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Personal Income Taxes in Developing Countries

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Comparative work on income taxes in developing countries has commonly looked at average tax rates. These rates are often constructed by dividing revenue collections by some measure of private or personal income. Recent controversies have, however, focused on the incentive effects of marginal tax rates. This article develops and applies a simple methodology to compare marginal official tax rates across a sample of fifty developing countries. As would be expected given differences in fiscal capacity, the poorest and the lower-middle-income countries impose relatively low marginal rates, and the rates for the upper-middle-income and developed countries are higher. Conversely, several low- and lower-middle-income countries' tax thresholds start at income levels which are low relative to their mean income when compared with those of developed countries. The results warn against trying to derive information on the disincentive effect of a country's tax schedule from the highest marginal rate; our data show that this is not an accurate indicator of overall disincentive effects.

Governments have adopted income tax systems which vary in both scope and scale. This article presents information on marginal tax rates in a detailed cross-country comparison of the structure of personal income taxes in which an estimated "average" of family income is used to suggest the scale and breadth of coverage. Attention is focused on developing countries.

In many past studies, the scale of different taxes has been evaluated by comparing the ratio of total tax revenues with gross domestic product (GDP). A further refinement to measuring the relative size of income tax revenues is to define a base other than GDP and to calculate an average tax rate relative to this base (Tait, Gratz, and Eichengreen 1979; Chelliah, Baas, and Kelly 1975). The scope or breadth of coverage of the income tax can be assessed by comparing the share of total revenues accruing from households at different income levels.

Past studies do not, however, effectively address the central issue of the distorting consequences of the tax system. The income tax is the most commonly used tax instrument for income redistribution and has been at the center of discussions on the distorting effect of high marginal rates of taxation (Feldstein

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1986; Fullerton, 1982; Cantor and others 1983). Tax evasion and behavior changes may incur real resource costs, as the rent-seeking literature reminds us. Tanzi (1987) shows that personal income tax revenues are 11 percent of the total revenues of the eighty-two countries covered by his study, a ratio significantly smaller than that of developed countries because of the extent of evasion and the high level of exemptions.

Any analysis of the distortions caused by the tax system requires information on the effective marginal tax rates faced by different taxpayers. In the absence of such information, attention has often been focused on the highest marginal rate. In this article it is shown how misleading the arbitrary selection of one nominal marginal rate, such as the highest one, can be in assessing the overall disincentives created by the tax system of a country.

The information presented below indicates the relative incentive to evade taxes or to change economic behavior that is created by the different tax rates at increasing income brackets, if tax collection is effective. This study can form the basis for preliminary discussion of income tax reform to alleviate the costs of evasion and economic disincentives. It can be seen as one in a series of steps designed to evaluate differing tax schedules. In order to simplify and thus allow cross-country comparison, the article does not incorporate differences in family size, number of income earners per household, income distribution, or the relative strictness of enforcement. This type of detail should be added for any discussion of income tax policy reform for a single country.

I. The Methodology

The typical income tax system can be thought of at the simplest level as consisting of three elements: the deductions which can be netted out of gross income to yield net taxable income; the income tax rate schedule which applies to net income; and the credits deductible from the resultant tax liability. Deductions and credits vary in general with the income source (salary, interest, dividends, perquisites); with the purpose of the deduction or credit (life or medical insurance premiums, mortgage interest, losses from theft or natural calamities); and with personal circumstances (number of dependents, working status of spouse). These deductions vary not only with gross income but also for different taxpayers with the same gross income.

Several studies of countries in the Organisation for Economic Co-operation and Development (OECD) have solved this problem by selecting a typical taxpayer. These studies compare the tax rate faced by the average production worker heading a hypothetical family of four (see, for example, OECD 1980, 1983). Such an approach is not very useful, however, in comparing our large sample of highly diverse developing countries. Because complete information on the typical worker is not available for all fifty countries in the sample, the income tax base can vary so widely that many poor countries may not even tax the "typical worker," and tax structures are much less homogeneous compared

with those of the OECD countries, comparison is much less informative and could even be quite misleading.

A choice must therefore be made between accounting for all these deductions and credits in a few countries or taking account of only the standard deductions and credits so as to compare a larger number of countries. The second approach is adopted in this article.[1] We focus on wage and salary earners only, to avoid the complexities of capital taxation. The variations in household and family structure across countries are avoided (as in the OECD study) by focusing on married couples with one income earner and three children, the average family size in developing countries (World Bank 1985). Further, only standardized deductions and credits related to the family or linked to wage and salary income are subtracted from gross income to obtain taxable income.

