A Representative Tax System Approach to Measuring Tax Effort in Developing Countries

A Representative Tax System Approach to Measuring Tax Effort in Developing Countries[1]

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THE OBJECTIVES OF THIS PAPER are to develop and to apply a method for making intercountry tax effort comparisons, in which the tax effort index derived may be related to the intensity of use of specific taxes. This methodology, designated here a "representative tax system approach," involves application of average effective rates to a standard set of tax bases.[2] Severe data limitations have led to the use of subjectively defined tax base proxies, and therefore the model presented below bears little resemblance to the representative tax system approach as used, for example, by the U. S. Advisory Commission on Intergovernmental Relations.[3]

Two techniques of comparative analysis have been used previously in measuring tax effort variations among developing countries. One equates tax effort to the ratio of taxes (or revenues) to income. Such a straightforward comparison implicitly assumes total income to be the only relevant indicator of intercountry differences in taxable capacity. The second, a stochastic approach, gives markedly different results. It involves the assumption that the tax ratio (T/Y) is an appropriate

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[2] The term "representative tax system" in no way connotes any model system selected on purely normative grounds. The adjective "representative" is used here instead of "average" only because of tradition.

[3] See U. S. Advisory Commission on Intergovernmental Relations, *Measures of State and Local Fiscal Capacity and Tax Effort* (Washington, 1962), and *Measuring the Fiscal Capacity and Effort of State and Local Areas* (Washington, 1971).

reflection of taxable capacity if it is adjusted for intercountry variations in factors that are assumed to reflect intercountry differences in the size of the tax base and the ability to collect taxes.[4] From this approach may be deduced a definition of taxable capacity as the level of taxation that would occur if, for example, per capita income and the foreign trade sector were taxed at some (regression) average intensity.

While clearly preferable to a straight tax ratio for comparative purposes, the stochastic approach has a number of methodological problems that cannot be overcome completely.[5] One of the more serious from a policy point of view is that statistical difficulties impose restraints on the variables that may be included in the analysis. For example, the high collinearity between the import ratio and the export ratio [6] prohibits using both in the same equation as explanatory variables of the tax ratio, even though both are thought to be valid determinants of particular components of the tax ratio. Consequently, it may not be possible from such results to describe, for example, the marginal effects on taxable capacity (or the tax ratio) of a change in the import tax base. In general, the regression approach does not allow a desirable examination of the kinds of explicit relationships between particular taxes and particular economic structure variables that would seem useful for purposes of making intercountry comparisons of taxable capacity and tax effort.

The representative tax system approach, as developed and tested here, does allow an examination of such marginal effects. Taxable capacity is defined in this approach as the total tax amount that would be collected if each country applied an identical set of effective rates to the selected tax bases, that is, as the yield of a representative tax system.[7] While such an approach has been used to compare tax effort

[4] Examples of the stochastic approach may be found in Roy W. Bahl, "A Regression Approach to Tax Effort and Tax Ratio Analysis," *Staff Papers,* Vol. XVIII (1971), pp. 570–612; Jørgen R. Lotz and Elliott R. Morss, "Measuring 'Tax Effort' in Developing Countries," *Staff Papers,* Vol. XIV (1967), pp. 478–99; and United Nations Conference on Trade and Development (UNCTAD), *Objectives for the Mobilization of Domestic Resources—Mobilization of Resources for Development* (mimeographed, TD/B/C. 3/75/Add. 1, February 23, 1970).

[5] The major methodological problems are discussed in Bahl, *loc. cit.,* and are not repeated here.

[6] The ratio of imports (exports) to gross national product (GNP).

[7] Taxable capacity was defined in an earlier paper in terms of a tax ratio. It may also be defined in terms of expected total tax collections, given some level of income. Whereas the ratio formulation is standardized and therefore useful for intercountry comparisons, the absolute figure is meaningful only in the context of

among states in a federation,[8] it has not been employed to make comparisons among developing countries.[9]

I. Identifying Proxy Bases and Representative Rates

Ideally, the first step in estimating taxable capacity with a representative tax system approach involves an identification of the magnitude of actual tax bases, for example, taxable income by income class for the personal income tax, corporate profits for the corporate income tax, and taxable property values for the property tax. However, data limitations prohibit the use of actual tax bases; therefore, the resort must be to use measures that reflect intercountry variations in the true bases. Necessarily, the choice of these proxies reflects some amount of subjective judgment. Naturally, the tax effort indices derived will vary, depending on the proxy bases chosen. There is no pretense here that the variables selected are the only ones that make sense, or that other combinations of assumed bases would yield the same results.

The second step in estimating taxable capacity with a representative tax system approach involves defining a set of representative rates. There are two possible ways of deriving a set of effective rates. The first is to hypothesize a rate structure strictly on an a priori basis,

analysis of a particular country. However, since both formulations require a defined level of income, they are not conceptually inconsistent.

[8] This approach was used to estimate fiscal capacity and tax effort for each of the 50 United States in *Measures of State and Local Fiscal Capacity and Tax Effort* and in an updated version, *Measuring the Fiscal Capacity and Effort of State and Local Areas* (both cited in footnote 3). A similar index of taxable capacity is used for the distribution of certain funds to the Canadian provinces. See Douglas H. Clark, *Fiscal Need and Revenue Equalization Grants,* Canadian Tax Foundation (Toronto, September 1969).

[9] An attempt to make international tax burden comparisons with a technique analogous to the representative tax system is to be found in the work of Vito Tanzi. He uses cross-section data on individual States in the United States to generate a tax ratio/per capita income estimating equation, and examines the tax ratio deviations of European countries from the regression line. Such a method allows him to conclude, for example, that country A's level of taxation is high given country A's per capita income and the average relationship between the tax ratio and per capita income among the States' taxable capacity. This method is not suitable here, where the intent is to make comparisons of tax effort among developing countries. See Vito Tanzi, "International Tax Burdens: A Study of Tax Ratios in the OECD Countries," in *Taxation: A Radical Approach,* The Institute of Economic Affairs (London, 1970), pp. 28–35. He carries out a similar exercise in comparing the U. S. individual income tax burden with that of selected European countries in *The Individual Income Tax and Economic Growth: An International Comparison* (Baltimore, 1969), pp. 46–49.

thereby defining a "model" tax system. Such an approach would require a decision as to how intensively each proxy base ought to be used. This method is rejected here, partially because of the intent to retain the positive content of this analysis, that is, to allow for the "average" behavior of this sample of less developed countries. The other possibility for estimating a set of representative rates—and the one adopted here—is simply to calculate the arithmetic mean for the countries in this sample. Specifically, for each tax the following ratio will be computed:

$$r_i = \frac{\sum_{j=1}^{m} (T_{ij}/B_{ij})}{m} \quad i = 1, 2, \ldots, 6, \tag{1}$$

where

T_{ij} = actual collections of the i^{th} tax in the j^{th} country

B_{ij} = value of the assumed base of the i^{th} tax in the j^{th} country

m = number of countries for which data on revenues from the i^{th} tax are available.

Problems arise in calculating certain of these averages, since for some countries data are not complete, for example, the breakdown of personal and corporate income taxes. The options open to resolving this data problem are to include in the study only those countries in the sample for which a complete tax breakdown is available, or to compute the effective rate for each tax only on a basis of those countries for which appropriate data are available. The latter option is taken here, thereby making the implicit assumption that inclusion of all the omitted countries would not change this average.[10]

Given the absence of data on true tax bases, the approach taken in the following sections is straightforward. First, a proxy for the base of each tax is selected on a priori grounds, given the constraint that measurement of this base is possible on a comparable cross-country basis. Second, a set of representative rates is calculated simply by averaging

[10] If the lack of data for a country carried the implication that the tax was not intensively used by that country, the procedure adopted here in the computation of the average would give an upward bias to average effective rates. This implication is not borne out by the sample. For corporate and personal income taxes, for which data are not available for 23 countries, the problem is that total income taxes cannot be broken down into these two components. In only one country are data missing for sales, excise, and other internal indirect taxes; and in two countries, for import duties. Data on export tax collections are available for all 49 countries.

the actual effective rates in the developing countries in the sample. This set of average rates, or "representative rate structure," is then applied to the corresponding tax bases in each country, thereby generating estimates of the yield of a representative tax structure, that is, estimates of taxable capacity. The ratio of actual tax collections to this measure of taxable capacity is the corresponding measure of tax effort.

II. Conceptual Differences from Regression Approach

Similarities exist between the representative tax system and the aggregate regression approach. In each case, conceptually, the definition of taxable capacity is the same, that is, the level of taxation that would occur, given certain assumptions as to tax bases, and the average intensity of use of the bases by all countries in the sample. Similarly, tax effort is defined as the ratio of actual tax performance to taxable capacity in both cases. Moreover, both are subject to the criticism that the tax base proxies and/or explanatory variables chosen are assumed to reflect only taxable capacity differentials and not tax effort factors.[11]

However, while the broad objectives are similar, there are methodological differences between the two approaches. In the former, the statistical objective is to explain intercountry variations in tax performance by relating collections of each type of tax to the best available measure of the true tax base. In the latter, the statistical objective is to "explain" the same variations, but in terms of general characteristics of the population, or of the economy, that are thought to be determinants of overall taxable capacity. No attempt is made in the aggregate regression approach to define particular tax bases explicitly. Hence, while the aggregate regression approach considers such measures as "stage of development" as determinants of taxable capacity, the representative tax system approach, as developed here, considers only the specific tax bases as indicators of capacity. However, insofar as the share of representative tax system bases in total income tends to vary with the stage of development, the approaches are not inconsistent. This fact illustrates that while the point of view of the two approaches is quite different it might be expected that their general conclusions will not be contradictory. This is shown to be so in Section IV. However, it should be

[11] The implications of such an assumption are covered in Bahl, *op. cit.*, pp. 1–3.

emphasized that the approaches taken are basically different, and the choice between them must turn on subjective evaluation by specific users.

