aid management at the central level appears to be designed to make foreign resources fungible. In Bajaj’s words “...this arrangement (of allocating foreign aid) preserved an internally determined pattern of inter-sectoral and inter-regional distribution of plan resources. The additional resources generated by external flows were therefore shared among all states, not only those that undertook and implemented externally aided projects” (p. 194).

The increase in recent years in the proportion of earmarked external assistance transferred to the states does not necessarily imply that the funds are truly additional. To examine whether central transfers on account of foreign aid are additional, we estimate the regression model outlined in Eq. (8).

The regressions presented in Table 4 are based on our sample panel data from fourteen general category states. Together, these states account for nearly 98\% of the assistance given to all states on account of foreign aid over the sample period (1980 through 1992). As a share of total, central transfers to states on account of foreign aid have been small; the average share of ACA in total transfers over the sample period was 6\%. Results presented in Table 4 show that at the margin, states do not benefit on account of externally aided projects. For example, Eq. (4.1) indicates that a rupee increase in central transfers on account of foreign aid to a state is associated with a reduction of Rs. 1.62 in other transfers to that state. (The reduction is Rs. 1.41 if other transfers for development purposes are considered. See Eq. (4.3)). The more than a rupee reduction in other transfers suggests that not only the state is losing out for acquiring external resources but is also being penalized for it. Though we do not have enough data to test the hypothesis, it is

\textsuperscript{6}Prior to any disbursement, however, 30\% of the total allocable amount through this channel is earmarked for the generally poor and resource constrained states which are Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The formula is then applied to the fifteen “General Category” states – Andhra Pradesh, Bihar, Goa, Gujrat, Haryana, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal – which receive the remaining 70\%.

\textsuperscript{7}In fact, prior to 1976 there was no identifiable transfer from the center to the states on account of external aid; earmarked aid for state projects only augmented the total plan resources in the country. In recent years, however, the proportion of earmarked external assistance transferred to the states has increased to nearly 100\% in most sectors in order to ease their resource constraint and thereby, improve aid utilization.
likely that at the margin some of these resources are being transferred to the special category poor states, which do not get any significant external assistance. Eq. (4.1) also indicates that a rupee increase in state government’s spending financed by its own resources in the previous year leads to a 12 paise increase in central transfers in the following year. The latter link suggests some evidence of rewarding past revenue efforts of states. The regression reported in Eq. (4.3), development transfers on ACA, has similar results. In Eqs. (4.2) and (4.4) we control for two additional factors: foreign aid to other states and spending by other states. In both cases, the coefficient on ‘aid to other states’ is negative and statistically significant. It shows that a rupee increase in external aid for all other states is associated with a 39 paise reduction in central transfers. Moreover, the own foreign aid variable in the specification, which was previously significant, now becomes insignificant. Evidently, central transfers to the general category states are reduced with an overall increase in foreign assistance to states.

3.4. Linking foreign aid, the central government’s development budget and inter-governmental fiscal transfers: A simultaneity issue

It is possible that Eqs. (7) and (8), which are based on the theoretical model of Section 2, are subject to some degree of simultaneity. For example, the size of the central government’s own development spending \(G_d\), an endogenous variable in one of the specifications of Eq. (7) – could influence its transfers to states for

<table>
<thead>
<tr>
<th>Table 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OLS regressions: central-transfers to states on Additional Central Assistance (ACA)</strong></td>
</tr>
<tr>
<td><strong>Equation</strong></td>
</tr>
<tr>
<td><strong>Dependent variable</strong></td>
</tr>
<tr>
<td><strong>Constant</strong></td>
</tr>
<tr>
<td>(g_{i,t-1})</td>
</tr>
<tr>
<td>(\Sigma (g_{i,t-1,j} + F_{j,t}^{s}) j \neq s)</td>
</tr>
<tr>
<td>(\Sigma (g_{i,t-1,j} + F_{j,s}^{s}) j \neq s)</td>
</tr>
<tr>
<td>(\Sigma \text{aid}_{i,t} j \neq s)</td>
</tr>
<tr>
<td><strong>R-square</strong></td>
</tr>
<tr>
<td><strong>Observations</strong></td>
</tr>
<tr>
<td><strong>Model</strong></td>
</tr>
</tbody>
</table>

