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Norman Gemmell\*

## Tax Systems, Tax Revenue and Growth in LDCs: A Review of Empirical Evidence

*The relationship between taxation, savings and growth is a complex one, which economists to date have only partially been able to explain. The following paper reviews empirical evidence on differences in tax systems and their operation between developed and less developed countries and the role of various taxes in the development process, and examines some evidence on the effects of taxation on economic growth in LDCs.*

Economists have long recognised that the tax system in any country is a powerful policy instrument available to governments in the pursuit of a number of economic and social objectives. Among these objectives it is perhaps in assisting the acceleration of economic growth that tax instruments have most often been identified, particularly in the Keynesian tradition, as of crucial importance. In the early stages of development such prerequisites for rapid growth as education, health care and communications systems must be expanded and these are often provided by governments. The funding of these services is therefore an important constraint in many LDCs. Although the size of the government sector in these countries, as measured by various statistical indicators, is typically smaller than in most developed countries (DCs) – excluding centrally planned economies – the government's direct impact on production is often more widespread.

### Tax Structures

Tax systems are used by governments to achieve a variety of objectives, including income redistribution, stabilization, financing publicly provided goods and services, and fostering economic growth. The weighting of these and other objectives is likely to vary across countries and over time, depending on such factors as the economic environment and political outlook, and it is therefore not surprising that tax systems vary

enormously across countries. Differences in the ease with which different households, firms or sectors within an economy can be taxed also give rise to many alternative specifications of particular taxes which may have different associated economic effects. Taxes common to many structures include "direct" taxes on income, profits and property (e.g. land, wealth) and indirect taxes on domestically produced goods and services (general sales taxes, value added taxes, excises), imports and exports. For the purposes of many tax analyses social security contributions can also be treated as taxes. The contributions of these broad categories to government revenue in a sample of countries are shown in Table 1. It is immediately obvious that the main differences between the "developed" countries in group A (the main OECD countries) and the various groups of "developing" countries (B, C and D) are (1) the greater share of revenue from income and profit taxes and social security contributions in the former group, and (2) the greater importance of various trade taxes in the latter groups. Interestingly, domestic indirect taxes provide a broadly similar share of revenue across the four groups. This may result partly from the omission of production subsidies which, though usually classified with public expenditure, are effectively negative indirect taxes, and tend to be more prevalent among the developing country groups.

Although income taxes are less important in revenue terms in LDCs they are often more complex than in developed countries, with greater use of "schedular" income taxes which tax different sources of income using different schedules, with a variety of thresholds

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and rates. Similarly, indirect taxes in LDCs typically use a more complex set of consumption and commodity-specific taxes (excises) than DCs. Subsidies on basic wage-goods (for example, bread, rice, beans) are frequently used and implicit taxes and subsidies occur when "marketing boards" – government agencies which act as intermediaries between producers and consumers in the market, and to whom producers are usually obliged to sell – fix prices above or below "market" rates. Such schemes are particularly associated with African countries. In recent years, however, following the adoption of value added taxes (VAT) in the EEC, a number of LDCs have introduced or experimented with VAT-type taxes and other general sales taxes. VAT now exists in such countries as Brazil, Argentina, Mexico, Israel, Korea, Ivory Coast and Senegal. Not surprisingly it is generally in the more developed LDCs – mainly in Latin America – that VAT is most important, since the tax requires well-developed administrative and accounting systems.

Among the problems created by the extensive and complex set of taxes used in LDCs are

- ☐ widespread evasion because the tax system cannot be adequately monitored;
- ☐ unintended economic effects resulting from unforeseen interactions between different component taxes;
- ☐ and partly as a result of these effects, problems identifying whether tax policies are achieving government objectives.

Finally, evidence from a number of sources suggests strongly that the ratios of total tax revenue to GDP are

higher on average in developed than in less developed countries, due primarily to higher ratios of *income* tax revenue to GDP.<sup>1</sup>

### Tax Revenues and Development

While there may be general agreement on major differences between DC and LDC tax systems there is much less agreement on how *changes* in tax structure are related to development, normally measured in this context by per capita income levels. Two particular concerns have been to identify whether total and individual tax revenues as a proportion of GDP rise as per capita income increases, and to investigate how the shares of tax components in total revenue change with per capita income. For both cases, because of a paucity of time-series data, most studies have used cross-section data for samples of DCs and LDCs under the maintained hypothesis that this approximates long-run time-series changes. A few studies have, however, investigated changes over time for a number of countries.