There is, of course, the further difference that the representative tax system permits identification of direct linkages between the yield of individual taxes and their respective proxy bases, whereas the aggregate regression approach does not. There is nothing inherent in the regression approach that prohibits analysis of such linkages, since it would be possible to recast the regression approach in terms of an analysis of each component of the overall tax ratio and then to construct an array of tax effort indices. However, this approach to measuring tax effort has not been tried, and therefore its implications remain unexplored.

III. The Model

As the construct of a representative tax system necessitates the relating of each tax to an assumed base, the first step of the analysis is some classification of taxes. Theoretically, at least two choices are open. One is to group taxes according to whether their impact is on domestically produced or imported goods, in which case the tax bases would be defined, respectively, as gross domestic product (GDP) and its components and as imports. The other is to use a more conventional classification, centered around the actual methods used in taxing income and wealth (for example, taxes on income and taxes on property), in which case the bases chosen will be some proxy for the total money amount susceptible to a particular kind of tax.[12] The first choice is rejected if for no other reason than to avoid the problems that would result from trying to separate empirically and conceptually the portion of each tax that is levied on imported goods and services. Accordingly, the following breakdown of taxes is used in this analysis: [13] (a) personal income taxes, (b) corporate income taxes, (c) property taxes (including poll and personal taxes), (d) internal indirect taxes (sales, excise,

[12] This approach will, of course, present difficulties if tax nomenclature is not uniform across countries. For example, if a surcharge on imports is for some reason labeled a "sales tax," then the effective sales tax rate will be overstated and the effective import tax rate understated.

[13] A more complete description of the contents of each tax class is presented in Appendix I.

and other internal indirect taxes), (e) import taxes, and (f) export taxes.

In the remainder of this section, the representative tax bases are posited on a priori grounds, and effective rates are presented. The original six classes of taxation considered are reduced to four by combining internal indirect taxes with personal income taxes, and corporate income taxes with export taxes. These aggregations are made on grounds of substitutability. For example, a corporate income tax and an export tax are alternative ways of taxing the same base; and the size of the effective tax rate, and therefore the estimated taxable capacity, should not be influenced by intercountry variations in the choice between the two.[14] An inherent problem with the representative tax system approach is the effect of substitutability on representative effective rates. Personal income taxes are combined with internal indirect taxes and corporate income taxes with export taxes on the grounds that these are the most likely areas where substitutability takes place. Similar relationships may exist between sales taxes and import taxes, and between excises and corporate income taxes; to the extent that this is true, a bias will be introduced into the analysis. However, in point of fact, the similarity in the size of the average effective rates of most tax classes that are potentially substitutes indicates that such bias may not be large.

Personal income taxes and internal indirect taxes

Substitutability

As was suggested above, it would be misleading to judge the relative use of internal indirect taxes, apart from that of the personal income tax, if countries view these taxes as either joint or alternative methods of taxing the same base. This assumed substitutable relationship between internal indirect and personal income taxes is defensible, in the context of the model, if local fiscal planners conceive of extracting some amount of tax from a particular base with a combination of these levies. The hypothesis that such a relationship between these two types of tax exists is consistent with the view that the determinants of the relative intensity of use of each include such factors as the channels of distribution of commodities, the average size of firm, the level of domestic production, existing procedures for administering the income

[14] This influence is demonstrated more clearly in Appendix II.

tax, and probably the tax structure of neighboring countries. These considerations lead to the choice of a single proxy base for these two taxes.

There are several reasons why a strategy designed to maximize revenue returns from a given tax base might call for the joint use of personal income taxes and internal indirect taxes. As a complement to the personal income tax, internal indirect taxes may be used to broaden the overall taxable base (a) by indirectly including that portion of the population whose incomes either are below the taxable range of the personal income tax or are administratively outside its bounds and (b) by raising the overall tax burden on those currently paying the personal income tax without risking undesirable incentive effects that may result (or may be thought to result) from increases in the personal income tax. Alternatively, a more intensive use of the personal income tax may provide increased revenues in periods when increasing the sales tax rate is not acceptable. In general, at any given point in time, countries may conceive of some feasible upper limits to personal income tax and sales tax rates. These upper limits change through time depending in part on the tax policy actions of neighboring countries. Therefore, maximum flexibility for discretionary tax actions will be achieved by countries that use both forms of taxation. To the extent that such flexibility is in fact part of the objective function of fiscal decision makers in developing countries, it would seem valid to consider the personal income tax and internal indirect taxes as substitutes.

Tax base

Ideally, the base used for the personal income tax would be total personal income in each tax bracket, less some amount for personal allowances. To derive the yield from a representative personal income tax system, a set of average rates would be applied to taxable income in each bracket. However, such an exercise would require at least comparable, intercountry income distribution information. As such data are not available, it becomes necessary to resort to using a more aggregative measure of income, which is thought to vary across countries in about the same fashion as would the true base.

The classification "internal indirect taxes" here includes, as already indicated, all excises, general and selective sales taxes, and other indirect taxes, including license duties and stamp taxes other than on

property transfers (see Appendix I). In theory, the taxable base of selective sales and excise taxes would require measurement of the value of sales or output of specific items, especially cigarettes, liquor, and gasoline, whereas the base of a general sales tax would require deducting what are thought to be "nontaxable" sales from the value of output for domestic use. In practice, data limitations prohibit such an approach here. At least two possibilities remain for estimating the base of internal production and consumption taxes. The first is an estimate of output for domestic use that might be obtained by subtracting the difference between exports and imports from domestic production and assuming that this measure (domestic consumption *plus* investment) varies systematically with actual taxable consumption. This approach would view the tax base as consisting of a set of transactions or "tax handles." The second approach involves conceiving of the sales/excise tax base in a tax-incidence rather than a tax-impact sense and measuring the base as the total amount of income from which these taxes are paid.[15]

The assumption made here is that the personal income tax and all internal indirect taxes in developing countries are essentially a tax on incomes generated in the monetized sector, that is, on income generated outside the subsistence sector. Since there are no estimates of subsistence sector income by country, some attempt will be made to establish a proxy measure that covaries systematically with income generated in the agricultural sector for domestic consumption. Nonagricultural income may be calculated initially by subtracting the agricultural share of GDP from total income. However, since all agricultural sector income is not subsistence income and therefore does not lie outside the purview of personal income and internal indirect taxation, the share of total income generated outside the agricultural sector will tend to understate the taxable base sought here. To adjust for this, the value of agricultural exports is added to income generated outside the agricultural sector.[16] This is done on the grounds that this portion of agricultural output generates money income, and hence contributes to the size of the personal income and consumption tax bases. It should be emphasized that because of data limitations the total value of agricultural exports is added to net income, or *value added,* in the nonagricultural sectors,

[15] Assumed away here is the possibility that sales, excise, and other internal indirect taxes are exported.

[16] Hereafter, this total will be referred to as "nonagricultural income."

thereby leading to an incomparability in the treatment of the costs of inputs within the agricultural sector. To the extent that value added is a large percentage of total agricultural export value, the overstatement of the tax base that results from using this measure will not be large. Given the nature of agricultural production for export, the assumption of a high value added would not seem unreasonable. The alternative, to use only income generated in nonagricultural sectors, is less satisfactory in that for some countries an important portion of the base for personal income and consumption taxes would be omitted.

Whether this proxy measure makes the desired adjustment or not, the conceptual exclusion of income generated in the (domestic) agricultural sector from the personal income tax base involves an implicit assumption that the fraction of income generated in that sector is a good proxy for the part of total income that is not amenable to personal income taxation—because a part of it does not enter the monetized sector, because collection difficulties with respect to the remainder may be prohibitive, and/or because the proportion of income earned in the agricultural sector seems a reasonable indicator of the portion of personal income that is, according to the average practice of less developed countries, below the taxable range. The nonagricultural income definition of the base of consumption taxes implies that the average propensity to consume out of nonagricultural income is the same across countries in the sample. Further, the exclusion of the domestic agricultural sector from the consumption tax base implies that the average propensity to consume taxable goods out of this income is zero. Although the latter is clearly not exactly correct, the position taken here is that to assume, on the contrary, that the propensities to consume taxable goods are equal in the agricultural and nonagricultural sectors would introduce an even greater error.

Effective rates

The data in column (1) of Table 1 show the intercountry variance in the percentage of total income accounted for by the nonagricultural sector, or, in the present context, the percentage of total income that is amenable to combined personal income and internal indirect taxes. On average, this figure is equivalent to 76 per cent of gross national product (GNP) and varies from 36 per cent in Nepal to 99 per cent in Singapore.

TABLE 1. SELECTED DEVELOPING COUNTRIES: DISTRIBUTION OF TAX BASES, 1966–68

(Per cent of gross national product)

Country	Nonagricultural Income [1]	Basic Sector Income [2]	Value of Imports
Argentina	89.22	38.42	7.79
Bolivia	81.25	30.55	26.12
Brazil	84.07	31.02	7.17
Burundi	40.63	12.83	10.97
Ceylon	79.23	26.93	24.07
Chad	41.35	18.45	15.54
Chile	91.19	38.89	14.24
China	83.06	29.66	21.28
Colombia	78.42	28.72	15.33
Costa Rica	96.19	38.69	32.58
Ecuador	80.86	33.66	16.77
Egypt	88.04	39.54	18.33
Ethiopia	43.32	14.22	10.90
Ghana	63.22	20.62	17.80
Guatemala	82.05	24.65	16.23
Guyana	88.02	59.26	64.21
Honduras	85.47	41.47	31.34
India	48.83	14.33	6.88
Indonesia	53.99	18.79	17.27
Iran	78.63	34.03	18.33
Ivory Coast	86.54	36.24	28.87
Jamaica	92.62	28.82	42.34
Kenya	75.59	22.09	26.28
Korea	65.50	21.60	21.42
Lebanon	92.31	17.01	46.40
Malaysia	94.50	42.40	41.48
Mali	57.96	8.56	14.39
Mexico	88.66	35.86	11.80
Morocco	78.20	28.20	22.29
Nepal	36.14	14.04	4.01
Pakistan	55.56	13.76	9.52
Paraguay	75.94	26.04	16.40
Peru	86.55	28.65	20.21
Philippines	76.33	28.13	19.37
Rwanda	41.67	11.77	10.77
Senegal	76.89	26.49	19.90
Singapore	99.02	14.92	64.50
Sudan	56.84	18.64	15.88
Tanzania	64.88	25.38	20.65
Thailand	82.35	29.75	20.61
Togo	66.43	30.93	26.02
Trinidad and Tobago	93.60	47.90	64.20
Tunisia	87.06	17.86	32.09
Turkey	68.02	21.02	6.36
Upper Volta	51.88	12.98	15.32
Venezuela	93.18	41.08	22.76
Viet-Nam	83.47	23.67	27.01
Zaïre	85.70	24.50	31.77
Zambia	92.81	46.41	49.11
Arithmetic mean	75.56	27.34	23.36
Coefficient of variation	0.2337	0.3993	0.6251

[1] Total income *minus* the agricultural share of gross domestic product *plus* the value of agricultural exports.