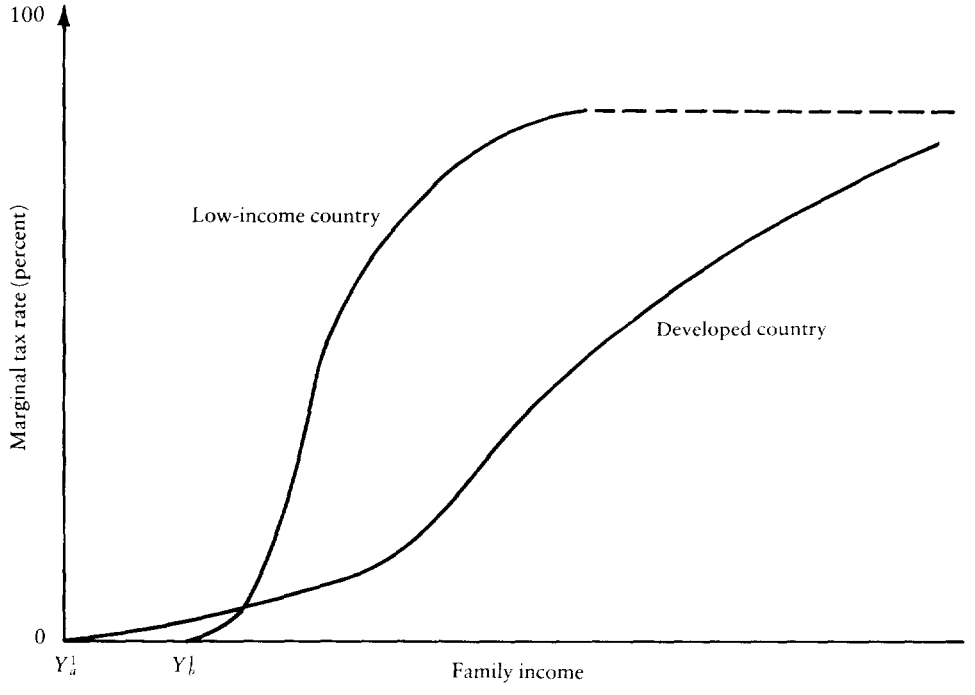
The effective marginal tax rate at any gross income level is obtained by applying the countries' tax rate at that income level to the taxable income. As income tax schedules are almost universally piecewise linear, the nominal marginal rates obtained rise in steps. Figure 1 shows hypothetical (smoothed out) marginal tax schedules for a low-income and a developed country. Even if the two countries had similar per capita income levels, the schedules could cross. In countries with widely different per capita income levels, a crossing such as that depicted in figure 1 is likely.

For purposes of comparison, gross family income is measured relative to each country's mean family income, which is defined for our hypothetical single taxpayer family of five people as five times per capita GDP. GDP is the most reliable and current number available for comparison across such a large group of developing countries. Though this measure is likely to overestimate mean family income, the bias is not likely to distort the overall comparison. A more important potential source of bias for the few developed countries included in our sample is the assumed family size. As the developed countries typically have families of less than five, this will tend to overstate their average and marginal tax rates relative to those of the developing countries.

The income threshold at which a positive tax payment must be made, or the maximum of the zero tax bracket (Y^*), will just equal the sum of standard deductions and the basic exemption. Y^* is also measured relative to per family GDP (FGDP). Because allowable deductions, the zero bracket, and tax credits have been accounted for in determining Y^*, the ratio of the threshold income level over "average" family income (Y^*/FGDP) defines a comparative *tax threshold index*. If the index is zero, all income is subject to the tax. If the value is 0.5, families with an income of less than half FGDP are not subject to any tax, whereas families with income equal to FGDP pay a tax on half their income. The larger the deductions, credits, and zero bracket, the greater this index value and the smaller the tax base.

1. Readers interested in further detail for each country are referred to the appendix in Sicat and Virmani (1987).

Figure 1. *Marginal Tax Schedule for Two Diverse Countries*



The income level at which the tax rate reaches the highest marginal rate is similarly measured relative to FGDP. This provides a basis for judging the proportion of taxpayers to which the highest rate may apply. The comparative analysis is based on this, the threshold income level defined above, and four other income levels (which are 3/4 of mean FGDP, mean FGDP, 2 times FGDP and 3 times FGDP). Summary marginal effective tax schedules for each country are thus defined in terms of family income at these six levels.[2]

II. The Income Tax Base

In developing countries an important and often legitimate reason for limiting the size of the income tax base is administrative feasibility. The existence of a large informal sector makes it difficult to categorize and collect taxes. Thus smallholders in agriculture, small retail services, and small industrial establishments are often exempted from many types of taxes. In poor countries the

2. A single measure of the mean marginal tax rate or the mean average tax rate for all taxpayers in a country requires information on either the general or the taxpayer income distribution. As these are readily available for relatively few countries, such a measure is beyond the scope of the current study (see Virmani 1986, which studies the case of India).

proportion of people facing absolute poverty may be larger, and this also restricts the base. Administrative costs may also be used, however, as an excuse for giving special exemptions to favored taxpayers and political pressure groups. The present calculations do not account, however, for "special" elements of the base such as excluded income sources and exceptional deductions and credits.

The tax threshold index (Y^*) for all countries is shown in table 1, whereas table 2 groups countries by ranges of this index. Under the low income countries category, it is surprising to find five countries with an almost universal income tax base. According to this index, the low-income countries with an index close to zero are Burkina Faso, Chad, Ghana, Madagascar, Malawi, and Somalia, whereas among the lower-middle-income countries, Côte D'Ivoire, Liberia, Morocco, and Nigeria also have a zero index; all are in Africa.