Early studies tested the hypotheses that total tax ratios and the share of direct taxes in total tax revenue rise with per capita income.<sup>2</sup> Using regression analysis on samples of developed and less developed countries these studies found evidence in support of the hypotheses, but only when both DCs and LDCs were included. When the two country groups were examined separately the relationships appeared to break down. However, even with an aggregate sample, some studies found no clear evidence that increases in per capita income were associated with a declining importance of indirect taxes. Subsequent investigations<sup>3</sup> found that

<sup>1</sup> R. J. Chelliah, H. J. Baas and M. R. Kelly: Tax Ratios and Tax Effort in Developing Countries 1969-71, in: IMF Staff Papers, 1975, pp. 187-205; A. A. Tait, W. L. M. Gratz and B. J. Eichengreen: International Comparisons of Taxation for Selected Developing Countries, in: IMF Staff Papers, 1979, pp. 123-156.

<sup>2</sup> H. H. Hinrichs: Determinants of Government Revenue Shares among Less Developed Countries, in: Economic Journal, 1965, pp. 546-557; R. A. Musgrave: Fiscal Systems, Yale University Press, New Haven 1969.

**Table 1**  
**Shares of Different Taxes in Total Government Revenue (%) around 1980**

Country Groups <sup>1</sup> (number)	Taxes			
	Income and profit	Domestic goods and services	International trade	Social security contributions
A: Industrial countries (20)	33.3	26.0	3.7	25.0
B: Semi-industrial countries (15)	25.3	30.6	14.5	13.0
C: Middle-income countries (55)	23.7	23.1	28.9	4.1
D: Least developed countries (14)	17.0	21.7	41.6	1.6

<sup>1</sup> For a list of countries included in each group see Goode, pp. 6, 91. Countries have generally been assigned to groups following IMF practice. Source: Richard Goode: Government Finance in Developing Countries, Brookings Institution, New York 1984.

between 65 and 80 per cent of the countries in a sample of 47 LDCs experienced rising tax ratios during the 1966-75 period. For tax revenue shares, however, the evidence was less clear-cut, with only 52 per cent of the sample experiencing a rising share of direct taxes (1953-71). More recently, Greenaway has found, using cross-section data, that the share of trade taxes in total revenue appeared to be related to per capita income and the size of the traded goods sector only for an aggregate sample of DCs and LDCs and for "middle-income" countries, with no similar evidence for "low" or "high" income subsamples.<sup>4</sup> However, some evidence of declining trade tax dependence as income rises was found from time-series data for a number of countries, 1962-78.

These results would seem to bear out the suggestions of Hinrichs and Musgrave that direct taxes are more likely to be prominent at very low income levels (when "traditional" land and poll taxes can be most readily applied), and at high income levels when widespread use of personal and corporate income taxes becomes

possible. Indirect taxes, initially on trade and then on internal transactions, could be expected to dominate middle income levels. Thus a U-shaped pattern for the direct tax share is more likely. Hinrichs also suggested that, partly as a result of this pattern, tax revenue growth is likely to be higher in the early and late stages of development, but slower in the middle. This is certainly consistent with the failure of several studies to identify a simple positive relationship between tax ratios and per capita income.

### Effective Tax Rates

It has long been recognized that import tariffs can have widely differing effects on the production costs of different domestic industries as a result of differing

<sup>3</sup> R. J. Chelliah et al., op. cit.; A. A. Tait et al., op. cit.

<sup>4</sup> See D. Greenaway: Trade Taxes as a Source of Government Revenue: An International Comparison, in: *Scottish Journal of Political Economy*, 1980, pp. 175-182; and by the same author: A Statistical Analysis of Fiscal Dependence on Trade Taxes and Economic Development, in: *Public Finance*, 1984, pp. 70-89.