[2] Total value added in the mining and manufacturing sectors *plus* the value of agricultural exports.

The results in column (1) of Table 2 show that, on average,[17] governments extract 2.35 per cent in personal income taxes from each currency unit of income earned outside the domestic agricultural sector. The relative variation in effective rates of this tax [18] is lower than that for corporate income, export, or property taxes but higher than that for internal indirect or import taxes. In this context, the relative variation is a measure of the homogeneity among countries in their preference for utilizing a particular tax base; for example, countries are more similar in their preference for using the personal income tax base than in their preference for using the corporate income tax base. To the contrary, the average effective rate of internal indirect taxes is 6.34 per cent; that is, on average, 6.34 per cent in internal indirect taxes is extracted from each currency unit of income earned outside the domestic agricultural sector.[19] A comparison of effective rates in columns (1) and (2) of Table 2 suggests a higher intensity of usage of internal indirect taxes than of personal income taxes—possibly a result of tax administration considerations. Such a result might also be expected, however, if internal shifting of sales/excise taxes results in indirectly including a part of the domestic agricultural sector in the tax base. To the extent that this is true, the effective rates are biased upward.

The relative variance in effective rates among these 48 countries suggests that there is more homogeneity in the intensity of use of internal indirect taxes than in any other separate tax class presented in Table 2. Of the countries showing relatively high effective rates, at least in Brazil and India this heavy usage of the domestic indirect taxation may be traced to sales tax practices of the states.

The meaningful intercountry comparison of effective rates, however, is not with respect to either tax class considered separately but with respect to combined personal income and internal indirect taxes. As is shown in Table 2, the average country extracts 8.69 per cent from each currency unit of nonagricultural income.[20] The array of effective

[17] Arithmetic mean of the 28 countries for which personal income tax data are available.

[18] As measured by the coefficient of variation, that is, the standard deviation as a percentage of the mean.

[19] Computed from data for 48 of the 49 countries in the sample.

[20] The effective rate, 8.69 per cent, is the sum of the means of the personal income tax (2.35 per cent) and the internal indirect taxes (6.34 per cent). The sum of the means is used here, rather than the mean of the sums (9.07 per cent), in order to be consistent with the assumption that countries omitted because of lack of data would not have affected the mean effective rate.

rates also gives some empirical support to the argument that these two tax forms are viewed jointly rather than separately by fiscal decision makers in developing countries. The coefficient of variation presented in column (3) shows that countries are more homogeneous in their preference for intensity of use of the two taxes combined than for either considered separately.

Taxes on property

The property tax classification used here includes urban and rural real estate taxes, land taxes, property transfer taxes, and all taxes on motor vehicles. Taxes on property are here combined with poll and personal taxes and all taxes that are not classified. For either property taxes or personal taxes, it would be improper to exclude the domestic agricultural sector from the base of taxation. Because there seems no preferable, measurable alternative, total income is assumed to be the base of taxes on property.

The effective rates of this tax class average 1.32 per cent of total income and exhibit a wide variation in intensity of use.[21] In fact, the relative intercountry variance in the intensity of property tax use is exceeded only by that of export taxes. This relatively heterogeneous distribution is due partly to the classification used, where a number of different types of tax are lumped together.

Corporate income and export taxes

Substitutability

Corporate income taxes as defined here include all income taxes on companies, as well as royalties. Export taxes include also marketing board profits and exchange taxes on exports.[22] As argued above, fair intercountry comparisons require joint consideration of corporate income and export taxation. For example, consider Zambia and Zaïre, countries that rely heavily on the taxation of copper. To compare, separately, their effective rates of export or corporate income taxation would be spurious,

[21] Based on data for all 49 countries.

[22] The total proceeds from an exchange transaction tax in Paraguay, Bolivia, and Zaïre are included, since it is not possible to separate import and export proceeds. The amount involved in these three countries is not large in any case. The exchange tax in Viet-Nam has been reclassified as an import duty.

TABLE 2. SELECTED DEVELOPING COUNTRIES: EFFECTIVE TAX RATES, 1966–68

(In per cent)

Country	Taxes Related to Nonagricultural Income			Taxes Related to Total Income	Taxes Related to Basic Sector Income			Taxes Related to Imports
	Personal income tax [1] (1)	Sales taxes, excises, and other internal indirect taxes [1] (2)	Total effective rate [2] (3)	Property [3] (4)	Corporate income tax [4] (5)	Export tax [4] (6)	Total effective rate [5] (7)	Import taxes [6] (8)
Argentina		8.47		1.61		2.87		17.77
Bolivia	0.36	4.75	5.11	1.80	0.72	10.64	11.36	2.40
Brazil	2.79	21.56	24.35	0.29		—		10.17
Burundi	2.49	4.32	6.81	1.67	6.93	12.81	19.74	24.17
Ceylon		5.62		0.52		8.82		21.11
Chad	3.98	9.50	13.48	2.55	3.89	5.40	9.29	24.64
Chile	2.39	9.76	12.15	1.29	12.01	6.09	18.10	
China		10.56		1.69		1.60		13.59
Colombia		4.01		0.92		1.71		17.14
Costa Rica		4.16		0.69		0.71		10.72
Ecuador		3.42		1.24		3.56		35.44
Egypt		13.88		1.47		0.86		19.53
Ethiopia		8.50		0.72		5.00		19.73
Ghana	1.80	5.26	7.06	0.35	9.43	10.82	20.25	24.12
Guatemala		4.76		0.44		2.14		12.59
Guyana	3.65	3.56	7.21	0.55	7.13	1.08	8.21	13.74
Honduras		3.99		0.21		3.36		8.46
India	2.38	12.59	14.97	1.10	7.96	2.29	10.25	25.19
Indonesia	0.92	3.58	4.50	0.15	8.86	7.42	16.28	10.73
Iran	1.42	4.36	5.78	0.27	31.44	1.26	32.70	18.76
Ivory Coast		7.68		1.37		11.52		16.85
Jamaica	2.57	5.34	7.91	1.43	13.20	—	13.20	10.25
Kenya	7.83	4.15	11.98	0.91		0.75		17.46
Korea	4.18	7.39	11.57	0.97	5.80	—	5.80	8.94
Lebanon		3.89		1.51		—		8.74
Malaysia	1.58	2.34	3.92	2.39	6.87	7.07	13.94	11.47
Mali		7.55		4.22		10.11		23.55
Mexico				4.80		1.18		12.47
Morocco	1.56	8.96	10.52	1.32	13.06	1.20	14.26	13.27
Nepal		2.07		0.84		1.48		31.83
Pakistan		8.08		0.47		14.55		
Paraguay		3.64		0.80		6.71		18.89
Peru		6.37		1.19		0.88		20.42
Philippines	1.18	5.59	6.77	1.12	5.13	0.68	5.81	9.85
Rwanda	1.37	3.56	4.98	1.80	5.78	10.62	16.40	22.50
Senegal	2.29	7.31	9.60	2.49	5.28	5.51	10.79	27.53
Singapore	1.09	3.37	4.46	3.52	8.00	—	8.00	5.22
Sudan	0.19	9.37	9.56	0.02	3.99	7.69	11.68	33.81
Tanzania		3.39		4.42		0.89		23.02
Thailand	0.95	6.67	7.62	0.27	3.24	5.00	8.24	18.59
Togo	0.64	5.56	6.20	0.70	1.99	2.41	4.40	15.50
Trinidad and Tobago	2.55	2.41	4.96	1.01	12.82	—	12.82	5.25
Tunisia	3.66	12.33	15.99	1.06	16.54	4.03	20.57	6.33
Turkey	5.56	6.46	12.02	1.23	3.77	—	3.77	61.04
Upper Volta	2.45	9.18	11.63	3.71	2.88	3.25	6.13	15.69
Venezuela		2.04		0.07		0.37		5.81
Viet-Nam		4.09		0.73		9.95		20.35
Zaïre	1.44	6.49	7.93	0.03	8.42	44.35	52.77	11.48
Zambia	2.60	2.45	5.05	0.82	34.49	10.50	44.99	4.52
Arithmetic mean	2.35	6.34	9.07 (8.69) [7]	1.32	9.22	5.08	15.37 (14.30) [8]	17.25
Coefficient of variation [9]	0.698	0.579	0.499	0.866	0.867	1.387	0.765	0.589

For footnotes, see page 101.

since Zaïre used essentially an export tax in this period, whereas Zambia used a combination of a corporate income tax, an export tax, and royalties. Therefore, it would be erroneous to compare the intensity of taxation of the copper industry without examining the joint effective rate of the export and corporate income taxes. An exposition of the empirical consequences of not accounting for substitutability is presented in Appendix II.