For a substantial range of incomes, many of the countries with a relatively broad base also have fairly low tax rates (see table 1). Among the low-income countries, Madagascar has a marginal tax rate of less than 10 percent up to an income level equal to 3 times FGDP. Malawi's marginal rate does not reach 10 percent till it reaches an income level equal to 2 times FGDP, whereas that of Burkina is less than 10 percent at the FGDP level. Among the lower-middle-income countries, the Côte D'Ivoire has a rate of 2 percent even at 3 times FGDP. The case of Côte D'Ivoire is particularly interesting because it has fairly low, almost uniform rates for much of its population. The simple rate structure probably makes it easier to administer a universal tax. The tradeoff between simplicity and administration costs needs to be investigated further.

All the countries with a zero index appear to have a broader base than the three developed countries included for comparison, which have indexes falling in the 0.11–0.2 range (table 2). Thirty-five of the countries, however, have a narrower base than these developed countries. Table 2 shows that thirteen countries have an index between 0.1 and 0.2 and that twelve countries have an index between 0.2 and 0.5. These form the broad midrange of countries within which the base appears to be reasonable.

Countries with a high threshold level of taxable income, which suggests a relatively narrow base, seem more consistent with expectations. The low-income countries with the highest indexes, Bangladesh and India, are both relatively large, poor countries. Within the low-income group, Niger and Pakistan also appear to have a relatively narrow base. Niger has a very narrow base given its rather small population.

Among the lower-middle-income countries, exceptionally high index values (greater than two standard deviations from the group average) are found for Indonesia and Guatemala. Indonesia fits the pattern of a large, populous country that has potentially high administration costs and thus an expectedly lower tax base. Guatemala's tax base appears to be even narrower for its size than Niger's. Among the upper-middle-income countries, Argentina has an exceptionally narrow base, which seems to be too extreme to be explained by its large size alone.

Table 1. *Marginal Tax Rates and Tax Threshold Index, 1984–85*

Number	Within-group number		Tax threshold index (Y*/FGDP) (1)	Marginal tax rate on first bracket (percent) (2)	Marginal tax rate on 3/4 FGDP (percent) (3)	Marginal tax rate on FGDP (percent) (4)	Marginal tax rate on 2 FGDP (percent) (5)	Marginal tax rate on 3 FGDP (percent) (6)	Marginal tax rate on highest bracket (percent) (7)	Ratio of highest bracket to FGDP (8)
Low-income countries										
1	1	Ethiopia	0.42	10.0	10.0	10.0	10.0	13.0	85.0	31.22
2	2	Bangladesh	1.56++	2.5	0.0	0.0	10.0	20.0	65.0	15.05
3	3	Mali	0.34	10.0	10.0	18.0	25.0	35.0	70.0	4.94
4	4	Zaire	0.75	4.0	10.0	12.0	18.0	22.0	60.0	9.11
5	5	Burkina Faso	0.00	2.0	5.0	8.6	16.3	16.3	30.0	9.71
6	6	Burma	0.65	4.0	4.0	4.0	7.0	10.0	75.0	43.11
7	7	Malawi	0.00	3.0	—	3.0	10.0	20.0	50.0	19.00
8	8	Niger	0.92	2.0	0.0	1.8	5.4	5.4	72.0	41.58
9	9	Tanzania	0.69	20.0	20.0	20.0	25.0	30.0	95.0	19.93
10	10	Somalia	0.00	5.0	21.0	36.2	56.1	56.1	56.1	1.57
11	11	India	1.56++	33.0	0.0	0.0	28.0	39.1	62.0	7.79
12	12	Benin	0.23	4.5	10.2	10.2	16.6	20.1	66.0	12.00
13	13	Ghana	0.02	5.0	60.0	60.0	60.0	60.0	60.0	0.18
14	14	Madagascar	0.00	na	3.1	3.5	6.7	9.7	60.0	36.27
15	15	Sierra Leone	0.13	2.4	21.5	27.0	51.0	57.5	70.0	6.28
16	16	Sri Lanka	0.30	9.3	17.5	28.5	55.0	55.0	61.5	1.66
17	17	Kenya	0.86	10.0	0.0	10.0	15.0	25.0	65.0	11.50
18	18	Pakistan	0.88	15.0	0.0	—	35.0	50.0	60.0	5.76
19	19	Sudan	0.18	5.0	15.0	20.0	30.0	40.0	60.0	4.51
20	20	Chad	0.00	16.0	15.4	15.4	15.4	21.6	65.0	46.78
Lower-middle-income countries										
21	1	Senegal	0.49	5.0	9.3	9.3	9.3	19.4	65.0	70.97
22	2	Liberia	0.00−	12.0	12.0	15.5	24.5	31.5	73.0	37.59
23	3	Yemen A.R.	0.17	3.0	12.0	15.0	15.0	15.0	15.0	0.85
24	4	Indonesia	1.29++	15.0	0.0	0.0	15.0	15.0	35.0	22.43
25	5	Zambia	0.75	5.0	5.0	5.0	20.0	20.0	80.0	7.41
26	6	Egypt A.R.	0.33	2.0	16.3	23.0	31.0	32.9	73.0	76.80