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### THE STATE OF THE ECONOMY IN THE SOCIALIST COUNTRIES OF EASTERN EUROPE AT THE BEGINNING OF 1988

For 16 years now the Eastern European department of the HWWA-Institute has examined the state of the economies of the individual countries of Eastern Europe at the beginning of the new year, paying particular attention to the achievements of the previous year and trends in the current year. The achievements of the economy are reviewed in particular within the setting of the current five year plan. This year special attention is given to the economic reforms in the individual countries, not least with an eye to the economic and social reforms in the Soviet Union and their effects on its CMEA partners.

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import tariff rates and different usages of intermediate imports across industries. Thus "effective protection" to domestic industry may be quite different from "nominal protection" as represented by the tariff. In LDCs domestic indirect taxes – sales taxes, excises, etc. – typically apply to final consumer goods and hence differences in effective tax rates across sectors have not been thought to be a problem. However in India and Pakistan, for example, where taxes on intermediate goods are more common, recent estimates have revealed some interesting divergences between nominal and effective rates.<sup>5</sup>

In India, for example, handloom and khadi manufactures of cotton faced an effective tax rate of 5 per cent though the nominal rate was zero; effective rates for tobacco were more than double the nominal 9 per cent rate; and in artificial silk and man-made fibres the *difference* between effective and nominal rates amounted to 44 percentage points! For most intermediate goods and consumer durables the difference between rates was in the 15-25 percentage point range, and for non-durable consumer goods the range was 5-15 percentage points. A similar picture emerged for Pakistan with many goods facing effective tax rates 5-20 percentage points above nominal rates. These differences are clearly non-negligible, and highlight the possibility of unintended effects of tax policy in one area on another. It is clear that, where differences between nominal and effective tax rates are significant, the latter must be used in tax analysis if reliable results are to be obtained. It is possible, for instance, for a good which bears a nominal subsidy to face a positive *effective* tax rate.

### Tax Buoyancy and Elasticity

Two important parameters of tax systems, and individual taxes, are buoyancy and elasticity. Tax buoyancy refers to the realized increase in tax revenues in association with increases in GDP (or some other income measure). The elasticity of a tax or tax system, on the other hand, measures the "automatic" change in revenue for a given tax base, as GDP rises. Thus the elasticity measure excludes the effects of discretionary tax changes by the authorities, changes in compliance and collection rates and so on. In addition it is often of interest to decompose the tax elasticity into the elasticity of tax revenue with respect to the relevant tax base, and the elasticity of the tax base with respect to GDP. This

can help to identify the extent to which the overall tax elasticity can be attributed to structural changes in the economy affecting the base-to-GDP elasticity, or to the properties of the tax schedule which affect the tax-to-base elasticity. It is common in the literature for elastic taxes to be identified as preferable to inelastic taxes because additional revenue can be raised more readily. However, it should be noted that while this may be true for the tax authority, its desirability from society's point of view will depend on preferred allocation of resources between private and public use. Nevertheless a knowledge of relevant tax elasticities can assist governments' decisions on discretionary tax and expenditure plans.

Unfortunately since most observed changes in tax revenue are a combination of automatic and discretionary effects, with only the combined change directly observable, it is difficult to calculate tax elasticities accurately. A number of approaches have been used including estimating discretionary revenue changes from treasury forecasts; using dummy variables for years when tax rate changes take place in a regression of revenues on GDP; and estimating "tax functions".<sup>6</sup>

Given the acknowledged inaccuracies of the various methods, the elasticity estimates from various studies of LDC tax systems should be treated with caution, and can indicate only rough orders of magnitude.

However the evidence tends to support (though not invariably) several generally held views regarding tax elasticities:

- ☐ Tax buoyancies typically exceed elasticity estimates, indicating the prevalence of discretionary tax increases and/or improvements in collection, administration etc.
- ☐ Income and domestic consumption tax elasticities tend to be higher than trade tax elasticities.
- ☐ Indirect tax elasticities can be highly variable across commodities, indicating opportunities to raise revenue by taxing "elastic" commodities more.
- ☐ Income tax elasticities tend to fall in association with income increases.
- ☐ Particularly for indirect taxes, base-to-income elasticities may be high relative to tax-to-base elasticities, so that automatic revenue increases result mainly from structural changes such as the changing composition of domestically produced goods and

<sup>5</sup> See, for example, S. E. Ahmad and N. H. Stern: The Theory of Reform and Indian Indirect Taxes, in: Journal of Public Economics, 1984, pp. 259-298.

