

The countries chosen all have populations considerably less than one million and land areas ranging from 430 to 23,000 square kilometres (sq. km). The tax experiences of these mini-states are compared with those of a representative group of three very large countries or maxi-states within the same geographical groupings.

In the following section we examine the comprehensiveness of the tax system, paying attention to the choice of individual taxes by the countries. Next we relate the particular basket of taxes to tax yields and analyse the responsiveness of taxes to changes in Gross Domestic Product (GDP); we also construct a tax concentration ratio for each country. Section three deals with the subject of tax effort using both the simple tax ratios as well as estimated ratios which take account of each country's economic structure and size. Finally, we comment on the policy implications of the pattern of taxation.

1. The Scope of the Tax System

Barbados, Gambia and Belize are among the smallest countries within the group of African, Caribbean and Latin American states. Barbados has the smallest land area of the three countries, 430 sq. km., and is inhabited (1982) by 266,000 persons. Belize occupies an area of about 23,000 sq. km. but has a population of only 150,000, while Gambia, a country of 11,000 sq. km. boasts the largest population, 619,000. In our study we compare their individual tax performance during the two periods; we also

compare average data from the small states with the average for Nigeria, Brazil and Mexico. None of the bigger countries has a population below 70 million and their land areas are at least 1,000,000 sq km.

The first thing we examined was the coverage of the tax system; this entailed an analysis of the type of activities which are taxed in each country, noting changes between the two periods. The Government Finance Statistics Yearbook of the International Monetary Fund (I.M.F.) lists seven broad categories of levies which are divided into twenty-eight main taxes²; this classification was unchanged between 1972 and 1982. In the early 1970s taxation in Barbados spanned six of the seven broad categories listed while Gambia's taxes were confined to five. Belize's taxes encompassed five groups in its base year, 1977.

In 1972, the tax system in Barbados was quite pervasive with fifteen of the twenty-eight listed taxes in effect. Personal and corporate income taxes were in use and the social security system was already in place; in addition there was a comprehensive system of taxation on both property and domestic goods and services. Taxes on international trade included levies on imports, exports and exchange profits and stamp duties were levied. The payroll tax was the one main group not in use (See Table 1).

Gambia employed very few taxes in 1972; apart from a stamp duty taxation was confined to income and profits, domestic transactions

and international trade. There were no payroll or property taxes nor social security contributions. In Belize (1977) eleven taxes were in use. There were the usual income and profits taxes with a few levies on property as well as a number of taxes on domestic transactions and foreign trade.

The average number of taxes in use in the mini-states was eleven, the same as in the group of larger states. But if one computes the percentage of taxes in use from each tax group the situation is somewhat different. The mini-states, on average, made greater use of taxes on property and international trade, but since payroll taxes and social security contributions were not widespread, their overall tax coverage was only 36%. The larger countries were more comprehensive in imposing levies on income and domestic transactions, groups with a large number of individual taxes, and as a result they employed about 45% of the available taxes.

By 1982 Barbados' choice of taxes was much the same but additional taxes had been introduced in Gambia and Belize. Although Barbados still levied fifteen taxes the composition was a little different; another set of income taxes had been introduced and there was no longer a levy on exchange profits. Meanwhile the country had experimented with a payroll tax for three years, abolishing it in 1980.

Belize had by now added social security collections to its tax system; in other respects the pattern of taxation was quite

similar to that of Barbados and indeed identical with the situation in 1977. By the end of the review period Gambia had introduced a payroll tax (the only mini-state with one in effect) and broadened its collection of income taxes. Other additions included excise taxes on domestic goods and services as well as a tax on exchange profits.

On average now the small countries were relying on a larger number of taxes and had a slightly higher tax coverage. The mini-state group was again more comprehensive in the use of taxes on foreign trade and property; the maxi-state group still favoured levies on domestic transactions and payroll taxes.

As the number of taxes in mini-states grew, so did their coverage of levies on income and domestic transactions. Evidently as the small countries developed they were able to put more of the tax burden on income earners, both through traditional direct taxes and social security levies. The increasing sophistication of their economies also enabled the small countries to use a wider range of taxes on goods and services. By comparison the larger states put additional efforts into collecting revenue from property-owners and international trade.