27	7	Côte d'Ivoire	0.00−	2.5	1.2	2.2	2.2	2.2	72.5	239.61
28	8	Zimbabwe	0.33	12.0	2.0	2.0	28.8	30.0	63.0	9.33
29	9	Morocco	0.00−	0.3	11.9	13.1	18.6	34.0	80.2	33.33
30	10	Philippines	0.44	1.0	7.0	11.0	15.0	19.0	35.0	13.65
31	11	Nigeria	0.00−	10.0	1.0	10.0	15.0	20.0	70.0	11.72
32	12	Thailand	0.47	7.0	7.0	7.0	17.0	22.0	65.0	21.35
33	13	Peru	0.82	2.0	0.0	4.0	18.0	34.0	65.0	14.24
34	14	Guatemala	1.26++	5.0	0.0	0.0	6.8	9.5	48.0	87.33
35	15	Turkey	0.06	36.0	36.0	40.0	40.0	48.0	65.0	20.72
36	16	Tunisia	0.19	5.3	24.7	42.6	63.3	67.3	89.3	25.07
37	17	Jamaica	0.45	30.0	45.0	57.5	57.5	57.5	57.5	0.94
38	18	Ecuador	0.35	8.0	20.0	20.0	26.0	29.0	46.0	9.99
39	19	Colombia	0.06	7.0	20.0	24.0	39.0	44.0	49.0	12.14
Upper-middle-income countries										
40	1	Jordan	0.51	5.0	3.8	5.0	15.0	20.0	45.0	10.60
41	2	Malaysia	0.47	6.0	15.0	20.0	40.0	45.0	55.0	4.41
42	3	Chile	0.95	8.0	0.0	8.0	13.0	18.0	54.0	11.15
43	4	Brazil	0.59	5.0	10.0	15.0	35.0	45.0	60.0	7.36
44	5	Korea, Rep.	0.39	7.1	10.6	14.0	31.0	44.6	70.1	8.06
45	6	Argentina	1.16++	6.4	0.0	0.0	16.0	22.8	54.0	7.90
46	7	Portugal	0.20	5.5	29.5	39.5	67.5	95.5	95.5	2.21
47	8	Mexico	0.14−	3.1	20.5	24.2	34.0	40.0	55.0	11.16
48	9	Greece	0.54	12.1	48.3	52.9	62.1	66.7	69.0	3.41
49	10	Hong Kong	0.37	5.0	25.0	25.0	17.0	17.0	25.0	0.21
50	11	Singapore	0.08−	3.6	22.5	27.0	32.0	36.0	40.5	10.66
Industrial countries										
		Ireland	0.16	35.0	60.0	66.0	66.0	66.0	66.0	0.72
		Japan	0.11	14.5	44.0	50.0	71.0	77.0	84.0	6.93
		United States	0.12	11.0	38.0	42.0	49.0	50.0	50.0	2.34

n.a. Not available.

Note: Y* = threshold income or maximum nontaxable income level; FGDP = family per capita GDP (five times GDP per capita).

+, − stand for number of standard deviations above (+), and below (−) the mean of the income group. For instance India's index is between 2 and 3 standard deviations above the mean for the low-income countries.

Source: Derived from tax information mainly from the Bureau of International Fiscal Documentation. For details, see Sicat and Virmani (1986).

Table 2. *Countries Grouped by Range of Tax Base Index*

Range of tax base index (Y/FGDP)*	*Countries in the range*
0.00	Low-income: Burkina Faso, Malawi, Somalia, Madagascar, Chad Lower-middle-income: Liberia, Côte d'Ivoire, Morocco, Nigeria
0.01–0.20	Low-income: Ghana, Sierra Leone, Sudan Lower-middle-income: Colombia, Turkey, Yemen A.R., Tunisia Upper-middle-income: Singapore, Portugal, Mexico Industrial: Ireland, Japan, United States
0.21–0.50	Low-income: Benin, Sri Lanka, Mali, Ethiopia Lower-middle-income: Egypt A.R., Zimbabwe, Ecuador, Senegal, Philippines, Thailand, Jamaica Upper-middle-income: Malaysia
0.51–0.80	Low-income: Burma, Tanzania, Zaire Lower-middle-income: Zambia Upper-middle-income: Greece
0.81–1.00	Low-income: Kenya, Pakistan, Niger Lower-middle-income: Peru Upper-middle-income: Chile
1.01–1.40	Lower-middle-income: Indonesia, Guatemala Upper-middle-income: Argentina
1.41–1.60	Low-income: Bangladesh, India

Note: Y* = threshold income or maximum nontaxable income level; FGDP = family per capita GDP (five times GDP per capita).

Source: Derived from table 1.