<sup>6</sup> For an example of tax functions, see J. Creedy and N. Gemmell: The Built-in Flexibility of Progressive Income Taxes: A Simple Model, in: Public Finance, 1982, pp. 361-371.

imports in consumption. Some studies suggest that low tax-to-base elasticities for imports result from shifts towards low-rated intermediate imports from high-rated consumer goods. Also the tax-to-base elasticity of income taxes can be a function of their progressivity as measured by the difference between effective marginal and average tax rates. Therefore policies aimed at redistribution via income taxation will affect tax elasticity.

### Tax Effort and Capacity

Prominent among studies of taxation in LDCs have been attempts to identify the extent to which tax authorities have exploited available tax capacity, determined largely by the size and availability of tax bases. It has been argued by some IMF economists, with whom the approach is associated, that evidence on a country's tax "effort" relative to its "capacity" could be used, for example, to allocate foreign aid to LDCs, since tax effort indices would measure the extent to which governments were willing to use domestically available resources.

The essence of the approach is to use regression analysis on cross-section data to "explain" tax ratios using a number of variables of tax capacity. This yields a set of predicted tax ratios for given tax capacity, and may be compared with countries' actual tax ratios, the difference between the two measuring tax effort.<sup>7</sup> Variables which have been used to proxy tax capacity include the share of trade (exports plus imports) in GDP, per capita income levels, the relative size of the agricultural, mining or retail sectors and the literacy level.

Tax effort studies have been severely criticized on a number of grounds.<sup>8</sup> Firstly, as can be seen from the discussion of tax structures above, a country's capacity to tax is determined by many factors, often highly specific to that country – such as the composition of domestic production and of imports, the efficiency of its civil service and so on. On the other hand, the variables listed above are such poor proxies for individual countries' actual tax bases that it seems likely that observed differences between actual and "predicted" tax ratios are more a reflection of inaccurate measurement of capacity rather than a reflection of tax effort. Secondly the use of tax effort indices for *normative* judgements regarding desirable changes in countries' tax systems – for example to "improve its effort" – is wholly inappropriate. At best the tax effort equations provide a description of the relationship

between tax revenue and proxies for tax bases, and identify the extent of inter-country uniformity in the use of these tax bases. However, they are likely to be highly misleading guides to tax improvement since they do not consider the characteristics of desirable tax systems – such as efficiency or equity.

### Taxation and Growth

A property commonly ascribed to the tax system, especially in LDCs, is its ability to accelerate the rate of economic growth. Particularly in the Keynesian tradition it has been argued that the generally lower utilization of resources in LDCs compared with DCs renders tax policy a potent instrument for expanding economic activity. It is important, however, to distinguish between the use of taxation and the use of deficit financing to foster growth. Arguments for the former rely on the prospects of reallocating resources from the private to the public sector stimulating growth, as captured, for example, in the balanced budget multiplier. Deficit financing arguments, on the other hand, typically incorporate the notion that governments can create additional resources. Many of these latter arguments have lost their force in recent years with the recognition of the role played by the government budget constraint.

The ability of the tax system to generate growth hinges on three distinct steps:

- ☐ the responsiveness of savings to tax incentives/policies;
- ☐ the economy's ability to transform savings into investment resources; and
- ☐ the effects of increased investment on income growth.

Where tax incentives are aimed directly at investment this process reduces to two steps. Tax incentives/policies may of course also affect income growth directly via associated incentive effects. Each of the three steps will be considered in turn below.

### Taxation and Savings

The generation of additional savings through tax policy can take two main approaches – the creation of tax incentives to encourage increased private savings; and the use of tax instruments to reallocate investible resources to the public sector. An example incorporating

<sup>7</sup> See R. J. Chelliah et al., op. cit.; and A. A. Tait et al., op. cit.

