1983

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1. INTRODUCTION

The governments of most less developed countries (LDCs) depend basically on their tax and non-tax revenues to finance their expenditure programmes. Unless countervailing action is taken, instability in government revenue will result in instability in government expenditure. The latter can add considerably to the complexity of fiscal management, which may then render ineffective development planning.[1] It can also reduce business confidence and lead to the precautionary discounting of prospective investment returns and so a lowering of the investment level.[2]

This note does not attempt to verify the claim that expenditure instability has adverse effects on economic growth. Its aim is the more limited one of (1) presenting estimates of instability in government revenue and expenditure, (2) examining the impact of revenue instability and other factors on expenditure instability, and (3) estimating the contributions of the various sub-categories of expenditure to the instability of government expenditure, for a group of 45 LDCs over the period 1965-1973.[3]

2. INSTABILITY OF GOVERNMENT REVENUE AND EXPENDITURE

The instability index used is the standard error of estimates obtained from a linear regression of the variable concerned on time over the period 1965-1973. The advantages of using this index are the ease of calculation and the use of all the information contained in the annual time-series. The linear fit was preferred to the non-linear fit as the former produced much higher R^2s and more significant t values for the regression coefficients.

Instability indices were calculated for the total government revenue, total government expenditure and the various sub-categories of government expenditure for each of the 45 LDCs. The median values of these indices for the total, African, Western Hemispheric and Asian samples of LDCs are given in Table 1.

For the African sample of LDCs government revenue fluctuated considerably more than total government expenditure. For the Asian LDCs, the difference was not so marked while for the Western Hemisphere LDCs, there was no difference at all. For the total sample of LDCs, revenue instability exceeded government instability quite significantly. This suggests that for LDCs as a whole certain factors had operated to soften the destabilizing effect of revenue instability.

Table 1. *Median instability indices of government revenue, expenditure and expenditure sub-categories, 1965–1973*

	Total 45 LDCs	Africa 21 LDCs	Western hemisphere 13 LDCs	Asia 11 LDCs
Government revenue	64	54	25	126
Government expenditure	48	20	25	112
Agriculture	6	4	2	12
Education	6	3	4	13
Health	3	2	2	8
Transport	7	5	5	23
Defence	13	7	5	34
Industry	5	5	1	17
Other	29	15	11	62

3. REVENUE AND EXPENDITURE INSTABILITY

The postulated positive relationship between revenue. instability (R) and expenditure instability (E) is given by ST in Figure 1a. Other things being equal, an increase in R, from OB_1 to OB_2, will produce an increase in E, from OC_1 to OC_2.
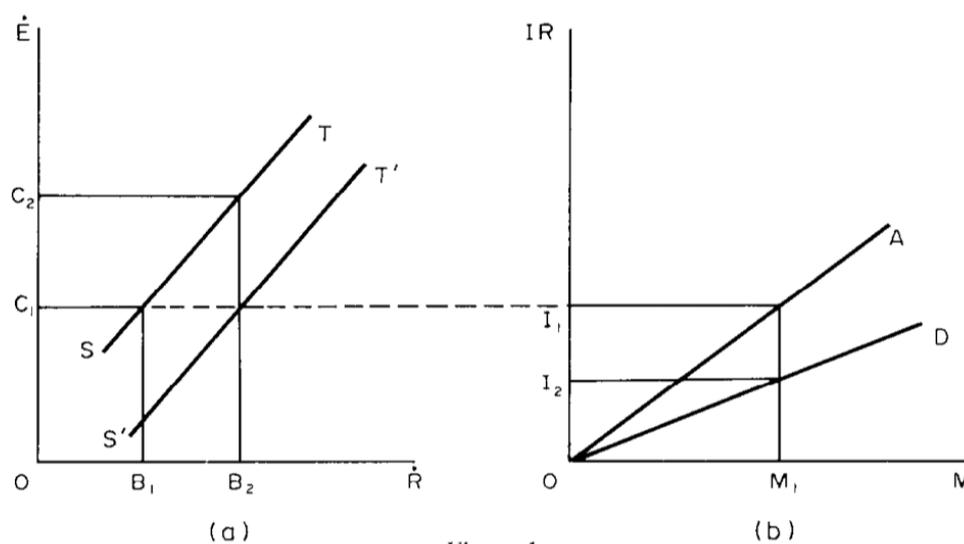

Figure 1.