\( ^*\) Notes: (a) The regressions are based on annual data from 1980 to 1992 on 14 states and are in first differences (for time-series data); ACA is transfers on account of foreign aid that are passed-on by the central government to state governments. (b) The number in parenthesis is \(t\)-statistics for fixed-effects models and \(z\)-values for random-effects models. R-square is ‘within’ for fixed-effects model and ‘overall’ for random-effects model. ‘Model’ indicates whether the state dummies in the regression represent a Fixed effects or a Random effects model. The test is based on Hausman (1978).
development purposes ($F_{t,s}^d$) — the endogenous variable in Eq. (8). Suppose the central government builds a university in a state. Clearly the state residents will benefit from the increased opportunity for higher education. However, with the new university in the state, the central government may decide to lower its transfers to that state for higher education. Conversely, if the new university is partially funded by the central government and requires state funds also, the central government may increase its assistance to that state. Thus, an increase in central government spending in a state may crowd-in or crowd-out central transfers to that state. In this sub-section we model such effects, which were not allowed for in our previous empirical analysis.

Let $G_{t,s}^d$, central government development expenditure, be an additional right-hand-side variable in Eq. (8). We could think of this variable as part of the error term in our previous estimation process described in Section 3.3. With this formulation, we can write the two-equation system as:

$$
G_{t,s}^d = \delta_0 + \delta_1 GDP_t + \delta_2 Aid_t + \epsilon_t,
$$

(9)

$$
F_{t,s}^d = \tau_0 + \tau_1 G_{t,s}^d + \tau_2 Aid_{t,s} + \tau_3 \left( \sum_{j=1}^S \left( F_{t-1,j}^d + F_{t,j}^d \right) \right) + \tau_4 \sum_{j=1}^S Aid_{t,j} + \tau_5 \sum_{j=1}^S Aid_{t,j} + \epsilon_{t,s},
$$

(10)

While $G_{t,s}^d$ is the endogenous variable in Eq. (9), it appears as a right-hand-side variable in Eq. (10). This set of simultaneous equations can be estimated by the two-stage least squares (2SLS) method. In applying the 2SLS method, we first estimate Eq. (9) by ordinary least squares and obtain the predicted value of $G_{t,s}^d$. In stage 2, we replace $G_{t,s}^d$ on the right-hand-side of Eq. (10) by its predicted value obtained from the first regression, and then estimate the equation by ordinary least squares (OLS).

In Table 5 we report the second-stage regression (for space consideration, we report the first-stage OLS regression in a footnote of the table). The upshot of this table is that our findings based on the results of Table 4 continue to hold. The 2SLS estimates also show that at the margin, states do not benefit on account of externally aided projects. The size of the coefficient on the variable “central transfers on account of foreign aid to a state” increases marginally from $-1.62$ (Eq. (4.1) in Table 4) to $-1.41$ (Eq. (5.1) in Table 5). The coefficient on the “predicted value of $G_{t,s}^d$” is positive but insignificant. The coefficient of state

---

8In general, it is possible that the reverse causality would also apply, i.e., $F_{t,s}^d$, influencing $G_{t,s}^d$. In the Indian budgetary system, however, this is unlikely. Discretionary transfers to states, that are not based on predetermined revenue-sharing formulae, belong to the “residual” part of the budget. This is the portion that remains after the central government determines its own development and non-development spending.

9See Maddala (1992) for a discussion of the 2SLS method.
Table 5
2SLS regressions: central-transfers to states on ACA^a

<table>
<thead>
<tr>
<th>Equation</th>
<th>(5.1)</th>
<th>(5.2)</th>
<th>(5.3)</th>
<th>(5.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>$F_{t,s}$</td>
<td>$F_{t,s}$</td>
<td>$F'_{t,s}$</td>
<td>$F'_{t,s}$</td>
</tr>
<tr>
<td>Constant</td>
<td>8.15 (0.90)</td>
<td>1.86 (0.13)</td>
<td>8.73 (1.08)</td>
<td>18.35 (1.58)</td>
</tr>
<tr>
<td>$g_{t-1,s}$</td>
<td>0.12 (2.53)</td>
<td>0.12 (2.70)</td>
<td>0.04 (2.76)</td>
<td></td>
</tr>
<tr>
<td>$\Sigma (g_{t-1,j} + F_{t,s}) j \neq s$</td>
<td>0.08 (1.72)</td>
<td>0.09 (1.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Sigma (G_{t-1,j} + F'_{t,s}) j \neq s$</td>
<td>0.02 (1.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$G_{t,s}$ (predicted)</td>
<td>-1.41 (-2.04)</td>
<td>-0.86 (-1.20)</td>
<td>-1.16 (-1.90)</td>
<td>-0.74 (-1.08)</td>
</tr>
<tr>
<td>$\Sigma aid_{t,j} j \neq s$</td>
<td>-0.37 (-2.79)</td>
<td>-0.36 (-2.84)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.02 (1.35)</td>
<td>0.01 (0.36)</td>
<td>0.02 (1.77)</td>
<td>0.01 (0.39)</td>
</tr>
<tr>
<td>Observations</td>
<td>168</td>
<td>168</td>
<td>168</td>
<td>168</td>
</tr>
<tr>
<td>Model</td>
<td>Random</td>
<td>Fixed</td>
<td>Random</td>
<td>Fixed</td>
</tr>
</tbody>
</table>