III. Highest Bracket and Marginal Rates

Impressionistic statements about comparative tax rates sometimes single out the highest marginal tax rate. The highest tax rate is a measure which has some value in comparing countries with similar income levels and a measurable fraction of income earners in this bracket. But in some of the poorer developing countries, such rates may apply only to a handful of individuals. In many countries, few earners will actually pay these rates because of tax evasion. This provides a measure of the incentive for evasion and corruption (see, for example, Virmani 1983). The income (relative to FGDP) at which this highest rate applies is an important element in judging the importance of this rate within the entire tax schedule.

The importance of the tax bracket level can be seen from the following illustrative calculation. Under the assumption that income is distributed log normally, the National Council of Applied Economic Research survey of India for 1975–76 is used to calculate the mean and variance of the income distribution. Using tables for the normal distribution, we find that only 0.05 percent of the population has an income greater than 5 times mean per capita income. If every family had the same number of members and only one income earner, this also

implies that only 0.05 percent of families have income greater than 5 times FGDP. That is, if the same distribution applied to a country of 50 million people with 10 million families, only 5,000 families (taxpayers) would have an income greater than 5 times mean FGDP. The number would fall to insignificant levels at 20 to 30 times mean income.

Table 1 presents the high tax bracket income level relative to FGDP (column 8) along with the highest marginal tax rates (column 7). Among the low-income countries, Burma, Ethiopia, Niger, and Tanzania have the highest marginal rates, ranging from 95 to 72 percent. For all these countries the income level at which these rates apply is 20 or more times FGDP. In the case of Burma, a marginal tax rate of 75 percent becomes applicable at an income level equal to 43 times FGDP. The number of people with this level of income can probably be counted on one hand, and it seems highly unlikely that anyone officially declares incomes at these levels. Similar arguments apply to Ethiopia and Niger, and the high rates appear quite meaningless for a realistic discussion of incentive effects. In the latter three countries marginal tax rates are a relatively low 5–13 percent at 3 times FGDP.

Tanzania has a 30 percent marginal rate at 3 times FGDP and a 95 percent rate at 20 times FGDP. Though only a small fraction of the population is likely to have income levels of 20 times FGDP, high marginal rates come in at relatively low income levels in Tanzania. Similarly, Mali and Sierra Leone also have high rates at relatively low income levels: though the highest rate is only 70 percent in both, it applies at 6 and 5 times FGDP, respectively.

Among the lower-middle-income countries, the highest bracket marginal tax rate of six countries is greater than 70 percent. Of these, five countries have the highest tax rate applying at incomes which are more than 25 times FGDP. For four of these countries, Côte D'Ivoire, Egypt, Liberia, and Morocco, the high rates of 73 to 80 percent seem quite irrelevant. For example, in the case of Côte D'Ivoire, the 73 percent rate becomes applicable at 240 times FGDP! The fifth country, Tunisia, has the highest marginal rate in the group, 89 percent. The fact that it applies at income levels of 25 times FGDP seems to indicate that this too is never applied. But even at 3 times FGDP, Tunisia has a marginal tax rate of 67 percent, the highest rate at this level for the lower-middle-income countries. This indicates that high marginal rates may have significant incentive effects in Tunisia. Portugal has the highest marginal rate in the entire set of countries. This rate applies at an income level less than 3 times FGDP and thus is likely to be important for incentives.

In some countries the extremely high marginal tax rates on a very small number of taxpayers raise questions about the intent of the tax schedule. In economic terms, if there is no individual with a present or potential income at which the rate applies, the rate is irrelevant. It could therefore be reduced to zero without having any economic effect. The question is why countries have such high rates on mythical income. The answer may be a mix of sociopolitical pressures and a wild hope that somebody will pay these high rates.

IV. Effective Marginal Tax Rates

As discussed in section I, the four income levels we use to define a summary effective marginal tax schedule for each country, assuming taxpayer compliance, are the four multiples of FGDP (3/4, 1, 2, and 3). These are also shown in table 1. In the absence of detailed earner information either from the returns of all tax filers or from an income distribution survey, we can only illustrate the applicability of these rates by using the previously mentioned data on India. Given the assumption of log normal income distribution, these data suggest that 25–50 percent of families have income above the FGDP, 6.5 percent of families have income greater than 2 times FGDP, and 1 percent of families have income greater than 3 times FGDP. Given that only 0.05 percent of families have income greater than 5 times FGDP, we conclude that a majority of taxpayers have income less than 4 times FGDP. For most developing countries, the bulk of tax revenues are also likely to accrue from those with income greater than FGDP. In a more detailed study, Virmani (1986) finds that fewer than 3.5 percent of earners in India were liable for a positive tax in a single year.

A ranking of countries by marginal tax rates provides a useful frame of reference for determining which income levels have a more representative tax structure than others. The Spearman's rank correlation coefficient of the ranking at different multiples of FGDP is a useful index for this purpose. We find that the correlation coefficient is 0.96 for the ranks at 3/4 FGDP and FGDP, and for 2 times FGDP and 3 times FGDP. The same pattern of relatively high correlations is found for countries ranked within the income groups. The rank correlation coefficient between the ranks at 1 and 2 times FGDP, however, is much lower at 0.8. The pattern of rank correlation coefficients suggests that the structure of taxes changes most significantly between 1 and 2 times FGDP in many countries. These two income levels together are therefore reasonably representative for cross-country comparison of marginal tax rates.