It is important to our analysis of the countries' tax performance that we comment a little more on the particular types of taxes which each country introduced between 1972 and 1982. Barbados dropped the tax on exchange profits which yielded very little while imposing additional taxes on income which had a broader

base. Belize introduced social security contributions which are a direct tax with guaranteed high returns, especially when the security scheme is young and its liabilities are small. In the first year of implementation these contributions already amounted to nearly seven percent of total tax collections. Gambia, in contrast brought in a number of taxes with negligible yields. Between 1976 and 1978 Gambia's new taxes together accounted for less than three percent of tax revenues. This analysis suggests that the revenue from taxation in each country depends somewhat on the basket of taxes it chooses.

2. Tax Yields and Elasticities

(a) Tax Yields

The combination of taxes which a country employs is often determined by its current economic realities. Therefore it is often true that the pattern of distribution of tax revenue among tax groups provides insights into the relative importance to the country of each taxed activity.

During the first period Barbados raised over one-quarter of its revenues from levies on international trade; taxes on personal income and company profits together accounted for over 40% while levies on domestic transactions contributed modestly to the total (See Table 2). The social security system was still young and made a small contribution, the same as that coming from property taxes. Gambia's taxes came largely (83%) from levies on foreign trade; taxes on income and profits provided the remainder. In

1977 Belize raised just more than half of its taxes from international trade and nearly 30% from taxes on personal income and company profits.

One striking feature at this time was the pronounced openness of the three mini-states which pushed the average yield from taxes on foreign trade to 55%, compared to 10% for the larger states. In the smaller countries personal income taxes yielded an average of 14%, roughly the same as corporate taxes with only 10% from taxes on goods and services. For the large country group tax yields were more evenly distributed among taxes on corporations, on domestic transactions and social security contributions.

Next we measured the degree to which tax yields were distributed across tax groups by employing a form of the Gini-Hirschman coefficient (See Appendix 1). The highest possible number of the index is 100 when a country's taxes come from one source and the value decreases as additional taxes are employed. Concentration ratios are shown in Table 2. Barbados, whose taxes were already quite diversified in the first period, had a ratio of 44.9, marginally below that of Mexico. Belize and Gambia, which both relied heavily on taxes on foreign trade had much higher concentration ratios. The average ratio for the mini-states was 64, a little above that for the maxi-state group.

As the Barbadian economy developed between 1972 and 1982 so did the sophistication of the tax system. By the second period the country's tax concentration ratio had fallen to 42, the lowest

for all the states we examined. Gambia's ratio also fell a little but a more pronounced decline was recorded for Belize, a consequence of the increase in the number of taxes in use. As the smaller countries employed additional taxes their average concentration fell. By contrast there was a marginal rise in the ratio of the larger countries as Mexico and Nigeria became much more dependent on taxes on international trade.

By 1980 in Barbados the yield from profit taxes had stagnated and the contribution of personal income taxes had fallen six percentage points. Corporate taxes had been affected by the fiscal concessions to foreign industrial enterprises³ while a revised tax schedule and higher personal allowances depressed personal income taxes. The contribution of taxes on goods and services had risen quite a bit. Part of this increase represented an attempt to offset the fall in corporate taxes but it was also made possible by the rapid increase in spending power and the growing importance of services which made it easier to raise revenue from that source.

Even though the economy remained highly open, taxes on international trade now contributed only moderately (19%) to total collections. This resulted from the implementation of the Common External Tariff scheme in 1973 which abolished or reduced duty on imports from the regional free trade area Caricom. The social security system was now well developed and contributions to the scheme amounted to 12% of the total; property taxes still contributed very little to revenues.

In Belize whose ratio had fallen to 57, three taxes accounted for 86% of all revenue. The ratio of exports plus imports to GDP was still high (133%) and therefore levies on foreign trade still averaged around half of all tax collections. Most persons were better off than in the earlier period but the yield from income taxes was somewhat smaller. The yield from stamp duties (8.5%) almost doubled and there was a marginal increase in the contribution of taxes on domestic goods and services. By now a social security system had been introduced and this source provided five percent of total taxes.

Gambia's tax system still showed a marked degree of concentration (81) with virtually all tax revenue attributed to two groups of levies. Taxes on international trade mainly import duties, remained equivalent to four-fifths of the total. Between 1972 and 1978 the rate on import duties rose rapidly and tax collections grew faster than imports. There was a small rise in the yield from taxes on corporate profits but personal income taxes fell a little. The domestic economy still appeared to have little taxable capacity, with the yields from taxes on domestic transactions at around three percent, the same as in the earlier period.