Notes: (a), (b) See Table 4. (c) The first-stage regression in first differences (over the period 1980–1992) is: $G_{t,s} = 19.5 + 0.05 GDP_t - 1.25 Aid_t - 1167.8^* $ Fiscal crisis (1991) dummy $R^2 = 0.56; ^* $ indicates significance at 10%. Predicted values of $G_{t,s}$ are then used in the second-stage regression, as reported above.

4. Conclusion

In this paper we model two dimensions of foreign aid fungibility, one at the federal level and the other at the inter-governmental level. We use the model to test whether foreign aid to India, a federal country, is being spent for purposes intended by the donor agencies. This involves asking the question: what would have happened to the government budget in the absence of donor financing? Our empirical results suggest that the central government converts most foreign funds, including those earmarked for state governments, into fungible monies; and spends on activities that would have been undertaken anyway. Foreign aid merely softens its budget constraint.

What are the implications of these results? The finding that foreign aid does not influence the internally determined pattern of resource allocation would be good news for policymakers in India. For the donors, however, the fungibility results indicate that what one sees is not always what happens. If aid is fungible, it simply does not matter what donors finance – be it feeder roads or power plants or family
planning clinics – and how well their projects perform. A better approach to make aid effective in terms of the overall development impact is to link aid with an overall public expenditure program that provides adequate resources to crucial sectors. Indeed, this is the main message of the paper.

Acknowledgements

The views expressed in this paper are entirely those of the authors and do not necessarily represent the views and policies of the World Bank. We received helpful comments from Shanta Devarajan, David Dollar, Tarhan Feyzioglu, Howard Pack, Martin Ravallion, Lant Pritchett, Tapas Sen, P.V. Srinivasan, D.K. Srivastava and seminar participants at the Indira Gandhi Institute of Development Research (Mumbai, India), the National Institute of Public Finance and Policy (New Delhi, India), and the World Bank. The comments from an anonymous referee and the editor were extremely useful in revising the paper. We are grateful to Mohey Ragab for providing us the data on concessionary assistance to India. Rajeev Ahuja helped with data collection and compilation. We acknowledge financial assistance from the World Bank (research grant rpo 681-41).

Appendix A

With the Stone–Geary specification, Eq. (3) of the fungibility model of Section 2 can be written as

\[ U^s = (C_p - \gamma_{C_p} \beta_{C_p} \gamma_{C_p} (G_1 - \gamma_{G_1}) \beta_{G_1} \gamma_{G_1} (G_2 - \gamma_{G_2}) \beta_{G_2} \gamma_{G_2} (G_2' - \gamma_{G_2'}) \beta_{G_2'} \gamma_{G_2'}) \cdot (g_2 + G_2' - \gamma_{G_2'}) \beta_{G_2'} \gamma_{G_2'}) \]

\[ (A.1) \]

\( \gamma \)'s are the subsistence quantities and are positive. A restriction imposed by this functional form is that all choice variables of the central government, \( G_1, G_2, \) and \( G_2' \), are independent of each other at the margin and the only link they have is through the budget constraint. Thus, while our Stone–Geary functional form gives us an estimable linear expenditure system (see below), it comes at a cost.