<sup>8</sup> R. M. Bird: Assessing Tax Performance in Developing Countries. A Critical Review of the Literature, in: J. F. J. Toye (ed.): Taxation and Economic Development, Frank Cass, London 1978, pp. 33-61; and B. R. Bolnick: Tax Effort in Developing Countries: What Do Regression Measures Really Measure?, in the same volume, pp. 62-80.

both approaches would be differential taxation of savings and consumption which simultaneously encourages a substitution of private saving for consumption and provides revenues which, to the extent that it substitutes public investment for private consumption, raises savings. The choice between the two approaches – public saving or incentives to private saving – which are not of course mutually exclusive, depends on the relative magnitudes of the income and substitution effects associated with each tax instrument or incentive. For instruments such as a tax on wages it is desirable for income effects (presumed positive here) to outweigh negative substitution effects, while for tax incentives (for example tax concessions on retained profits) which usually represent implicit subsidies, large substitution effects relative to income effects are required.

It follows therefore that where producers, consumers, suppliers of labour and so on are responsive to price signals, substitution effects will tend to be relatively large, thus favouring tax policies which emphasize incentives to private savings, and those taxes with relatively low disincentive or substitution effects. For taxes on wages (where substitution effects are generally related to *marginal* tax rates but income effects depend mainly on *average* tax rates) this would suggest a tax structure with low marginal rates. Of course since this implies a *relatively* inelastic and regressive tax compared to one with a high ratio of marginal to average rates, this may conflict with other policy objectives.

### Empirical Studies

Most empirical studies of the effects of tax policies on savings or investment have failed to find strong incentive effects. A wide-ranging survey of studies on tax incentives to firms in LDCs found few instances where investment decisions by firms appeared to respond to tax incentive,<sup>9</sup> though the technique most commonly used – of interviewing firms – is notoriously unreliable. Most studies using this technique found less than 5 per cent of firms apparently influenced to any significant extent by tax incentives. An alternative technique estimates the critical minimum profit necessary for firms to invest (from information on discount rates and project lives) and compares this with investment projects' net present values both with and without the tax incentives. Where the value of the critical minimum profit lies between the two NPVs, the incentive may be said to

have created or stimulated the investment. While this method has produced apparently greater incentive effects (20 and 30 per cent of firms stimulated in Pakistan in two separate studies; 10 per cent of firms in Colombia) the results are of doubtful accuracy and are still not very high.

Another interview-based study of Jamaican tax incentives found only two of 55 firms reporting significant tax effects on investment decisions.<sup>10</sup> More interestingly, Chen-Young attempted to evaluate the benefits and costs of the various incentive schemes (in terms of revenues foregone and investments created). He found a benefit-cost ratio of only 0.27 if businesses were assumed to set up regardless of incentives, rising to 0.66 under the most generous assumptions regarding incentives *necessary* for new investment and multiplier effects.

Finally the interest sensitivity of savings represents an important variable to the tax authorities who can, via fiscal and monetary policy, alter this relative price. Unfortunately there appear to be no reliable studies of the interest elasticity of savings in LDCs. A few studies conducted for developed countries suffer from many estimation problems but tend to suggest generally low elasticities.

### Savings and Investment

For savings to contribute to growth they must be transformed into investible resources. There are, however, a number of reasons why this link in the chain of causation from taxation to growth may be unreliable. Three of these are discussed briefly here.

A more important constraint on growth than shortages of savings or foreign exchange may be a constraint on *absorptive capacity*. Thus even if savings rates rise substantially these may not be able to be productively invested, because investment opportunities cannot be exploited. This may arise due to a shortage of complementary inputs such as skilled labour or raw materials, poorly developed financial institutions which prevent savings from being channelled smoothly and effectively where they are needed and, where savings rise rapidly, an inability to achieve necessary reallocations of resources quickly enough.

Secondly, it has been suggested that where savings rates rise via increased *public* sector savings these may

<sup>9</sup> S. M. S. Shah and J. F. J. Toye: Fiscal Incentives for Firms in Some Developing Countries: Survey and Critique: in: J. F. J. Toye, op. cit., pp. 269-296.