By this time the average contribution of taxes on foreign trade to total collections had fallen in the mini-states to below 50%, but it was still almost three times the average for the larger countries. There was not a great deal of change in the relative positions of the two groups of countries with respect to the

yield from taxes on domestic transactions, with the larger countries having by far the bigger yield. Both groups collected, on average, a little less from income taxes than previously. All told the small states continued to rely heavily on taxes on income and international trade while the maxi-states collected most of their revenues through social security, direct taxes on income and levies on foreign trade.

(b) Tax Elasticities⁴

Over the periods for which information is available the responsiveness of various taxes to income changes showed both similarities and differences. Barbados, whose tax system was largely in place in 1972 had an overall income elasticity of 1.05. In both Belize and Gambia total collections responded only marginally higher to income changes, suggesting that these countries had a little more capacity than Barbados for increasing tax collections. The mini-state average of 1.08 compared with 1.06 for the bigger countries, whose overall position was affected by Nigeria's elasticity (0.63) which was the lowest of all (See Table 3).

The elasticity of personal income taxes in Barbados was well below unity, mainly an indication of the easing in the progressivity of the tax schedule; corporate taxes which had just about reached their taxable potential had an elasticity just above unity. In both Gambia and Belize where income taxation was still being regularised the elasticity of direct income taxes was very high.

The rapid growth in the domestic economy in Barbados facilitated a very high elasticity (1.53) for taxes on domestic goods and services; the comparative figure in Belize was 1.18. But in Gambia where the potential of these levies was limited they grew at just above the rate of GDP. Between the two periods all the economies became less open, this was especially true in Barbados where the elasticity for taxes on international trade was only 0.73. In the two other mini-states these taxes grew at almost the same rate as GDP.

In the mini-states as a group the average elasticities of taxes on personal income, corporate profits and domestic goods and services were substantially higher than for the maxi-state group. In the smaller countries there was more potential for raising these levies because they had been comparatively smaller in the earlier period. By contrast the average elasticity of foreign trade levies in the small countries was nearly half the value recorded for the bigger countries. Once more this indicated greater attempts by the big countries to collect more taxes from international trade transactions.

The social security system appears to have been a particularly favoured source of revenue for all the countries which had one. Between the two periods Barbados' social security collections showed an income elasticity of 1.91 while Mexico and Brazil recorded an average of 1.21. It does appear that the social security scheme was called upon to finance increasingly larger portions of government expenditures, especially since increases in income tax rates were politically unpopular.

3. The Tax Effort

(a) Computation of Tax Effort

The tax effort is a measure which relates tax collections to some indicator of taxable capacity; most of the time the indicator is income levels, measured by GDP. Chelliah [1971] while raising reservations about the use of the tax/GDP ratio agrees that it does show the proportion of GDP compulsorily transferred from private to public hands (p.258).

During the first period Barbados and Gambia raised 84% and 90%, respectively, of government revenues from taxation; the figure for Belize was 79%. At this time taxation provided on average a somewhat larger proportion of revenues for the large countries. The tax/GDP ratio in Barbados was 24.3, the highest of all the countries (large and small); Belize and Gambia had ratios of 19.6 and 14.5 respectively. On the basis of the simple ratio, the mini-states had the two highest values recorded; Mexico's ratio (11.2) was the lowest.

We also looked at the ratio of particular taxes to GDP i.e. the tax effort of each tax group (See Table 5). Barbados had the highest personal income tax ratio of the six countries; the country's effort at collecting company taxes was second only to Mexico's. For the tax ratio with respect to domestic goods and services Barbados recorded significantly higher values than either Belize or Gambia. However, Gambia made the most effort to collect taxes on foreign trade, with Belize a close second.

Largely because of Belize and Gambia the small states, on average, had by far a bigger ratio of foreign trade taxes to GDP. But the big countries were only a little better at collecting taxes on income and domestic goods and services.

Next we used a model developed by Lotz and Morss in 1967 in order to see whether the crude tax ratios changed when allowances are made for per capita GDP and openness. These two factors are said to indicate the average citizen's ability to be taxed as well as the taxable capacity of foreign trade transactions (See Appendix 2).