Maximization of \( U^s \) subject to the budget constraint

\[ p_1 G_1 + p_2 G_2 + \sum_{s=1}^{S} p_2 G_2' = R + \phi^s a^s + \sum_{s=1}^{S} \phi^s a^s \]

\[ (A.2) \]
yields the following linear expenditure equations:

(i) Expenditure on $G_1$:

$$ p_1 G_1 = p_1 y_{G_1} + \beta_{G_1} \phi^* a^s + \beta_{G_1} \left[ R + \sum_{i=1}^{S} (\phi' a' - p_2 G_2') - \sum_{j=1}^{2} p_j y_{G_j} \right] . \quad (A.3) $$

where

$$ \beta_{G_1} = \beta_{G_1} (\beta_{G_1} + \beta_{G_2}) $$

(ii) Expenditure on $G_2$:

$$ p_2 \tilde{G}_2 = p_2 y_{G_2} + (1 - \phi^*) \beta_{G_2} \phi^* a^s + \beta_{G_2} \left[ R + \sum_{i=1}^{S} (\phi' a' - p_2 G_2') - \sum_{j=1}^{2} p_j y_{G_j} \right] \quad (A.4) $$

where $\tilde{G}_2 = G_2 + \text{amount of } G_2 \text{ purchased from the non-fungible part of } a^s$.

(iii) Expenditure on $G_2^s$:

$$ p_2 G_2^s = - p_2 (g^s - \gamma_{G_2^s}) + (1 - \phi^s) a^s $$

$$ + \frac{d^s}{1 - \delta^s} \sum_{j \neq s} \left[ p_j (g_j^s + \tilde{G}_2^s - \gamma_{G_2^s}) - (1 - \phi) a^j \right] . \quad (A.5) $$

where $d^s = (\alpha^s \beta_{G_2^s}) / \sum_{j=1}^{S} \alpha^j \beta_{G_2^s}$ and $\tilde{G}_2^s = G_2^s + \text{amount of } G_2^s \text{ purchased from the non-fungible part of } a^s$.

Using data, these linear expenditure functions can be estimated along with the following equation, which models endogeneity of domestic revenue with respect to foreign aid:

$$ R = \mu_0 + \mu_1 GDP + \mu_2 a \quad \text{where } a = a^s + \sum_{s=1}^{S} a^s. \quad (A.6) $$

Appendix B

As part of this research, we put together a data set on the major fiscal variables of the central and state governments as well as on external assistance to India.

B.1. Data on foreign aid

Data on aggregate external assistance to India, total disbursement of grants and
loans from all bilateral and multilateral sources, were obtained for the period
1970–1995 from the Government of India’s publication, Economic Survey (various
issues). These data are not available by sectors.

To do the sector-specific analysis for the central government, we use conces-
sionary loans as the aid variable. The latter information, previously unavailable,
was collected from World Bank sources.

On average, concessionary loans account for nearly 85% of all external
assistance for the sample period. Data on external resource transfer from the
central government to states over the period 1980 through 1988 were taken from
Bajaj (1992). Information on later years was taken from
“External Assistance,” an annual publication of the Aid Accounts & Audits
Division, Department of Economic Affairs in the Ministry of Finance, Government
of India.

B.2. Budgetary data at different levels of government

Two different sources were used to compile the data on the central govern-
ment’s fiscal variables: Chandhok and the Policy Group (1990) and Indian Public
Finance Statistics (various issues), Government of India. Data were collected on
public spending (aggregate as well as by sectors, purposes etc.), revenue receipts
and fiscal deficits for the period 1970–1995. Full sample (26 annual observations)
was used for all the central government analysis excepting the sectoral analysis for
which data for 1974–1995 were used. This was done due to a change in sectoral
classification systems between 1973 and 1974, making comparisons of pre-1973
and post-1973 data (on individual sectors) almost impossible. Moreover, the
following modifications were made in the original expenditure data to conform to
our research needs:

First, loans and grants (from the center to states) were re-classified to put them
in the development or non-development categories. In the original data, loans and
grants are included as transfer payments and are listed under two categories:
“plan” and “non-plan.” We put loans of both types and “plan” grants in the
development category; “non-plan” grants were included in the non-development
category. Second, we included principal payments on all foreign debt in the
non-development category. In the Indian accounting system, principal payments
are netted out from loans received, the latter being an entry in the Capital Receipts
Accounts. Finally, we included the external assistance given by the center to the
states, in the development category.

Data on spending and receipts by the state governments, including loans and
grants received from the center, were obtained from the Reserve Bank of India
Bulletin on State Finances (various issues). The database for states covers the
period 1980 to 1992 and includes 16 major states of India (out of a total of 25):
Andhra Pradesh, Assam, Bihar, Gujrat, Haryana, Himachal Pradesh, Karnataka,
Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

B.3. Other data
Information on Gross Domestic Product, Exchange Rates (Official) and Consumer Price Index were obtained from Economic Survey (various issues). Population figures for the country and for individual states are from the Census of India (various issues).

References