Tax base

Data on corporate income are not available on a comparable intercountry basis. The major consideration in the choice of a proxy measure for the corporate income tax base is the derivation of an index that will vary systematically with corporate income. For tax administration reasons, corporate income taxes are likely to be higher in developing countries where production is concentrated in a relatively few large firms. This suggests the need for a base that includes income generated in the manufacturing and mining industries. The inclusion of royalties with corporate income taxes underlines the need to include mining activities. Moreover, since export taxes are viewed here as an alternative to corporate income taxes, the value of agricultural exports—often a target of export taxes—is added to the tax base. On the surface, the appropriate base for export taxes would seem to be the total value of exports; however, this alternative is ruled out, since export taxes and corporate income taxes are viewed here as substitutes. Therefore, the same tax base—income generated in the mining and manufacturing sectors *plus* the value of agricultural exports—is used.

Some empirical support for the inclusion of agricultural exports and mining income in the base for export and corporate income taxes is to

Footnotes to Table 2

[1] Tax collections as a percentage of nonagricultural income (that is, income generated outside the agricultural sector *plus* the value of agricultural exports).
[2] Sum of columns (1) and (2) computed for 28 countries where personal income and internal indirect tax collection data are available.
[3] Property, poll and personal, and unclassified tax collections as a percentage of total income.
[4] Tax collections as a percentage of basic sector income (that is, income generated in mining and manufacturing *plus* the value of agricultural exports).
[5] Sum of columns (5) and (6) computed for 26 countries where corporate income and export tax data are available.
[6] If entrepôt trade is excluded, Singapore's effective import tax rate becomes 9.12.
[7] Sum of the mean effective rates of the personal income tax and of internal indirect taxes.
[8] Sum of the mean effective rates of the corporate income tax and of export taxes.
[9] The standard deviation as a percentage of the mean.

be found in the Lotz/Morss analysis of tax composition.[23] They found the level of corporate income taxes to be directly related to the size of the export sector, particularly to the relative importance of mineral and oil exports. Alternatively, they found the level of export taxes to be significantly and positively related to the share of agricultural employment. One possible interpretation of these results is that, given some constant export ratio, countries that have a heavy concentration of agricultural exports will tend to use export taxes, while those with a heavy concentration of mineral and oil (and presumably manufacturing) exports will tend to use income taxation. This essentially is the justification for including some indicator of the relative importance of agricultural exports in the corporate income tax/export tax base.

One major problem in using this proxy tax base is the implicit assumption of equality in the degree of taxable surplus within a given sector, as among countries, and between the mining, manufacturing, and agricultural export sectors, within a given country. Clearly there is a case that this surplus is significantly higher in mining industries, such as copper and oil; therefore, total basic sector income will understate taxable capacity in countries with heavy export concentration in these products, especially in relation to those countries with exports that face less favorable market conditions.

This proxy base—the sum of mining and manufacturing sector income and the value of agricultural exports—is referred to below as basic sector income and differs from total nonagricultural income only in its exclusion of tertiary activities.[24] By this definition, basic sector income averages about 27 per cent of GNP, with a range from under 9 per cent in Mali to about 60 per cent in Guyana (see Table 1). The intercountry distribution of basic sector income is much less homogeneous than that of total nonagricultural income, as may be seen by a comparison of the coefficients of variation (Table 1).

Effective rates

The average effective rate for the 26 countries where data on corporate income tax collections are available is 9.22 per cent, vary-

[23] Joergen R. Lotz and Elliott R. Morss, "A Theory of Tax Level Determinants for Developing Countries," *Economic Development and Cultural Change,* Vol. 18 (April 1970), pp. 328–41.

[24] Tertiary activity is defined here as the difference between total income and the sum of income generated in the agricultural, extractive, and manufacturing sectors.

ing from 31.44 per cent in Iran (oil) and 34.49 per cent in Zambia (copper) to 0.72 per cent in Bolivia and 1.99 per cent in Togo. The relative variation about the mean is larger than that found for any other set of effective rates except that for export taxes. This heterogeneity reflects in part the choices open for taxing this base—for example, corporate income taxes, royalties, and export taxes—and the large variation in the composition of industry within the extractive and manufacturing sectors.

The mean effective export tax rate is 5.08 per cent, varying from 44.35 per cent in Zaïre and 14.55 per cent in Pakistan to 0.68 per cent in the Philippines and 0.37 per cent in Venezuela (see column (6) of Table 2) and with no export taxation in seven countries. The variance in these effective rates is higher than that for any other tax considered.

The average combined effective rate on basic sector income is 14.30 per cent. The intercountry variance in effective rate is in fact lower for the combination of these taxes than that for either examined separately, which reinforces the argument that the proper analysis of intensity of use requires a joint consideration.

Import taxes

The total value of imports is assumed to be the base of import taxation. By including all producer goods as well as all consumer goods, the true import tax base has been knowingly overstated. This amounts to an implicit assumption that total import value is distributed across import tax groups [25] in approximately the same way in each country. As may be seen in Table 1, the total value of imports averages about 23 per cent of GNP but shows a more heterogeneous intercountry distribution than either total nonagricultural income or basic sector income. The import ratio varies from 4.01 per cent in Nepal, 6.36 per cent in Turkey, and 6.88 per cent in India to about 64 per cent in Guyana, Singapore, and Trinidad and Tobago.

On average, import taxes account for 17.25 per cent of the total value of imports.[26] The homogeneity in this effective rate is greater than that of any tax class except internal indirect.

[25] If all data were available, it might have been possible to identify classes of goods that are generally subject to differentially higher, or lower, rates.

[26] Computed on the basis of data for 47 countries.

IV. The Yield of a Representative Rate Structure

The Model

Total taxable capacity ($\hat{T}$) may be computed as a linear combination of the set of effective tax rates (r_i) generated above and the assumed tax bases, that is,

$$\hat{T} = r_1(Y - A + Ax) + r_2(N + I + Ax) + r_3M + r_4Y + r_5(N + I + Ax) + r_6(Y - A + Ax), \quad (2)$$

which reduces to

$$\hat{T} = (r_1 + r_6)(Y - A + Ax) + (r_2 + r_5)(N + I + Ax) + r_3M + r_4Y, \quad (3)$$

where

Y = GNP
A = total income generated in the agricultural sector
Ax = total value of agricultural exports
N = total income generated in the mining sector
I = total income generated in the manufacturing sector
M = total value of imports
r_1 = effective rate of the personal income tax (2.35)
r_2 = effective rate of the corporate income tax (9.22)
r_3 = effective rate of import taxes (17.25)
r_4 = effective rate of the property tax (1.32)
r_5 = effective rate of export taxes (5.08)
r_6 = effective rate of internal indirect taxes (6.34).

The formula for computing the yield of a representative tax system ($\hat{T}$) is therefore

$$\hat{T} = 0.0869(Y - A + Ax) + 0.1430(N + I + Ax) + 0.1725(M) + 0.0132(Y). \quad (4)$$

Statistical Results

The estimates of taxable capacity, that is, the yield of a representative tax system as defined by equation (4), are presented in column (2) of Table 3.[27] Actual collections as a percentage of capacity are shown

[27] The figures in columns (1) and (2) of Table 3 are presented in U. S. dollars only to indicate the relationship between tax effort rankings and the scale of government operations. In the statistical analysis it was not necessary to use a conversion to U. S. dollars; hence, the problems associated with the use of exchange rates for such a purpose were avoided.

in column (3) with an index of unity designating an average tax effort. For example, the application of the representative rate structure developed above would yield $273 million in Ceylon, compared with actual tax collections of $264 million, that is, actual collections in Ceylon are

TABLE 3. SELECTED DEVELOPING COUNTRIES: TAXABLE CAPACITY AND TAX EFFORT, 1966–68

Country	Actual Tax Collections (*In millions of U.S. dollars*) (1)	Yield of a Representative Tax System (2)	Tax Effort		Relative Taxable Capacity	
			Index (3)	Ranking (4)	Ratio [1] (5)	Ranking (6)
Mali	48	32	1.4906	1	12.0425	44
Brazil	4,252	2,952	1.4407	2	12.6180	40
Chad	32	24	1.3427	3	12.2974	39
India	4,978	3,773	1.3194	4	11.3900	48
Zaïre	344	261	1.3182	5	15.9277	8
Upper Volta	32	25	1.2567	6	11.9883	43
Turkey	1,597	1,286	1.2424	7	12.0621	41
Tunisia	204	168	1.2189	8	14.4549	13
Iran	1,403	1,172	1.1978	9	13.8161	16
Senegal	147	123	1.1949	10	13.3777	26
Zambia	323	276	1.1677	11	17.9112	4
Venezuela	1,774	1,566	1.1328	12	16.0956	7
Chile	1,068	950	1.1239	13	13.6801	19
Sudan	176	158	1.1145	14	12.6215	37
Burundi	15	13	1.1076	15	11.8307	45
Ivory Coast	198	191	1.0367	16	15.0965	11
Ghana	296	286	1.0356	17	13.2263	30
Morocco	456	442	1.0330	18	13.6272	23
Tanzania	110	108	1.0191	19	13.5547	25
Egypt	1,006	995	1.0109	20	13.5694	24
Rwanda	12	12	0.9727	21	11.8804	44
Ceylon	264	273	0.9662	22	13.6349	22
Ethiopia	124	130	0.9559	23	11.7656	46
Argentina	1,940	2,083	0.9314	24	13.3350	27
China	507	559	0.9069	25	13.7430	18
Kenya	155	174	0.8921	26	13.6561	20
Korea	451	527	0.8553	27	12.9235	35
Pakistan	1,041	1,230	0.8466	28	11.7088	47
Peru	613	737	0.8317	29	13.7976	17
Jamaica	156	192	0.8132	30	16.6988	5
Viet-Nam	286	362	0.7901	31	13.6433	21
Thailand	654	830	0.7878	32	13.3104	28
Ecuador	161	206	0.7849	33	13.1645	33
Malaysia	531	720	0.7371	34	16.5381	6
Colombia	753	1,084	0.6946	35	13.2187	31
Guyana	45	66	0.6830	36	19.0361	3
Paraguay	46	70	0.6585	37	12.8711	31
Indonesia	774	1,205	0.6421	38	12.4283	38
Philippines	615	959	0.6418	39	13.2759	29
Togo	21	33	0.6374	40	13.9460	14
Mexico	2,142	3,520	0.6085	41	13.1117	34
Trinidad and Tobago	109	197	0.5537	42	20.6071	2
Lebanon	135	250	0.5400	43	15.3121	10
Singapore	157	292	0.5391	44	21.5161	1
Guatemala	114	213	0.5347	45	13.2120	32
Costa Rica	78	148	0.5281	46	15.3607	9
Honduras	61	117	0.5243	47	14.8896	12
Bolivia	65	126	0.5198	48	13.8845	15
Nepal	27	60	0.4455	49	11.0986	49

[1] Ratio of estimated taxable capacity to gross national product.

about 97 per cent of taxable capacity. Conversely, in India the actual level of taxes is well above taxable capacity, while in Singapore it is far below estimated taxable capacity. The rankings by tax effort and taxable capacity are shown in columns (4) and (6) of Table 3.