When the technique is applied to the data for the countries under consideration the overall tax ratio for Barbados falls while that of Gambia and Belize rises. This means that given the size of national income and the foreign sector, Barbados was making less effort and Belize and Gambia more than indicated by the simple tax ratio. As Brazil and Nigeria both recorded much lower ratios than before, the mini-states now occupied the three top rankings (See Table 4).

But our analysis was carried one step further since we wanted to test the effects of size on a country's tax effort. The new relationship we specified included a measure of size, indicated by population levels. The regression results are presented in Appendix 2. During the first period the population variable in equation (2) has a statistically insignificant coefficient; this is the first indication that size would not change the ranking of tax effort which had been observed. Moreover, apart from a

higher R^2 and no serial correlation the second regression is no better than the first. When compared to the result, from the first adjustment the inclusion of size penalised Barbados, Gambia and Mexico. But even so the two highest ratios were still held by small states (Belize and Barbados).

The Lotz-Morss model, as shown earlier, assigned major importance to per capita income and the level of openness in the economy: Between the two periods under review, Barbados' per capita income increased almost three and one half times. During the 1970s the economy rapidly diversified, with tourism and manufacturing replacing sugar as the main export activities; these two sectors sustained the significant increase in GDP. The diversification also saw a rise in service-related activities and a fall in the importance of foreign trade; moreover population growth was very slow (See Table 6).

Between 1977 and 1982 output growth in Belize was fuelled by the rapid expansion of forestry and services and with the virtual stagnation of the population, average income levels rose by 32%. The country also became less open. Gambia's per capita GDP grew by nearly four-fifths between the two periods but the absolute level in 1978 was still low, US\$254; it was the one small state which recorded any significant growth in population (12%). The country was still heavily dependent on groundnuts for foreign exchange earnings though there was a slight decline in the level of openness.

Both Barbados and Belize were in this latter period collecting over 90% of their revenues from taxes; this represented an increase for Barbados since 1972-74. Gambia in 1978 actually raised only three quarters of its revenue from taxes, a small decline. The Barbadian economy was not taxed much more than ten years earlier; although the simple tax/GDP ratio rose by only one percentage point, it was still the highest of all. This confirms our earlier statement that in 1972 the Barbadian tax system was basically in place. Belize had a tax ratio of 21.5, well above the earlier figure, while Gambia's was one percentage point higher. The mini-states were again doing consistently better than the larger countries; Nigeria's ratio 12.4, was the lowest for any country.

For reasons outlined in Section 2 (page 8) Barbados' income tax ratio fell marginally by the second period, but this was completely offset by a doubling of the effort to raise social security contributions. The country also did substantially better at levying taxes on domestic goods and services and its foreign trade tax ratio fell noticeably. Belize recorded increases in all its tax ratios while in Gambia there was virtual stagnation. On average now, both large and small countries had roughly the same income tax ratio. The bigger states kept the edge in the area of domestic transactions, but the small states had a large advantage in collecting taxes on international trade. The lotz-Morss adjustment for per capita income and openness was again made. It boosted the overall tax ratios for Barbados,

while penalising Belize. Since Gambia's ratio was virtually the same this indicates that the country's tax effort in this latter phase was well approximated by its simple tax ratio. After this first adjustment the mini-states again held three of the four top rankings.

When we take account of population size in this period none of the countries experienced anything but marginal changes in tax effort. In the adjusted equation the population variable is again insignificant and this time there is no improvement on the results of equation (1). The ranking of tax effort remains the same with Barbados and Belize recording the two highest values and Nigeria the lowest.

(b) Some Reasons for Differences in Tax Effort

Among the mini-states Gambia had the lowest and Barbados the highest tax ratios. The literature on taxation is helpful in explaining these differences. Musgrave and Musgrave [1973 (p. 747)] note that personal income tax yields very little when per capita income is low since everything goes to subsistence. This tax is also difficult to levy where there is a high level of self-employment and a lot of income is not known. Gambia, during our review periods, had the lowest per capita income of all the countries and owing to inadequate marketing facilities a lot of output was home-consumed. This was in stark contrast to the situation in Barbados where high income levels and a market-type economy assisted the imposition of taxes on personal incomes.