Table 3 summarizes the mean and standard deviation of the marginal rates for the low-, lower-middle- and upper-middle-income countries. For the low-income countries as a whole, the mean marginal tax rate rises from 11 percent at 3/4 FGDP to 30 percent at 3 times FGDP. As we would expect, the increasing marginal rate pattern is found for each group of countries. As shown in figure 2, the marginal rate rises most rapidly between 2 and 3 times FGDP, after which the rate of increase slows down somewhat. The schedule for the lower-middle-income countries is remarkably similar to that of the low-income countries. In contrast, for the upper-middle-income countries the mean marginal rate increases at virtually the same rate between 1 and 3 times FGDP. For the few developed countries considered here, the mean rate increases most rapidly between 1 and 2 times FGDP but less rapidly than for the developing countries between 2 and 3 times FGDP. The difference in pattern between the upper-middle and the high-income countries could be caused by the fact that the former have a greater proportion of potential taxpayers with incomes between 2 and 3 times FGDP.

Table 3. *Means and Standard Deviations of Marginal Tax Rates over Various Country Groups*

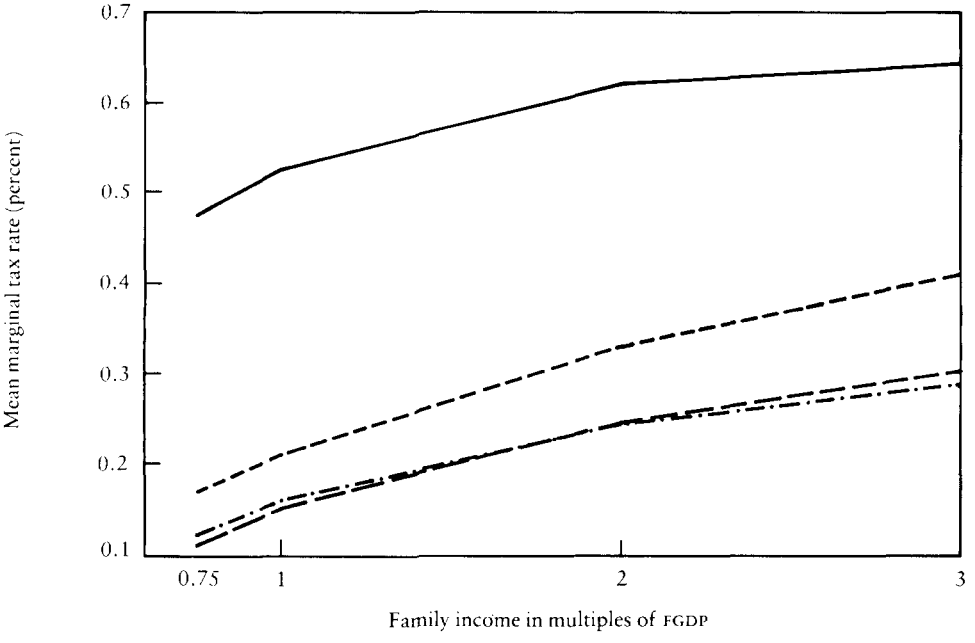
Countries and group	Multiple of FGDP			
	3/4	1	2	3
Low-income				
Mean (unweighted)	11.1	15.2	24.8	30.3
Standard deviation	13.5	14.5	17.3	17.2
Coefficient of variation	1.22	0.95	0.70	0.57
Lower-middle-income				
Mean (unweighted)	12.1	15.9	24.3	29.0
Standard deviation	12.2	15.4	15.7	15.9
Coefficient of variation	1.01	0.97	0.65	0.55
Upper-middle-income				
Mean (unweighted)	16.8	21.0	33.0	41.0
Standard deviation	13.8	14.7	17.5	22.5
Coefficient of variation	0.82	0.70	0.53	0.55
All developing				
Mean (unweighted)	12.8	16.7	26.4	32.1
Standard deviation	13.3	15.1	17.1	18.7
Coefficient of variation	1.04	0.90	0.65	0.58
All				
Mean (unweighted)	14.7	18.8	28.4	34
Standard deviation	15.3	17.0	18.7	19.8
Coefficient of variation	1.04	0.90	0.66	0.58

Note: FGDP = family per capita GDP (five times GDP per capita).
Source: Derived from table 1.

Though the mean marginal schedules for the low- and lower-middle-income countries are virtually identical, that for the upper-middle-income countries lies well above these two (figure 2). One can speculate that a structural change occurs in the economy between these per capita income levels. The most plausible candidate for this change is an increase in the proportion of labor employed by modern organized entities (corporate, government). This may be associated with a relative decline of the agricultural sector and a rise in the urban middle class. The schedule for the developing countries lies even further above that of the upper-middle income countries, perhaps because of an acceleration of this trend.