This format for comparing tax effort also allows a statement of the extent to which each tax class contributes to a high or a low tax effort. The actual tax ratio of a country is a linear combination of the bases presented in equation (3) expressed as percentages of income, that is,

$$T_y = \beta_1(1 - A_y + Ax_y) + \beta_2(N_y + I_y + Ax_y) + \beta_3(M_y) + \beta_4, \quad (5)$$

where the β_i are the actual effective rates as shown for each country in Table 2. The yield of the representative system for that country, expressed as a percentage of income (that is, $\hat{T}_y$), is equal to

$$\hat{T}_y = \alpha_1(1 - A_y + Ax_y) + \alpha_2(N_y + I_y + Ax_y) + \alpha_3(M_y) + \alpha_4, \quad (6)$$

where the α_i are the average effective rates presented in equation (4). It follows that the tax effort index may be obtained by dividing equation (5) by equation (6), that is,

$$E = \frac{T_y}{\hat{T}_y} = \frac{\Sigma\beta_i X_i}{\Sigma\alpha_i X_i}, \quad (7)$$

where the X_i are the proxy tax base/income ratios expressed in equation (5). The contribution of each of the four tax classes to below or above average tax effort may be discerned by subtracting equation (7) from unity, that is,

$$1 - E = 1 - T/\hat{T} = \frac{\Sigma\alpha_i X_i - \Sigma\beta_i X_i}{\Sigma\alpha_i X_i}. \quad (8)$$

Equation (8) may be expanded to

$$\frac{\Sigma\alpha_i X_i - \Sigma\beta_i X_i}{\Sigma\alpha_i X_i} = \frac{(\alpha_1-\beta_1)X_1}{\Sigma\alpha_i X_i} + \frac{(\alpha_2-\beta_2)X_2}{\Sigma\alpha_i X_i} + \frac{(\alpha_3-\beta_3)X_3}{\Sigma\alpha_i X_i} + \frac{(\alpha_4-\beta_4)X_4}{\Sigma\alpha_i X_i}, \quad (9)$$

where

$$X_1 = Y - A_y + Ax_y$$
$$X_2 = I_y + N_y + Ax_y$$
$$X_3 = M_y$$
$$X_4 = 1.$$

Each term on the right of equation (9) may be interpreted as the net contribution of a particular tax class to the above/below average performance of the country. Such a partitioning may give some indication as to the specific reasons for a relatively strong or relatively weak performance.

For example, the values for the Philippines are

$$\begin{aligned} \beta_1 &= 6.77 & \alpha_1 &= 8.69 \\ \beta_2 &= 5.81 & \alpha_2 &= 14.30 \\ \beta_3 &= 9.85 & \alpha_3 &= 17.25 \\ \beta_4 &= 1.12 & \alpha_4 &= 1.32, \end{aligned}$$

which by equation (7) yields an effort index of 0.64, that is, the actual tax ratio is about 36 per cent below the expected tax ratio. Of this 36 per cent, 15.60 per cent is due to below average intensity of use of the corporate income/export tax base, 9.36 per cent to below average use of the import tax base, 9.57 per cent to below average use of the personal income/internal indirect tax base, and 1.31 per cent to below average use of property and personal taxes. It follows that the low tax effort in the Philippines is not attributable primarily to a very low intensity of use of one particular tax base. This generally low performance of each component may be observed for several countries with low tax effort rankings, for example, Bolivia, Trinidad and Tobago, Singapore, and Guyana. On the other hand, the strong performance of India is the result of an overall above average tax performance. By comparison, for Zambia the actual effective rates are lower than the average for three of the four tax classes considered, but the overall tax effort is well above average (1.16). A partitioning of Zambia's tax effort index, as is done for the Philippines, shows that the high intensity of use of the corporate income/export tax base is more than sufficient to offset the below average intensity of use of the other taxes. In this case, Zambia more than compensates for a low intensity of use of personal income, internal indirect, and import taxes with a heavy tax on the output of the copper industry. A similar interpretation may be given the high tax effort in Zaïre. While specific policy implications are not forthcoming from such an aggregate analysis, it appears that in such cases high tax effort is the result of a favorable world market condition for certain exports, rather than of a balanced use of tax bases.

These possible interpretations of a high, or low, tax effort are not meant to suggest normative (policy) conclusions, but rather to assist in

an understanding of the components of tax effort. Because Venezuela has an effective rate of import taxation that is well below the average, it does not necessarily follow that Venezuela should tax imports more heavily. What this type of dissection of the tax effort ratio does allow, however, is a statement of whether a country's relative tax performance is due to a balanced use of different taxes or to the intensive use of a single tax. The policy implications of these results, that is, of the relationship between tax mix and tax effort, must await a detailed analysis of individual country situations.

Characteristics of the Representative Tax System Effort Index

One method of analyzing the distribution of tax effort indices derived here is to correlate this series with selected variables that indicate the dimensions of intercountry variations in economic structure, etc. As may be seen from the simple correlations presented in column (1) of Table 4, there is a positive relationship between levels of tax effort, as measured with a representative tax system approach, and actual tax ratios. The meaning of this relationship is that actual tax ratios increase more than in proportion to increases in taxable capacity. The signs of the simple correlation coefficients shown in Table 4 indicate that countries with the higher levels of tax effort are those with relatively lower per capita incomes, larger proportions of income generated in the domestic agricultural sector, and lower export, import, and manufacturing shares of income. The general direction of these relationships suggests that the tax effort index is negatively associated with stage of development, openness, and industrialization, that is, with those factors that conceivably have a strong positive effect on the level of taxable capacity. However, it should be emphasized that these rough conclusions are based on the signs rather than on the sizes of the coefficients presented in Table 4.

Comparison with Other Studies

It would seem valuable to compare the tax effort indices and rankings obtained in this study with those obtained in four earlier regression analyses. As those four regression studies and the present analysis have in common a definition of tax effort as the ratio of actual tax collections to estimated taxable capacity, and since each is tested on the same data, any differences in results are due either to the variables used in estimating taxable capacity or to the estimating procedure used. The

TABLE 4. SIMPLE CORRELATION COEFFICIENTS BETWEEN TAX EFFORT INDICES AND ECONOMIC VARIABLES

	Tax Effort Index [1]				
	Representative tax system	Equation A	Equation B	Equation C	Equation D
Actual tax ratio	0.57	0.90	0.75	0.74	0.83
Per capita income	−0.25	0.07	−0.07	−0.12	−0.10
Export ratio	−0.21	0.11	0.01	0.11	0.10
Import ratio	−0.35	−0.01	−0.04	0.03	−0.02
Population	0.22	0.01	0.03	−0.02	0.00
Mining share of income	0.09	0.37	0.00	−0.01	0.29
Agricultural share of income	0.19	−0.30	−0.14	−0.02	−0.02
Manufacturing share of income	−0.29	0.02	−0.03	−0.17	−0.22
Nonagricultural income [2]	−0.27	0.29	0.21	0.15	0.08
Basic sector income [3]	−0.24	0.28	0.09	0.11	0.16

[1] See equations (10) through (14).
[2] Income generated in the nonagricultural sector *plus* the value of agricultural exports, expressed here as a percentage of income.
[3] Income generated in manufacturing and extractive activities *plus* the value of agricultural exports, expressed here as a percentage of income.

single-equation estimates of taxable capacity and those of the representative tax system (RTS)—made comparable by dividing both sides of equation (4) by total income—are shown below:

Equation A[28] $$\hat{T}_y = 10.48 + 0.0026(Y_p) + 0.0614(X_y + M_y) \quad (10)$$

Equation B[29] $$\hat{T}_y = 10.05 + 0.0031(Y_p - X_p) + 0.3973(N_y) + 0.0881(X_y - Nx_y) \quad (11)$$

Equation C[30] $$\hat{T}_y = 14.95 - 0.0742(A_y) + 0.2951(N_y) \quad (12)$$

Equation D[31] $$\hat{T}_y = 15.98 - 0.1077(A_y) + 0.0350(X_y + M_y) \quad (13)$$

RTS $$\hat{T}_y = 0.0869(1 - A_y + Ax_y) + 0.1430(I_y + N_y + Ax_y) + 0.1725(M_y) + 0.0132 \quad (14)$$

[28] Lotz and Morss, "Measuring 'Tax Effort' in Developing Countries" (cited in footnote 4).
[29] This formulation has been used by the Fiscal Affairs Department for deriving tax effort indices in developing countries.
[30] Bahl, *op. cit.*
[31] UNCTAD, *Objectives for the Mobilization of Domestic Resources* (cited in footnote 4).

where

A_y = share of GDP generated in the agricultural sector
N_y = share of GDP generated in the mining sector
Y_p = per capita income
X_y = value of exports as a percentage of income
M_y = value of imports as a percentage of income
Ax_y = value of agricultural exports as a percentage of income
I_y = share of GDP generated in the manufacturing sector
X_p = per capita exports
Nx_y = value of mining exports as a percentage of income.