Gambia's low ratio for taxes on business profits was also related to the low base of corporate taxes; recent data show that the industrial sector contributed only one percent to GDP, compared to nine percent in Barbados.

The high degree of non-market transactions in developing countries also hamper the growth of revenue from taxes on domestic goods and services (See Lewis [1972 (p. 399)]). This observation adequately explains why in Gambia the ratio of taxes on domestic transactions to GDP did not rise above 0.5%. These taxes are also easier to collect when the population is largely urban, permitting large establishments like in Barbados, whose urban population is 39%, more than twice that of Gambia.

The yield from property taxes is also positively related to urbanization since it permits taxation of property such as net wealth, estate, inheritance, gift and finance⁵. This shortcoming may have stopped Gambia from realistically including property taxes in its taxation portfolio. It is not surprising then that the contribution of property tax was highest in Barbados. By the same reasoning Belize and Gambia had higher ratios for taxes on foreign trade, because these taxes are not difficult to collect in highly open economies where the passage of goods through ports is easily assessed. In this case the economy need not be very sophisticated. This is the essence of Arthur Lewis' argument that countries should avoid taxes which are costly to collect (See Lewis op. cit. p. 398).

Although our examination is limited by the small size of the sample it seems to indicate that among developing countries smallness can be an advantage; Barbados and Belize had consistently higher tax ratios than the maxi-states. In a big country it is difficult to enforce taxes for a variety of reasons which are related to size. Even among the mini-states Barbados' land area is tiny by comparison. But smallness made it easier for the country to achieve the consolidation of central government, the nationalism and urbanization which facilitate tax collections. The larger countries might be able to collect more taxes on, say, foreign trade if they could effectively police their extensive borders over which a substantial amount of unofficial trading occurs.

Other factors also worked to the advantage of the smaller country. Barbados, for example, has been able to pave five times the percentage of road that Nigeria has surfaced; a good road network facilitates the advent of a market economy. Both Belize and Barbados lack the wide diversity of religious and ethnic groups which threaten centralization in Nigeria and Brazil. Barbados also has a higher per capita income than any of the bigger countries, and the advantage in this area grew in the second period; the income differences may have two origins. Firstly, Barbados' birth rate was stagnant, compared to the rapid population increases recorded for the maxi-states. The small land area forced the country to control its birth rate, but the maxi-states had no such constraints and population increases were above 23%. Secondly, in the bigger countries a lot more of

income originated in subsistence agriculture and was therefore more difficult to assess and tax. A landed peasantry never developed in Barbados because the large plantations had occupied virtually all the good arable land; domestic transactions are therefore completely monetized.

Hinrichs [1966] is helpful in classifying the development of the tax structures in each country. During the earlier period it appears that both Belize and Gambia had most of the features of tax systems which are in the transitional stage. The low level of the contribution from taxes on domestic transactions and extremely high yields from import duties are common to tax structures in the breakaway phase of the transitional period. But direct income taxes were already in place, indicating the start of a modern tax system.

From all appearances Gambia by 1976/78 was to some extent still breaking away from traditional revenue-raising. The contribution of foreign trade taxes was still very high and taxes on domestic goods and services had stagnated. But Belize displayed the characteristics of a phase Hinrichs called the "adoption of modernity". The country had reduced its dependence on foreign trade taxes and was collecting more revenues from taxes on domestic transactions. Social security contributions had also assumed an important role.

Barbados, by virtue of its high tax/GDP ratio was in 1972/74 already into the modern period. However this contention would not find favour with those writers who believe that a high

tax/GDP ratio is insufficient for modernity when a country's economy is externally-propelled (See Odle op. cit. p. 398). By 1980/82 in addition to the high tax ratio, foreign trade taxes were on the decline while levies on domestic transactions were of major importance to revenues. Non-tax revenue was smaller only in Mexico. Another feature of the modern tax period was a highly developed road network, 95% of which was paved; in Gambia only one-quarter of the roads was paved. In this latter period Mexico and Brazil had ingredients of both the transitional and "adoption of modernity" phases. However, Nigeria had virtually no contribution from personal income taxes, only three percent from taxes on domestic goods and services and a tax ratio of 12.4. These are mostly features of a tax system still in the transitional period.