One of the factors which may weaken or even invalidate this relationship is the avail- ability of international reserves. Given the overriding aim of maintaining expenditure stability, a government of an LDC with an abundant supply of such reserves can cushion the impact of revenue instability by drawing on these reserves.

In Figure 1b the actual international reserves to imports ratio is given by the ray OA, while the desired ratio is given by the ray OD. The increase in expenditure instability, from OC_1 to OC, in Figure 1a, as a result of the increase in revenue instability, from OB_1 to OB_2, can be avoided, if the government were to reduce its reserves to imports ratio from ray OA to ray OD. For a given imports level, OM_1, this will mean running down the reserves from $0I_1$ to $0I_2$. International reserves can thus act as a buffer mechanism and produce an effect equivalent to the shifting of ST to S'T'. Thus the higher IR is the more it enables the government to reduce its expenditure instability for a given level of revenue instability. The

ability of the government to borrow from resident and non-resident individuals, enterprises and institutions also produces a cushioning effect, as does the availability of grants from foreign governments and multi- lateral agencies. In terms of Figure la this cushioning effect is also equivalent to a down- ward shift in *ST*. The larger are domestic borrowing, foreign borrowing, and the amount of grants received, the easier it is for the government to reduce fluctuations in its expenditure for a given level of fluctuation in its revenue.

The following estimating equation was therefore used to identify the determinants of expenditure instability:

$$\dot{E} = f(\dot{R}, IR, DB, FB, FG). \qquad (1)$$

E and *R* are the instability indices for government expenditure and revenue, respectively, for the period 1965- 1973. *IR* is the average of the LDC's holdings of gold, Special Drawing Rights, and foreign exchange as a percentage of its imports of goods and non-factor services over the period 1965-1973. *DB*; *FB* and *FG* are the averages of domestic borrowing, foreign borrowing and foreign grants, respectively, as a percentage of government expenditure over the period 1965-1973. *R* is expected to be positively related to *E*, while *IR*, *DB*, *FB* and *FG* are expected to be negatively related to *E*.

Equation (1) was estimated in its linear and logarithmic formulations, with intercepts, by ordinary least squares. The logarithmic function produces the better result, which is given by :[4]

$$\log \dot{E} = 0.469 \ + \ 0.915 \log \dot{R} - 0.081 \log IR$$
$$(1.833)^c \ (405.613)^a \qquad (-4.614)^a$$
$$- 0.169 \log DB - 0.217 \log FB - 0.004$$
$$\log FG$$
$$(-32.191)^a \qquad (-38.776)^a \qquad (-5.510)^a$$
$$\bar{R}^2 = 0.899 \ F - \text{ratio} = 79.162^b.$$

The results show that government revenue instability was the most important 'cause' of government expenditure instability. However, they also show that the availability of inter- national reserves, domestic and foreign borrowing and foreign grants had played a part in dampening the destabilizing effects of revenue fluctuations.

4. COMPOSITION OF EXPENDITURE INSTABILITY

Though a number of factors had softened the destabilizing effects of revenue instability on government expenditure, the latter is still very unstable. If the aim of having greater stability in government expenditure is still important, then a second line of defence may have to be used. This is to identify, firstly, the sectoral sources of spending instability and, secondly, the actions that can be taken to reduce instability within such sectors. The contribution that the *j* th sub-category (C_j) makes to the instability of, say, total government expenditure is given by:

$$C_j = 100(I_j \bar{E}_j)/C \sum_{j=1}^{k} I_j \bar{E}_j)$$

where I_j is the instability index of the j th sub-category of expenditure, k the number of sub-categories and E_j the arithmetic mean of the j th sub-category over the period under analysis.

For each of the 45 LDCs over the period 1965-1973, we calculated C_j for the various sectors in the instability of total government expenditure, government development expenditure and government recurrent expenditure. The unweighted averages of C_j, I_j and E_j for the sample of 45 LDCs are given in Table 2.

The relative sizes of the sectoral total expenditures are in line with the results of previous studies on the subject.' The largest share went into education. This was followed by the defence sector, a finding of considerable interest in view of the finding that defence spending has detrimental effects on economic growth. The relatively small share going to agriculture shows the traditional neglect of what is usually the largest sector in the economies of LDCs.