In each case a tax effort ratio is computed by dividing actual taxes (or the actual tax ratio) by taxable capacity as estimated in the equations above. A comparison of the resulting tax effort rankings is presented in descending order in Table 5. A product-moment correlation coefficient between the actual indices shows a highly significant correlation between all possible combinations of indices calculated with the five approaches (see Table 6). This is not to say that each country ranks the same or has an identical index regardless of the estimating equation used, but rather that these four different analyses do not yield significantly different results. It is especially interesting that the same countries tend to show a low tax effort by all models, suggesting either that their tax effort is indeed low or that each analysis is guilty of the same kind of bias.

With respect to individual countries, the tax effort position appears sensitive to whether or not the extractive share is considered explicitly. For example, Zambia, Zaïre, Chile, Venezuela, Iran, and Trinidad and Tobago all show lower tax effort rankings with the regression approach, when the equations specifically consider the extractive share of income as an independent variable, than under the representative tax system approach, which includes mining income as a component of the bases of both personal income/internal indirect taxes and export/corporate income taxes.

It would seem useful to compare the rank results of the regression and representative tax system analyses by examining the characteristics of those countries that show large rank deviations. Although an exact explanation of each case is not readily apparent from the rank deviations shown in Table 7, it may be seen that certain countries do consistently rank either higher or lower compared with the regression approach. Of

those that generally rank higher by the regression approach, several have in common a relatively high ratio of agricultural export value to GNP and an average or a relatively high level of per capita income.[32] Conversely, many of those countries that rank lower in the regression studies have in common a relatively low per capita income, relatively low ratios of agricultural export value to GNP, *and* relatively high shares of total GDP generated in the agricultural sector.[33] This rough analysis suggests that wide differences in rankings result primarily from the treatment of agricultural exports in the representative tax system. Such an adjustment has a substantial positive effect on the estimated taxable capacity of countries that have both high agricultural shares in income and a relatively high value of agricultural exports (such as Ceylon and Malaysia), but it has a relatively dampening effect on the estimated taxable capacity of countries with a large agricultural share in income but without a heavy dependence on agricultural exports (such as India, Pakistan, and Rwanda). To allow for these effects on taxable capacity is indeed the purpose of making the agricultural export adjustment in the representative tax system. However, it should be re-emphasized that the agricultural export variable, which is a component of two proxy bases, is expressed in a total value form and that its addition to value added in other sectors overstates the contribution of the monetized agricultural sector to taxable capacity.

While the rank deviations discussed here do indicate reasons for extreme differences in results as between the two approaches, it is possible to test for systematic relationships between the actual differences in tax effort indices obtained with the representative tax system approach (E_r) and those obtained by each of the regression studies (E_g). This may be done by calculating a simple correlation coefficient between each difference ($E_r - E_g$) and selected explanatory variables. The results, shown in Table 8, verify the suggestion that the representative tax system approach yields significantly lower effort ratios in countries where the agricultural export ratio is higher. The results also suggest that the effort ratio under the representative tax system will be significantly lower than the effort ratio derived through the regression analysis for countries at higher stages of development, with a greater level of industrialization, and with a greater degree of openness.

[32] Malaysia, Guyana, Egypt, Honduras, and Ceylon.
[33] India, Turkey, Ethiopia, Rwanda, Pakistan, and Burundi.

TABLE 5. SELECTED DEVELOPING COUNTRIES: A COMPARISON OF TAX EFFORT INDICES AND RANKINGS OBTAINED WITH ALTERNATIVE METHODS, 1966–68

Country	Representative Tax System Approach		Equation A		Equation B		Equation C		Equation D	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Mali	1.4906	1	1.2456	11	1.3648	5	1.3209	7	1.3045	7
Brazil	1.4407	2	1.6938	1	1.7794	1	1.5264	2	1.4473	3
Chad	1.3427	3	1.1173	15	1.2215	9	1.3929	3	1.4497	2
India	1.3194	4	1.0193	22	1.0516	21	1.0146	24	1.0704	22
Zaïre	1.3182	5	1.4691	3	1.4350	2	1.3791	4	1.3949	5
Upper Volta	1.2567	6	1.0827	18	1.1831	10	1.1785	12	1.1937	14
Turkey	1.2424	7	1.1673	13	1.1637	14	1.1006	18	1.1233	19
Tunisia	1.2189	8	1.4314	4	1.2972	7	1.2397	9	1.2811	9
Iran	1.1978	9	1.4027	6	0.9724	28	0.9712	28	1.2924	8
Senegal	1.1949	10	1.3597	7	1.3820	4	1.3742	5	1.3251	6
Zambia	1.1677	11	1.5968	2	1.1750	13	1.1689	13	1.5219	1
Venezuela	1.1328	12	1.3525	8	0.9710	30	0.9867	26	1.2740	10
Chile	1.1239	13	1.4181	5	1.1758	12	1.0873	19	1.2108	12
Sudan	1.1145	14	1.0300	21	1.0984	18	1.1811	11	1.1760	16
Burundi	1.1076	15	0.8030	32	0.8633	32	0.9559	30	1.0162	23
Ivory Coast	1.0367	16	1.3049	10	1.4286	3	1.6294	1	1.4218	4
Ghana	1.0356	17	1.0048	26	1.0144	25	1.0791	21	1.1028	20
Morocco	1.0330	18	1.2123	12	1.1627	15	1.1411	15	1.1588	17
Tanzania	1.0191	19	1.0638	20	1.0626	20	1.2193	10	1.2037	13
Egypt	1.0109	20	1.3250	9	1.3427	6	1.3410	6	1.2521	11

Rwanda	0.9727	21	0.6944	44	0.7041	44	0.7549	40	0.8426	34
Ceylon	0.9662	22	1.1485	14	1.2697	8	1.3016	8	1.1838	15
Ethiopia	0.9559	23	0.7309	39	0.7825	37	0.8336	35	0.8812	33
Argentina	0.9314	24	1.1114	16	1.0979	19	1.0332	23	0.9922	26
China	0.9069	25	1.0356	17	1.1156	17	1.0805	20	1.0057	24
Kenya	0.8921	26	1.0179	23	1.1548	16	1.1148	17	1.0050	25
Korea	0.8553	27	0.9131	31	0.9718	29	0.9267	31	0.8993	32
Pakistan	0.8466	28	0.7055	42	0.7519	42	0.7152	43	0.7227	39
Peru	0.8317	29	0.9900	28	0.9225	31	0.8755	32	0.9004	31
Jamaica	0.8132	30	1.0126	25	1.0307	22	0.9986	25	0.9642	27
Viet-Nam	0.7901	31	1.0042	27	1.1800	11	1.0664	22	0.9509	28
Thailand	0.7878	32	0.9639	29	0.9953	26	0.9758	27	0.9274	30
Ecuador	0.7849	33	0.9571	30	0.9779	27	0.9692	29	0.9333	29
Malaysia	0.7371	34	1.0140	24	1.0156	24	1.1596	14	1.0733	21
Colombia	0.6946	35	0.7822	33	0.8034	35	0.7772	37	0.7573	38
Guyana	0.6830	36	1.0816	19	1.0266	23	1.1291	16	1.1521	18
Paraguay	0.6585	37	0.7404	36	0.8007	36	0.7625	38	0.7161	40
Indonesia	0.6421	38	0.6035	46	0.6180	47	0.6210	46	0.6517	44
Philippines	0.6418	39	0.7404	35	0.7709	39	0.7557	39	0.7132	41
Togo	0.6374	40	0.7314	38	0.7061	43	0.7545	41	0.8022	35
Mexico	0.6085	41	0.7512	34	0.7713	38	0.6939	45	0.6570	43
Trinidad and Tobago	0.5537	42	0.7357	37	0.7011	45	0.7045	44	0.7645	36
Lebanon	0.5400	43	0.6975	43	0.8578	33	0.7538	42	0.6381	45
Singapore	0.5391	44	0.5810	48	0.7523	40	0.8498	33	0.5996	46
Guatemala	0.5347	45	0.5979	47	0.6466	46	0.6117	47	0.5615	48
Costa Rica	0.5281	46	0.7161	40	0.8134	34	0.8312	36	0.7076	42
Honduras	0.5243	47	0.7072	41	0.7522	41	0.8338	34	0.7586	37
Bolivia	0.5198	48	0.6460	45	0.5376	48	0.5056	48	0.5766	47
Nepal	0.4455	49	0.2874	49	0.3000	49	0.3151	49	0.3517	49

TABLE 6. CORRELATION COEFFICIENTS BETWEEN ALTERNATIVE TAX EFFORT INDICES [1]

Equation	Equation A	Equation B	Equation C	Equation D
RTS	0.80 (0.82)	0.78 (0.77)	0.77 (0.79)	0.87 (0.88)
A	...	0.90 (0.91)	0.85 (0.87)	0.94 (0.94)
B	...	...	0.96 (0.94)	0.88 (0.87)
C	...	...	...	0.92 (0.92)

[1] Values given without parentheses are product-moment coefficients, and those with parentheses are Spearman rank correlation coefficients.

TABLE 7. SELECTED DEVELOPING COUNTRIES: COMPARATIVE TAX EFFORT RANKINGS, SHOWING LARGE RANK DEVIATIONS

Equation A	Equation B	Equation C	Equation D
Countries that are 10, or more, ranks higher with the regression approach than with the representative tax system approach			
Malaysia	Ivory Coast	Malaysia *	Zambia
Guyana	Egypt	Guyana *	Ivory Coast
Egypt	Ceylon	Egypt	Malaysia
	Viet-Nam	Ivory Coast	Guyana
	Malaysia	Ceylon	Honduras
	Guyana	Singapore	
	Lebanon	Upper Volta	
	Costa Rica	Honduras	
	Kenya		
Countries that are 10, or more, ranks lower with the regression approach than with the representative tax system approach			
Mali	India	Ethiopia	India
Chad	Iran	Turkey	Turkey
India	Burundi	Venezuela	Rwanda
Upper Volta	Rwanda *	Iran	Ethiopia
Burundi	Ethiopia	Burundi	Pakistan
Ethiopia	Pakistan	Rwanda	
Pakistan	Venezuela	Pakistan	
Rwanda *		India *	

* Denotes a deviation of 20, or more, ranks.