4. Conclusion and Policy Implications

Our analysis has shown both that individual mini-states had somewhat different tax experiences and that the pattern of taxation in the mini-state group was different though not inferior to that in the large countries. Barbados, which had much higher levels of per capita incomes, urbanisation and economic diversification invariably made greater tax efforts than the other mini-states. Small populations and land areas did not stop Belize and Barbados from making tax efforts superior to those of the large countries.

There is a number of revelations which have important implications for the countries. First, in some countries, taxes are concentrated in one or two areas to a degree which threatens attempts at stabilization. In Gambia, for example, the overwhelming dependence on import duties means that either the value of imports or the rate on import duties must rise in order to protect government revenues. If imports keep rising, additional pressure is put on the balance of payments which could necessitate exceptional financing. If, on the other hand, imports fall sharply it could increase government's fiscal deficit and the possibility of foreign borrowing. In Barbados, where tax revenues are more evenly distributed there is less chance of these kind of destabilising influences.

It appears too, that countries with low tax efforts may have formidable problems in reversing the situation. Lewis (op. cit. p. 397) states quite correctly that revenue is harder to raise in poor countries than in rich ones. Before taxes can increase the poor country must realise a higher degree of urbanisation, with a proper transport system, a market-type economy and high per capita incomes. These conditions call for a veritable transformation of the underdeveloped economy, which is impossible without development aid. But international lending agencies often require reasonable tax efforts as a prerequisite for such assistance. The low tax effort country, like Gambia, is therefore caught in a dilemma.

Sometimes a country may have great difficulty in levying one particular tax; this is why some of the countries we surveyed omitted some taxes altogether. Barbados with its high level of urbanisation was the only mini-state to successfully impose a property tax. It is often true that the absence of a particular tax has underlying welfare considerations; there is no denying, for example, the income-distributive role of a social security scheme. But by the end of our review period Gambia was the only country without a scheme. In the absence of social security collections there was little room for spending on social security and welfare. These outlays in the 1980-82 period were a mere three percent of government current expenditure, compared to a little over 15% in Barbados.

Even though our sample is small it indicates that the mini-state has decided advantages in collecting taxes. Some of the restraints on the development of the tax systems in the bigger countries are beyond the government's control e.g. ethnic and racial divisions and the large land area. But the larger countries can work to control more of the goods crossing their borders by increasing the efficiency of their customs departments. Population growth has to be controlled in order to prevent an erosion of the gains in output; Barbados and Belize were fortunate to record zero population growth during the 1970s.

Collections from personal income taxation are very small in the large countries. In both periods the ratio of personal income taxes to GDP in Nigeria was not even measurable; the ratios for Mexico and Brazil were well below those in the mini-states. If Sir Arthur Lewis is right the maxi-states can correct this by reducing the importance of subsistence agriculture and thereby raising the level of per capita incomes to taxable levels. But this too calls for radical economic change.

Footnotes

1. For Belize the two periods are 1977 to 1979 and 1980 to 1982; data from Gambia and Nigeria were available for 1972 to 1974 and 1976 to 1978.
2. Further decomposition is possible. See I.M.F. Government Finance Statistics Yearbook, Introduction, Table A Revenue and Grants.
3. Odle [1977] advocates this position (p. 400).
4. The elasticities which are computed are strictly speaking buoyancy coefficients since they include the effects of discretionary fiscal changes. For a discussion of this difference see Mansfield [1972 (pp. 425-443)].
5. See Musgrave and Musgrave [1973] p. 752 for this argument.

References

1. ACP Statistics Yearbook 1980/81, Editions Delta, Brussels, 1980.
2. Central Bank of Barbados, Annual Statistical Digest, various issues.
3. Central Bank of Gambia, Annual Report 1979/80.
4. Chelliah R. et al., "Tax Ratios and Tax Effort in Developing Countries 1969-71", I.M.F. Staff Papers, Vol. 22 No. 1, March 1975.
5. Chelliah R., "Trends in Taxation in Developing Countries", I.M.F. Staff Papers, Vol. 18 No. 2, July 1971.
6. Hinrichs H., A General theory of Tax Structure During Economic Development, Harvard Law School, International Tax Programme, Cambridge, 1966.
7. Holder L., "Tax Revenue Performance in Barbados, 1946 - 1980" Central Bank of Barbados, (mimeographed).
8. International Monetary Fund, Government Finance Statistics, I.M.F. Washington D.C.
9. International Monetary Fund, International Financial Statistics, I.M.F. Washington D.C.
10. Lewis W.A., Theory of Economic Growth, George Allen and Unwin Ltd, London, 1972.
11. Lotz J. and Morss E., "Measuring Tax Effort in Developing Countries" I.M.F. Staff Papers Vol. 14 No. 3, November 1967.
12. Love J. "Trade Concentration and Export Instability" Journal of Development Studies Vol. 15 No. 3, April 1979.
13. Luben M., "Interrrelationships of the Fiscal Deficit and Balance of Payments Performance in Belize, 1979-1983," Regional Programme of Monetary Studies, 1984 (mimeographed).
14. Mansfield C., "Elasticity and Buoyancy of a Tax System: A Method Applied to Paraguay" I.M.F. Staff Papers, Vol. 19 No. 2, July 1972.
15. Musgrave R. and Musgrave P., Public Finance in Theory and Practice, McGraw Hill, 1973