The main sources of total expenditure instability were the defence, education and transport sectors. The importance of these sectors was due both to their high degree of instability (high I_js) and to their dominating shares in government expenditure (high E_js). For the transport sector, the instability in spending stemmed from the development side. This had to do with the lumpiness of transport expenditure. For educational expenditure, the instability originated largely from the recurrent side. This might have reflected the unfortunate widespread tendency to treat recurrent spending as consumption and development spending as investment. Recurrent and development expenditures on defence were unfortunately presented together so it is not possible to identify the main source of spending fluctuation. The instability of defence spending as a whole was probably due to the lumpiness of defence spending and the tendency for such expenditure to vary according to the frequent changes in internal and external political events.

Table 2. *Composition of government expenditure instability in 45 LDCs*, 1965−1973

	I_j	$\bar{E}_j$	C_j
Total government expenditure	304	100.0	100.0
Agriculture	28	6.9	3.0
Education	68	16.4	8.9
Health	23	6.5	1.7
Transport	43	8.6	6.6
Defence	90	12.9	10.8
Industry	58	2.6	2.6
Other	721	46.1	66.4
Government development expenditure	237	100.0	100.0
Agriculture	37	15.1	9.6
Education	22	6.4	2.4
Health	18	3.1	1.1
Transport	63	23.3	22.8
Industry	58	12.2	12.3
Other	129	39.9	51.8
Government recurrent expenditure	323	100.0	100.0
Agriculture	20	4.5	1.3
Education	72	19.1	10.6
Health	24	7.3	1.9
Transport	16	4.7	2.3
Defence	90	16.3	13.7
Other	843	48.1	70.2

It would thus seem that the scope for reducing overall spending instability by reducing sectoral spending instability is rather limited as it is confined to reducing instability in recurrent educational spending. A number of factors have accounted for this ineffectiveness. First, the sectors with the most stable spending (agriculture and health) were minor recipients of government funds. As the allocation of government funds among competing claims is guided by historical and economic factors which cannot be changed in the short run, the room for countervailing action here is small. Second, there is lumpiness of expenditure in those sectors which have been favoured (transport and defence). This lumpiness is technologically determined and the possibility of reducing it is rather small. Third, the internal and external political factors which make for fluctuating defence spending are largely outside the control of economic policy-makers in LDCs.

5. CONCLUSIONS

The analysis shows that the reduction of sectoral spending instability per se and the use of international reserves and various forms of borrowing and aid can only have a peripheral effect in decreasing the instability of overall government spending. It suggests that efforts need to be concentrated on reducing the degree of revenue instability as revenue instability was the main 'cause' of spending instability. However, the measures that must be taken to reduce revenue instability must remain the subject of further research.

NOTES

1. See A. R. Prest, Public Finance in Underdeveloped Countries (London: Weidenfeld and Nicolson, 1968), p. 13.

2. See A. 1. MacBean, Export Instability and Economic Development (London: George Allen and Unwin, 1966), p. 247; and F. S. ldachaba, 'Revenue instability in developing countries: the Ghanaian experience', Public Finance, Vol. 30, No. 1 (1975), p. 98.

3. Africa: Algeria, Botswana, Burundi, Egypt, Ethiopia, Ghana, Kenya, Libya, Malawi, Mauritius, Morocco, Nigeria, Rwanda, Scncgal, Sierra Leone, Sudan, Tanzania, Tunisia, Uganda, Zaire and Zambia; Western hemisphere: Argentina, Barbados, Bolivia, Brazil, Guatemala, Guyana, Honduras, Jamaica, Panama, Paraguay, Peru, Trinidad and Tobago and Venezuela; Asia: Afghanistan, Burma, Hong Kong, India, Malaysia, Nepal, Philippines, Singapore, South Korea, Sri Lanka and Thailand. The data are taken from the World Bank, World Tables 1976 (Baltimore: Johns Hopkins University Press, 1977).

4. The figures in parentheses are the t values while a, b and c indicate their statistical significance at the 0.0005,0.01 and 0.05 levels of confidence respectively.

5. These figures must, of course, be interpreted with care in view of the size of the 'other' sector, which was obtained as the residual sector. Inter-sectoral comparisons were made without reference to the 'other' sector.

6. D. Lim, 'Another look at defence and growth in developing countries', Economic Development Cultural Change (January, 1983).