TABLE 8. SIMPLE CORRELATION COEFFICIENTS BETWEEN TAX EFFORT INDEX DIFFERENCES AND SELECTED INDEPENDENT VARIABLES

	Difference Between RTS Index and Tax Effort Index Calculated by			
	Equation A	Equation B	Equation C	Equation D
Per capita income	−0.50	−0.82	−0.20	−0.30
Actual tax ratio	−0.62	−0.17	−0.22	−0.52
Export ratio	−0.32	0.09	−0.28	−0.32
Import ratio	−0.52	0.03	−0.56	−0.55
Population	0.32	0.11	0.36	0.42
Mining share of income	−0.48	−0.18	0.14	−0.41
Agricultural share of income	0.78	0.62	0.31	0.43
Manufacturing share of income	−0.46	−0.70	−0.18	−0.14
Nonagricultural share of income [1]	−0.90	−0.53	−0.62	−0.69
Basic sector income [2]	−0.65	−0.42	−0.01	−0.39
Agricultural exports as a percentage of income	−0.30	0.20	−0.76	−0.64

[1] Income generated outside the agricultural sector *plus* the value of agricultural exports, as a percentage of gross national product.

[2] Income generated in mining and manufacturing *plus* the value of agricultural exports.

V. Implications of the Representative Tax Model

The basic purpose of developing a representative tax model is the derivation of estimates of relative taxable capacity, from which tax effort indices may be deduced. For purposes of comparison, taxable capacity is usually measured in terms of a ratio to GNP. However, the purpose of this section is to examine in some detail the other implications of the representative tax system model, as developed here, in order to identify the interrelations between estimated tax collections (that is, $\hat{T}$) and the various components of the economy that are explicitly considered in this analysis. It follows that this kind of analysis is applicable only to individual countries and has no comparative implications.

Consider the increase in estimated tax collections arising from another $1 of each tax base if such an expansion were possible.[34] For example, an additional $100 in imports would raise estimated tax collections by $17.25. It would be tempting to use these coefficients to establish a

[34] The use of cross-section results to imply the time behavior of these variables is questionable; however, it is assumed here for interpretative purposes that intercountry differences simulate time changes for any given country.

ranking of desirable taxable capacity effects, that is, a $100 increase in basic sector activity is preferable to a $100 increase in imports, and so on. However, this interpretation of any one coefficient requires the assumption that the remaining three bases in the system be held constant. This assumption imposes certain rigidities in the interpretation of the coefficients. Moreover, if this assumption is varied, there are several different interpretations that the model will permit. To demonstrate, equation (4) is reformulated as

$$\hat{T} = 0.0869(NA) + 0.1430(NA - S) + 0.0132(NA + A) + 0.1725(M), \quad (15)$$

where

$NA = (Y - A + Ax)$ = nonagricultural income
A = agricultural income
$S = (Y - A - I - N)$ income from other than extractive, manufacturing, and agricultural activities, that is, income generated in the tertiary sector.

The following section compares the effects on estimated tax collections of combinations of economic structure changes:

Case 1: If nonagricultural income increases by $100 while total income ($Y$) and basic sector income ($I + N + Ax$) remain constant, estimated tax collections will increase by $8.69. The increase, in this case, is a direct result of a shift from the agricultural to the tertiary sectors. There is no loss in the overall capacity to tax property, since the sum ($NA + A$) remains constant, and there is no gain in corporate income or export capacity, since tertiary activities are not directly a part of their tax base. However, the $100 increase in tertiary activity increases the urban tax base, and therefore the capacity to use internal indirect and personal income taxes, by $8.69.

Case 2: If, as in Case 1, nonagricultural income increases by $100 and basic sector income is held constant but total income (Y) is allowed to increase, estimated tax collections will increase by $10.01. The total increase is still in tertiary activity income, but since total income has now increased, the capacity for property taxation has risen by $1.32 in addition to the $8.69 increase in the capacity for sales/excise and personal income taxation.

Case 3: If nonagricultural income increases by $100 as a result of a

$100 increase in basic sector income and total income increases by this $100 amount, estimated tax collections will increase by $24.31. The marginal increase resulting directly from the corporate income and export taxes is $14.30, and the increased income generates an additional $10.01 in internal indirect, personal income, and property taxes.

Case 4: If total income (Y) increases by $100 as a result of a $100 increase in nonexport, agricultural income, estimated tax collections will increase by $1.32, that is, only the potential for property taxation will be increased. This is consistent with the assumption that the agricultural share of income is a return to the subsistence agricultural sector and is therefore outside the purview of personal income and sales taxation.

These four cases [35] illustrate somewhat better the meaning and assumptions of the model developed here, and the "economic reasonableness" of the implications. Oversimplification aside, two points are clear. First, productivity increases (or external price increases) in the nonagricultural sector will raise estimated tax collections by a greater amount than will an equivalent increase in nonagricultural income that is brought about by a purely sectoral redistribution of income, for example, as might result from rural/urban migration. Second, this increase in the yield of a representative system will be markedly greater to the extent that the total income rise is attributable to the basic rather than to the tertiary sector.[36] These two points are not raised to demonstrate any

[35] It was assumed in each case that total imports remain constant.

[36] It could be argued that the marginal effects described above are not comparable, since, for example, a $100 difference in imports is greater in terms of percentage than a $100 difference in nonagricultural income. To compensate for these scale differences, elasticities at the mean value of each of the four tax bases were computed under alternative assumptions as to which bases would be held constant. For example, the elasticity (η_M) of the import base component was computed from

$$(\eta_M) = \frac{\partial \hat{T}}{\partial M} \cdot \frac{\Sigma M}{\Sigma \hat{T}} = (0.1725)\left(\frac{\Sigma M}{\Sigma \hat{T}}\right) = 0.2185,$$

that is, a 1 per cent increase in imports, holding constant all other variables in the representative tax system, results in a 0.2185 per cent increase in estimated tax collections. Such elasticities may be used to rank the effects of various combinations of changing economic structure on estimated tax collections. The results indicate that the representative tax yield responds most to a net increase in income that is attributable solely to a 1 per cent increase in basic sector income—for every 1 per cent increase in total income that is attributable solely to the basic sector, estimated tax collections will rise by 0.9317 per cent. The lowest responses are associated with increases in income attributable solely to the agricultural sector.

particular tax policy implications but only to suggest possible explanations for different secular tax performances of developing countries.

The discussion in this section has centered on estimated tax collections rather than on the estimated tax ratio. The relationship between the two (when total income increases) is a function of the existing estimated tax ratio, that is, if the increase in estimated tax collections for each $100 increase in income is greater than the existing estimated tax ratio, the income increment will result in an increase in the expected tax ratio, that is, in taxable capacity.

Finally, although the representative tax system and the regression models are different approaches to the question of comparative tax performance, their implications as to the relationship between economic structure and taxable capacity are somewhat similar. Exact comparisons of the implications of various tax effort models, for the effects of sectoral redistributions in the composition of total income on taxable capacity, are not possible, because different sets of variables have been used in each case. However, it is possible to make certain general comparisons that indicate the consistency of the models. From studies that have used the agricultural share as an independent variable, it is possible to derive comparable measures of $\frac{\partial \hat{T}}{\partial A}$: -0.0869 from the representative tax system approach, -0.0742 from the earlier regression study by the author, and -0.1077 from the UNCTAD study. In all cases, an increase in agricultural income not accompanied by an increase in total income is associated with a decline in overall taxable capacity. Since each of these three models either implicitly or explicitly holds that a given amount of income is more "taxable" in the nonagricultural than in the agricultural sector, it follows that a redistribution of income toward the latter will necessarily reduce overall taxable capacity. Conversely, reductions in the agricultural share with total income held constant will increase total taxable capacity.[37] Specifically, in the representative tax system, a shift of $100 in income to the tertiary sector from the agricultural sector results in an increase of $8.69 in the capacity to collect personal income and internal indirect taxes. Had the redistribution been from agriculture to the mining sector, the increase would have

[37] Although Lotz and Morss did not use the agriculture variable directly, the implications of their results are similar because of the strong negative intercorrelation between per capita income and agricultural share, that is, -0.78 for these 49 countries.

been greater, as is demonstrated above. However, conceptual differences exist along these lines between the representative tax and regression models. For example, in those versions of the regression approach where the mining share is treated as an independent variable, the estimating equation would imply that a shift from the manufacturing to the mining sector would increase taxable capacity. On the other hand, the representative tax system would predict no change in taxable capacity as a result of such a shift.

VI. Conclusions

The application of a representative rate structure to a set of assumed tax bases for 49 developing countries gives a distribution of tax effort indices that does not differ significantly from that obtained in earlier regression analyses. However, the representative tax system approach does possess the flexibility to permit a direct intercountry comparison of the intensity of use of various tax bases.

There are three general findings of the empirical analysis presented above. First, the level of taxable capacity responds most to changes originating in basic sector income (mining, manufacturing, and agricultural exports). Second, the yield of a representative system is more responsive to a change in income generated in a particular sector if it is accompanied by a change in total income than if it reflects only a sectoral redistribution of some constant amount of income. For example, an increase in domestic sector agricultural income will have a small positive effect on the expected yield of the tax system if it reflects a total income increment, but it will tend to reduce overall taxable capacity if it reflects a purely sectoral redistribution of income. Whether or not taxable capacity ($\hat{T}_y$) rises in the first case will depend on the relationship between the existing average ratio (T_y) and the marginal tax increment per currency unit of income $\frac{(\Delta \hat{T})}{(\Delta Y)}$.

Third, the criticism that tax effort indices and rankings vary erratically with changes in the estimating procedure used is not strengthened here, since the representative tax system approach and the three variants of the regression approach presented above give roughly similar results. However, to say that the alternative arrays of indices and ranks are not

significantly different is not to say that the position of individual countries is invariant with respect to the procedure used, but rather that there is generally a systematic relationship between any two sets. Most large differences in the relative position of various countries as between the representative tax system and the regression approaches may be traced to the method used in considering agricultural exports and to the use of the agricultural income share as an estimator of taxable capacity.