References (Cont'd)

16. Odle M., "Tax Structure and Development: A Non-Capitalist Interpretation" *Social and Economic Studies*, Vol. 26 No. 4, December 1977.
17. Tait et al., "International Comparisons of Taxation for Selected Developing Countries, 1972-76" *I.M.F. Staff Papers* Vol. 26 No. 1, March 1979.
18. *World Statistics in Brief*, U.N. Statistical Pocketbooks seventh edition, U.N. New York, 1983.

Appendix 1

Computation of Tax Concentration Ratios

To compute the concentration ratios we use a form of the Gini-Hirschman coefficient. This defines the degree of concentration in a country's levies $C_L(t)$ as

$$C_L(t) = 100 \sqrt{\sum_{j=1}^n (L_{jt}/L_t)^2}$$

where L_{jt} is the amount raised from levy j in period t and L_t is the total value of levies in that period; n is the number of levies analysed. The squaring of each levy's share in total revenues prior to summing is designed to place greater weights on the more important levies. This technique is discussed in Love [1979 (pp. 61-62)].

Estimating Tax Ratios2nd Period

Lotz and Morss [1967] estimated tax ratios which took into account per capita incomes and openness by making least squares estimates of the following relationship:

$$T/y = a + b Y_p + c F/y \dots\dots\dots (1)$$

where T/y is the known tax/GDP ratio, Y_p is the per capita income in U.S. dollars and F/y is the ratio of exports and imports to GDP. The estimates of a , b and c were then used to compute average tax ratios for each country. In our analysis we computed equation (1) and then estimated a relationship:

$$T/y = a + b Y_p + c F/y + dP \dots\dots\dots (2)$$

where P is population size.

The following results were obtained (with t-statistics in parentheses):

1st Period

$$\text{Equation (1) } T/y = 12.65 + 0.0024Y_p + 0.0404F/y$$

(2.62) (0.44) (1.23)

$$R^2 = 0.38 \quad D.W. = 2.64 \quad F = 0.91$$

$$\text{Equation (2) } T/y = 0.95 + 0.0001Y_p + 0.1326F/y + 0.1478P$$

(10.09) (0.03) (1.65) (1.24)

$$R^2 = 0.65 \quad D.W. = 1.82 \quad F = 1.23$$

$$\text{Equation (1) } T/y = 8.98 + 0.0027Y_p + 0.0586F/y$$

(4.12) (3.59) (3.31)

$$R^2 = 0.88 \quad D.W. = 1.90 \quad F = 10.95$$

$$\text{Equation (2) } T/y = 5.97 + 0.0026Y_p + 0.0828F/y + 0.0252P$$

(0.76) (2.99) (1.31) (0.41)