In figure 3, for any multiple of FGDP, the curve traces out the increase in the mean marginal rate as we move from the low-income to the developed countries. As shown in table 3, for instance, at 2 times FGDP, the mean marginal rate goes from about 24.8 percent for the low-income countries to 33 percent for the upper-middle-income countries. The rate is about 60 percent for the developed countries in the sample. As family GDP increases from about $4,000 to about $14,000 (or per capita income rises from around $800 to $2,800), the marginal rate increases most rapidly at the 3-times-FGDP level. The mean marginal tax rate falls slightly, however, for the early family GDP range of $2,000 to $4,000, at 3 times FGDP. Subsequently the increase is relatively more rapid at the FGDP level.

Figure 2. *Mean Marginal Tax Rates by "Family GDP"*



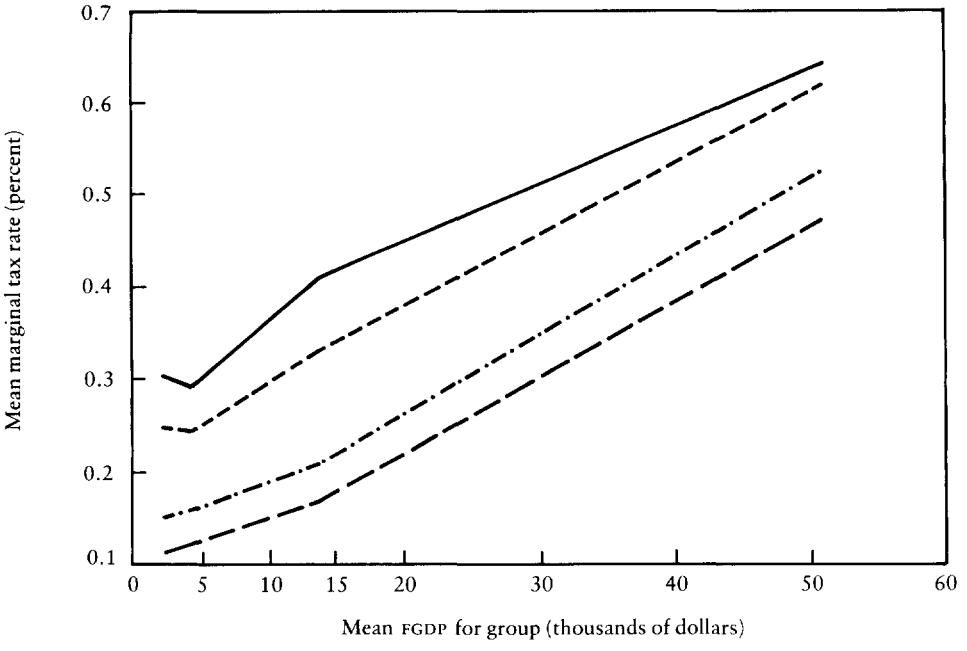
Key: Low-income countries; Lower-middle-income countries; Upper-middle-income countries; Developed countries

The mean values of the marginal rate for a group of developing countries obscures the variability within the group as shown in table 3. The coefficient of variation (cv) for all developing countries shows that the variability is greatest at 3/4 FGDP ($cv = 1$) and declines with increases in family income (to $cv = 0.6$ at 3 times FGDP). The same pattern is observed within each of the developing country groups. As the diversity in rates is reduced much more rapidly in the low-income countries, the coefficient of variation is almost identical (at 0.55) for all three groups at 3 times FGDP.

The low-income and lower-middle income countries have similar variability in marginal rates, except at 3/4 FGDP. There is considerably more diversity in the marginal tax rates of the low-income countries ($cv = 1.2$) than in the lower-middle-income countries ($cv = 1$). This is largely caused by differences in the tax threshold index. Many more low-income than lower-middle-income countries have a zero tax rate at 3/4 FGDP, with the index lying between 3/4 FGDP and FGDP.

The diversity in rates also tends to decline as we move from the low-income to the upper-middle-income countries at each family income level. For instance, at a family income of 2 times FGDP the cv is 0.7 for low-income, 0.65 for the lower-middle-income and only 0.53 for the upper-middle-income countries. This sug-

Figure 3. *Mean Marginal Tax Rates by Country Income Category*



Key: ¾ FGDP — FGDP — 2×FGDP — 3×FGDP

gests that as the importance of the income tax in total revenues increases, countries apply a more systematic approach to it. At low-income levels the tax seems more idiosyncratic and much more dependent on noneconomic factors or on factors not usually considered in traditional economic analysis, such as administration costs and evasion.

Table 4 indicates which countries deviate most widely from the mean for each country group. On the low side, whereas 14 countries fall more than 1 standard deviation below the mean, there is no country with marginal rates more than 2 standard deviations below the mean. Only one country, Ghana, differs from its group mean by more than 3 standard deviations. Focusing on the 2- and 3-times-FGDP income levels, we find that among the low-income countries, Ghana, Sierra Leone, Somalia, and Sri Lanka have the highest marginal rates. Other countries with relatively high rates are Jamaica, Portugal, and Tunisia.