<sup>10</sup> P. Chen-Young: Evaluating Tax Incentives. The Case of Jamaica, in: R. M. Bird and O. Oldman (eds.): Readings on Taxation in Developing Countries, Johns Hopkins University Press, Baltimore 1975, pp. 378-86.

find their way into current rather than investment expenditures.<sup>11</sup> Thus population, urbanization and poverty pressures lead to expenditure on food subsidies, housing, education and health. While some of these may have a substantial "capital" element they may not represent the most efficient investments. An important side issue here is that the type of expenditure undertaken by government may influence the effectiveness of its tax incentive policies. For example, the provision of housing or subsidized food may encourage the substitution of public provision for private purchases.

Thirdly, the form in which savings are raised may be a determinant of the quantity of investment. Where savings accrue in the form of profits they may be used for "conspicuous consumption", or where they result from the activities of foreign-owned firms they may be channelled abroad instead of invested domestically. Alternatively savings out of profits may be transformed into investment more readily compared to household savings by avoiding the need to use the intermediary financial sector.

## Savings and Growth

Clearly tax policies to expand savings and investment will have little effect on growth, at least directly, if increases in capital are incidental to growth. Space prevents a detailed review of the enormous literature on this subject, but it does seem to be the case that while many growth models have given a central role to capital accumulation, empirical evidence has generally not found increases in capital to be of primary importance, especially in LDCs.<sup>12</sup> Simon Kuznets, one of the most experienced researchers in this area, has concluded that improvements in the "quality" of labour services – via shorter hours, education, etc. – have been more important for growth in LDCs.

In fact the *a priori* arguments for the effects of savings (via investment) on growth are not universally accepted.<sup>13</sup> The model usually referred to in support of a positive effect of savings on growth is the Harrod-Domar model, but the savings result has been shown to be sensitive to a number of the model's assumptions, such

as the fixity of factor proportions. Finally, it may be noted that evidence on the relationship between savings rates and income *levels* which has been used to support or deny the savings-growth relationship is not an appropriate test of the model, though it can provide other insights into the role of savings. Various studies which have examined the effects of savings on growth have typically failed to find any strong effects.<sup>14</sup>

## Conclusions

One conclusion that may be drawn from the above review is that much has been learned about the operation of tax systems in developing and developed countries over the past 30 years or so. The tools used by economists have also developed over the years, enabling the results of early research to be confirmed, amended or rejected as appropriate. What is also clear, however, is that many aspects of how tax systems do, and should, affect the economy, remain unresolved in some cases because we do not yet have the necessary analytical tools.

However existing knowledge does permit a number of general conclusions:

- Tax systems in LDCs put a greater reliance on indirect (domestic and trade) taxes relative to income taxes than is typically the case in developed countries. Simple relationships between tax structure and per capita income, however, are not generally confirmed.
- LDCs can be expected to continue to rely on indirect taxes in the near future, but a tendency for development to cause shifts towards domestic production and intermediate imports and away from consumer imports may require increased use of *domestic* taxes to maintain revenue.
- The relationship between taxation, savings and growth is complex, and early views that taxation could significantly influence the growth rate now seem unwarranted. Price signals can be important in LDCs but the impact of taxation on these signals is generally too small to have large effects on incentives for growth.
- Finally, many tax parameters and variables important for policy, such as tax elasticity, vary considerably across countries for similar types of taxes. Advice on tax policy must therefore be based soundly on the results of individual country studies, and cannot rely on the "average" performance identified in cross-section studies.

<sup>11</sup> S. P l e a s e : Savings through Taxation. Reality or Mirage? in: R. M. Bird and O. Oldman, op. cit., pp. 38-47.

<sup>12</sup> For a summary of these studies see A. P. Thirlwall: Growth and Development, Macmillan, London 1983, chapter 2.

<sup>13</sup> Richard Goode: Government Finance in Developing Countries, Brookings Institution, New York 1984, provides an excellent review of alternative strategies for development resulting from different theoretical views on the growth process.

<sup>14</sup> See D. H a m b u r g : Models of Economic Growth, Harper and Row, New York 1971, pp. 168-73 for a review of evidence.