$$R^2 = 0.89 \quad D.W. = 1.48 \quad F = 5.31$$

Table 1

Taxes in Use by Country

	1972				1982			
	Barbados	Belize	Gambia	Nigeria	Barbados	Belize	Gambia	Nigeria
1. Taxes on Income, Profit, Capital Gains								
1.1 Individual	✓	✓	✓	✓	✓	✓	✓	✓
1.2 Corporate	✓	✓	✓	✓	✓	✓	✓	✓
1.3 Other								
2. Social Security Contributions								
2.1 Employees	✓				✓	✓	✓	✓
2.2 Employers					✓	✓	✓	✓
2.3 Self-employed								
3. Employers' Payroll Tax					✓			✓
4. Property Taxes								
4.1 Immovable Property	✓	✓			✓	✓	✓	✓
4.2 Net Wealth								
4.3 Estate, Inheritance, Gift	✓	✓			✓	✓	✓	✓
4.4 Financial, Capital Transactions								
4.5 Non-recurrent Taxes								
4.6 Other non-recurrent								
5. Taxes on Domestic Goods and Services								
5.1 General Sales, Turnover	✓	✓			✓	✓	✓	✓
5.2 Excises	✓	✓			✓	✓	✓	✓
5.3 Profits of Fiscal Monopolies								
5.4 Specific Services	✓	✓			✓	✓	✓	✓
5.5 Taxes on Use, Permission	✓	✓			✓	✓	✓	✓
5.6 Other								

Table 1 (Cont'd)

Taxes in Use by Country

	1972				1982			
	Barbados	Belize	Gambia	Nigeria	Barbados	Belize	Gambia	Nigeria
6. Taxes on International Trade								
6.1 Import Duties	✓	✓	✓	✓	✓	✓	✓	✓
6.2 Export Duties	✓	✓	✓	✓	✓	✓	✓	✓
6.3 Profits of Marketing Boards	✓				✓			
6.4 Exchange Profits								
6.5 Exchange Taxes	✓	✓			✓	✓		
6.6 Other								
7. Other Miscellaneous Taxes								
7.1 Poll Taxes	✓	✓			✓	✓		
7.2 Stamp Duties								
7.3 Other								

Source: I.M.F. Government Finance Statistics Yearbook, Introduction

Table A Revenues and Grants

Note: On this Table the first year for Belize is 1977 while the first year for Gambia and Nigeria is 1978.

Table 4

Measurement of Tax Effort

(Percentages)

1972/74

	Simple Tax/GDP Ratio	Tax Effort Adjusted for Openness and Income	Tax Effort Further Adjusted for Population Size
Barbados	24.3	21.1	20.5
Belize	19.6	21.8	22.7
Gambia	14.5	17.5	15.9
Brazil	17.4	15.4	18.5
Mexico	11.2	15.8	12.3
Nigeria	19.5	15.4	16.7
Average for mini-states	19.4	20.1	19.7
Average for maxi-states	16.0	15.5	15.8
		<u>1980/82</u>	
Barbados	25.6	26.4	26.5
Belize	21.5	19.9	20.0
Gambia	15.8	15.9	15.5
Brazil	18.1	15.9	16.4
Mexico	16.9	17.7	17.0
Nigeria	12.4	14.5	14.9
Average for mini-states	20.9	20.7	20.7
Average for maxi-states	15.8	16.0	16.1

Source: I.M.F. Government Finance Statistics Yearbook, 1980 and 1984

Lotz J. and Morss E. [1967 (pp. 484-485)]

Table 5

Tax/GDP Ratios for Various Tax Groups

(Percentages)

1972/74

	Personal Income Taxes	Corporate Taxes	Contributions to Social Security	Taxes on Domestic Transactions	Taxes on International Trade
Barbados	5.4	4.7	1.6	4.1	6.5
Belize	5.6		n.a.	2.0	10.7
Gambia	0.9	1.0	n.a.	0.4	11.9
Brazil	0.4	1.3	5.5	6.6	1.2
Mexico	1.9	2.3	1.8	3.4	1.3
Nigeria	-	15.4	1.5	-	2.5
Average for mini-states	3.2*	2.9*	n.a.	2.2	9.7
Average for maxi-states	1.2	1.5	2.9	3.3	1.7
		<u>1980/82</u>			
Barbados	4.1	4.9	3.1	6.3	4.8
Belize	7.5		1.3	3.2	14.4
Gambia	0.9	1.5	-	0.5	12.7
Brazil	0.1	1.2	6.6	6.5	0.7
Mexico	2.5	2.8	2.2	4.7	4.8
Nigeria	-	10.5	0.4	-	2.4
Average for mini-states	2.5*	3.2*	2.2	3.3	10.5
Average for maxi-states	0.9	4.8	3.1	3.7	2.6

- denotes negligible amounts or nil

Note: starred values are average for Barbados and Gambia only since no data breakdown was available for Belize.

Source: I.M.F. Government Finance Statistics Yearbook, 1980 and 1984