V. Conclusion

This study has produced a comparative view of the structure of personal income taxes in developing countries, based on a simple methodology which takes account of standard deductions and relative family incomes, on the basis of per capita GDP measurements. The marginal tax rates for the poorest develop-

Table 4. *Countries with Relatively High or Low Marginal Tax Rates at Different Income Levels*

Standard deviation from mean marginal tax rate	*Income level of 3/4 FGDP*			*Income level of FGDP*			*Income level of 2× FGDP*			*Income level of 3× FGDP*		
	Low-income	*Lower-middle-income*	*Upper-middle-income*	*Low-income*	*Lower-middle-income*	*Upper-middle-income*	*Low-income*	*Lower-middle-income*	*Upper-middle-income*	*Low-income*	*Lower-middle-income*	*Upper-middle-income*
+4	Ghana											
+3		Jamaica	Greece	Ghana	Jamaica	Greece	Ghana	Tunisia Jamaica			Tunisia	Portugal
+2		Turkey Tunisia		Somalia	Turkey Tunisia	Portugal	Somalia Sierra Leone Sri Lanka	Turkey	Portugal Greece	Somalia Ghana Sierra Leone Sri Lanka Pakistan	Turkey Jamaica	Greece
+1												
MEAN AND STANDARD DEVIATION OF MARGINAL TAX RATES (PERCENT)	11.1 13.5	12.1 12.2	16.8 13.8	15.2 14.5	15.9 15.4	21.0 14.7	24.8 17.3	24.3 15.7	33.0 17.5	30.3 17.2	29.0 15.9	41.0 22.5
−1			Chile Argentina	Bangladesh India Pakistan	Indonesia Guatemala	Jordan Argentina	Burma Niger Madagascar	Côte d'Ivoire Guatemala	Jordan Chile	Ethiopia Burma Niger Madagascar	Côte d'Ivoire Guatemala	Chile Hong Kong
−2												

Source: Derived from table 1.

ing countries were substantially lower than those for the upper-middle-income countries and were not found to be significantly different from that of the lower-middle-income countries. The marginal rates for the upper-middle-income countries were, in turn, substantially lower than for the developed countries included as comparators.

The naive view that high income tax rates are positively related to per capita income across countries can be decisively rejected. A related approach which uses the highest marginal rate as an indicator of overall marginal tax rates was shown to be equally erroneous. Among the countries with very high marginal rates at the highest bracket, there were many in which the highest bracket started at an extremely high income level, at which level no taxpayers are likely to be subject to the tax. Conversely, there were several countries with relatively low rates for the highest bracket but in which the highest bracket was at a relatively low income level. They therefore had relatively high marginal rates over an important range of incomes.

The tax base is an important component of tax reform discussions in developing countries. The tax threshold index we used suggests that a number of poor developing countries had a narrow base, as expected. Somewhat surprisingly, there were a number of low- and lower-middle-income countries which had a broader income tax base than the developed countries with which they were compared. The lower-middle-income countries had a somewhat broader base than other developing countries. In interpreting these results, however, the incomplete nature of this index should be kept in mind. It is proposed as one stage in a continuing analysis of income tax systems.

References

Bureau of International Fiscal Documentation. Various years. *Bulletins.*

Cantor, V. A., D. H. Joines, and A. B. Laffer. 1983. *Foundations of Supply-Side Economics: Theory and Evidence.* New York: Academic.

Chelliah, R. J., H. J. Baas, and M. R. Kelly. 1975. "Tax Ratios and Tax Effort in Developing Countries." IMF Staff Papers 22, no. 2 (March): 187–205.

Feldstein, Martin. 1986. "Supply-Side Economics: Old Truths and New Claims." *American Economic Review* 76, no. 2 (May): 26–30.

Fullerton, Don. 1982 "On the Possibility of an Inverse Relationship between Tax Rates and Government Revenues." *Journal of Public Economics* 19, no. 1: 3–22.

Organisation for Economic Co-operation and Development (OECD). 1980. "The Tax/Benefit Position of Selected Income Groups in OECD Member Countries, 1974–78." Paris.

———. 1983. "The 1982 Tax/Benefit Position of a Typical Worker in OECD Member Countries." Paris.

Sicat, G. P., and A. Virmani. 1987. "Personal Income Taxes in Developing Countries." World Bank Development Research Department Discussion Paper 265. Washington, D.C.

Tait, A. A., W. L. M. Gratz, and B. J. Eichengreen. 1979. "International Comparisons of Taxation for Selected Developing Countries, 1972–76." IMF Staff Papers 26, no. 1 (March): 123–56.

Tanzi, Vito. 1987. "Quantitative Characteristics of the Tax Systems of Developing Countries." In David Newbery and Nicholas Stern, eds., *The Theory of Taxation for Developing Countries,* pp. 205–41. New York: Oxford University Press.

Virmani, Arvind. 1983. "The Microeconomics of a Corrupt Tax Bureaucracy." World Bank Development Research Department Discussion Paper. Washington, D.C.

———. 1986. "Measuring Income Tax Incentives Under Evasion." World Bank Development Research Department Discussion Paper 187. Washington, D.C.

World Bank. 1985. *World Development Report 1985.* New York: Oxford University Press.