There is much similarity among the three indices with respect to the countries that show very low tax efforts. If the tax effort analysis is pointed essentially toward identification of countries where tax effort seems low, by comparative standards, this consistency is heartening.

Finally, the major limitations of the present analysis should be reiterated. First, data limitations resulted in the use of crude proxy measures for the tax bases. Since these measures were selected on subjective grounds, there is considerable room to argue for a set of alternative measures. Second, the unavailability of data resulted in using only 26 of the 49 countries to calculate the average effective rate of personal and corporate income taxes. To the extent that the countries not included depart from the average effective rate, these omissions bias the result. Third, there is an inherent problem with the representative tax system approach in this study, namely, if there does exist a substitution effect between any of the four tax classes considered, the taxable capacity estimate will be biased. For at least these reasons, the major contribution here may be said to be methodological.

APPENDICES

I. Note on Sources and Classification of Tax Data

Sources

Fiscal data have been taken mainly from government sources, such as budget documents or reports of the comptroller general. Where fuller coverage was found in other official documents, for example, central bank reports, they were used. Sometimes, where consolidated government sector accounts were not readily available directly from published official sources, unpublished (nonconfidential) figures supplied to the International Monetary Fund have been taken.

GNP data have been taken mainly from the United Nations, *Yearbook of National Accounts Statistics* and the International Monetary Fund, *International Financial Statistics* (*IFS*). In some cases, unpublished estimates available in the Fund have been used. For Burundi, Chad, Mali, Nepal, Rwanda, Senegal, Somalia,

the Sudan, Tanzania, Togo, Upper Volta, and Pakistan (first period), only GDP figures were available. For all other countries, GNP figures have been used. Data on the shares of different production sectors in GDP have also been taken mainly from United Nations sources, but certain other sources have been resorted to for a few countries.

Data on imports and exports have been taken mainly from the *IFS*.

The main limitation in relation to the tax data is that local governments could not be covered in all cases. Aside from this, the tax figures for different countries are comparable. But as regards national income data, more than one source has had to be used. This means that the comparability of estimates, which are in any case subject to well-known limitations, is further reduced. This limitation should be kept in mind throughout.

CLASSIFICATION OF TAX DATA

Taxes on income and profits

(1) Company: corporate profits taxes, franchise tax (for example, *patente*), minimum tax, and taxes withheld on dividends, interest, and royalties (unless they are clearly chargeable to resident individuals).

(2) Personal: income taxes on individuals and noncorporate entities, withholding taxes on wages and salaries, and payroll taxes (other than social security).

Poll or personal taxes

Poll, hut, and similar taxes, including those based on animals owned. The *tertib* on animals, trees, and crops in Morocco and the *canoun* in Tunisia are also included under this heading.

Property taxes

Taxes on real estate and net wealth (including land revenue), taxes on property transfer, gift and death taxes, and taxes on motor vehicles.

Taxes on production and internal transactions

(1) Excises: include also fiscal monopoly profits and the *taxe unique* (in French West and Equatorial Africa).

(2) Sales taxes: general as well as selective sales taxes, including special taxes on entertainment, services, and contractors.

(3) Other taxes on internal transactions: taxes on gambling, license duties, stamp duties other than on property transfer, and all other internal indirect taxes not otherwise identified.

Taxes on international trade

(1) Import duties and taxes: exchange taxes attributable to imports, customs duties, and other taxes on imports, such as consular duties and "statistical" duties.

(2) Export taxes: all export taxes and cesses, marketing board profits, and exchange taxes and profits not specifically attributable to the import base, and miscellaneous duties.

II. Note on Substitutability

To use exports as the export tax proxy base and basic sector income as the corporate tax proxy base would result in an assumption that taxable capacity is a function of the existing choices made by countries between export and corporate income taxation. Specifically, the use of different proxy bases for these two taxes would result in a different average effective rate than the 0.1430 presented in Table 2, and therefore the estimated taxable capacity for each country would be affected. To demonstrate for a hypothetical two-country, two-tax case, note that:

$$\hat{T}_1 = \frac{1}{2}\left[\frac{C_1}{B_1} + \frac{C_2}{B_2}\right]B_1 + \frac{1}{2}\left[\frac{E_1}{X_1} + \frac{E_2}{X_2}\right]X_1, \tag{16}$$

where

$\hat{T}_1$ = taxable capacity of country 1
C_1 = corporate tax collections in country 1
B_1 = "basic" sector income in country 1
E_1 = export tax collections in country 1
X_1 = value of exports in country 1.

Rearranging equation (16), derive

$$\hat{T}_1 = \frac{1}{2}\left[C_1 + E_1\right] + \frac{1}{2}\left[C_2\frac{B_1}{B_2} + E_2\frac{X_1}{X_2}\right]. \tag{17}$$

The second term on the right side of equation (17) shows that taxable capacity in country 1 is a function of the choice between export and corporate income taxation in country 2, given that both countries raise the same total amount from combined corporate income and export taxation, and given that

$$\frac{X_1}{X_2} \neq \frac{B_1}{B_2}.$$

If the same base is used for the two taxes, that is, if $B_1 = X_1$ and $B_2 = X_2$, and noting this base as G_1 and G_2, respectively, then equation (17) becomes

$$\hat{T}_1 = \frac{1}{2}\left[C_1 + E_1\right] + \frac{1}{2}\frac{G_1}{G_2}\left[C_2 + E_2\right] \tag{18}$$

and taxable capacity of country 1 is responsive to the relative size of the assumed base in the two countries and to the *total level* of usage of the two taxes, rather than to intercountry differences in the relative use of either tax.

The analysis above could easily be extended to show that total taxable capacity as estimated from a representative tax model is subject to the same kind of error, that is, country choices of an overall tax mix influence the estimate of total taxable capacity. This shortcoming is treated in only two cases in this analysis because the case for intertax substitutability, on an a priori basis, seems strongest.

Méthode utilisant un système fiscal représentatif pour mesurer l'effort fiscal dans les pays en voie de développement

Résumé

L'objet de cette étude est de mesurer et de comparer la capacité contributive et l'effort fiscal à l'aide d'un système fiscal représentatif, c'est-à-dire d'une méthode établissant une relation entre l'indice de l'effort fiscal et le degré d'utilisation des différents impôts. D'après cette méthode, les taux moyens effectifs sont calculés séparément pour a) les impôts sur le revenu des personnes physiques, b) les taxes sur le chiffre d'affaires, droits indirects et autres impôts et taxes indirects intérieurs, c) les impôts sur la propriété, d) les impôts sur les bénéfices des sociétés, e) les taxes à l'exportation, et f) les taxes à l'importation, par rapport à une série de bases d'imposition approximatives. [C'est-à-dire calculées de manière à être représentatives des bases réelles.] Les taux moyens effectifs ainsi obtenus sont alors considérés comme "représentatifs". On les applique aux bases d'imposition approximatives et l'on obtient une estimation de la capacité contributive — c'est-à-dire du montant que le pays pourrait percevoir s'il appliquait ces taux moyens effectifs. Le quotient entre les recouvrements effectifs et cette estimation de la capacité contributive représente l'indice de l'effort fiscal; l'auteur décrit ensuite une méthode permettant de décomposer cet indice en vue de déterminer la part de chaque impôt dans un effort fiscal faible ou élevé.

Ce modèle permet non seulement de procéder à une analyse de la relation entre le niveau global d'imposition et le degré d'utilisation des différents impôts, mais il permet également de dégager des conclusions relatives aux résultats comparatifs qui rejoignent celles des autres études de la présente série. Par exemple, le niveau de la capacité contributive réagit principalement aux variations enregistrées par le revenu des secteurs de base de l'économie (industries extractives, industries de transformation et exportations agricoles). Enfin, la critique selon laquelle des indices d'effort fiscal ainsi que leur classement varient irrégulièrement en fonction des méthodes d'évaluation utilisées perd ici de sa valeur puisque la méthode du système fiscal représentatif et les variantes de l'analyse de régression, examinées dans les deux premières études de la présente série, donnent grosso modo des résultats semblables.

Un método de sistema tributario representativo para medir el esfuerzo tributario de países en desarrollo

Resumen

Este estudio tiene por objeto medir y comparar la capacidad y el esfuerzo tributarios usando un método de sistema tributario representativo, es decir, relacionando el índice de esfuerzo tributario con la intensidad con que se usan los distintos impuestos. Concretamente, se calcula por separado la tasa media efectiva de a) los impuestos a la renta personal, b) los impuestos sobre las ventas, impuestos específicos al consumo, y otros impuestos indirectos, c) los impuestos sobre la propiedad, d) los impuestos sobre la renta de las empresas, e) los impuestos a la exportación, y f) los impuestos a la importación, con respecto a un conjunto de aproximaciones a las bases tributarias. Luego, se toman como "representativas" las tasas medias efectivas resultantes, y se aplican a las bases aproximadas, obteniéndose así una estimación de la capacidad tributaria—es decir, de la cantidad que podría recaudar cada país si aplicara las tasas medias efectivas. El cociente entre el resultado fiscal efectivo y la capacidad estimada nos da un índice de esfuerzo tributario; luego se expone un método para desglosar este índice a fin de medir la contribución de cada impuesto a hacer que el esfuerzo tributario sea mayor o menor.

Además de permitir un análisis de la relación entre el nivel tributario global y la intensidad con que se usan los distintos impuestos, este modelo presenta conclusiones sobre los resultados tributarios comparados, que son semejantes a los obtenidos en los trabajos anteriores de esta serie. Por ejemplo, el nivel de la capacidad tributaria reacciona principalmente ante las variaciones que se originan en el ingreso de sectores básicos (la minería, las manufacturas, y las exportaciones agrícolas). Finalmente, no se ve confirmada aquí la crítica de que los índices de esfuerzo tributario y las posiciones relativas varían en forma errática al variar el procedimiento de estimación utilizado, pues tanto el método de sistema tributario representativo como las variantes del método de regresión presentado en los dos primeros estudios de esta serie dan resultados bastante similares.