Internationales Asienforum, Vol. 12 (1981), No. 4, p. 353-370

REVENUE RESPONSE TO GROSS DOMESTIC PRODUCT IN SRI LANKA, 1963-76

T. W. Y. Ranaweera+

1. INTRODUCTION

The degree of response of tax revenue structures to changes in Gross Domestic Product (GDP) has an important bearing on public finance policy in developing countries. In order to satisfy a rapidly increasing demand for public goods and services, the governments of developing countries have been forced to incur large increases in both current and capital expenditures of the public sector. Faced with this situation, countries with GDP inelastic revenue structures will have to resort to one or more of the following policy options: a) legislative and/or administrative action to increase tax yields; b) foreign borrowing and/or aid; c) domestic borrowing. While legislative action is bound to lead to discontent in the private sector, foreign borrowing will have important repercussions on the debt burden of the country. Similarly, borrowing especially from the domestic banking system is most likely to lead to increased inflationary pressures on the economy. On the other hand, a GDP elastic tax structure would provide the increased revenues necessary for financing public expenditures, thereby obviating the need to resort to hasty policy action which may disturb the existing incentive systems in the country. Thus, it appears that a highly income elastic revenue structure is an important asset for countries where the scope for financing development expenditures is rather limited.

This study is intended to focus attention on the response of the revenue structures to changes in GDP in one developing country, Sri Lanka. The objective here is to provide a quantitative assessment of the ability of the Sri Lanka tax structure to generate proportionately higher tax revenues through automatic response and discretionary action. For this purpose, the elasticity and buoyancy of the tax system as a whole and its major components are estimated and analysed.

Tax elasticity is designed to measure the automatic response of revenue to changes in GDP. This excludes from consideration the effect on tax reve nues of such factors as changes in tax rate, tax base and legislative action on improvements in tax administration and collection. Tax bouyancy, however, is intended to measure the total response of tax revenues to changes in GDP, i.e. both automatic and discretionary effects[1].

In section 2, the revenue response criteria are introduced. Section 3 deals with some problems of estimation of the performance criteria under consideration. Section 4 is devoted to the presentation of the empirical results of the analysis for the period 1963-76. Finally, some concluding remarks are presented in section 5.

2. REVENUE RESPONSE CRITERIA

It is possible to use revenue income elasticity methodology to measure the response of revenue structures to changes in GDP [see (2), (3), (4), (6), (10)]. The broad measure can be formulated as follows:

$$\frac{\text{Percentage Change in Revenue}}{\text{Percentage Change in GDP}} > 1.0$$

However, a distinction must be made between the ability of tax structures to generate proportionately higher revenues through (a) automatic response and (b) discretionary changes.

In general, a high tax elasticity is a very desirable property of any tax system in a developing country. A high tax elasticity implies that developmental and other expenditures of the government could be financed without recourse to substantial discretionary changes in the tax system and consequently without major alterations in the existing system of economic incentives in the particular country. This attribute may be of considerable significance in countries where the private sector is well established and is disposed to play a dominant role in the development process. It is entirely possible, however, that in many developing countries, the major taxes may have a low income elasticity[2]. In this case the government will be compelled to mobilize additional resources for fulfilling its increased expenditures by resorting, among other things, to discretionary changes in the tax system. Increases in tax revenue in this latter case may be attributable to a high bouyancy.

3. ESTIMATION OF REVENUE RESPONSE CRITERIA

In most developing countries governments levy a large number of taxes. It would be extremely difficult to analyse these individually. Thus, the identification of major taxes and the level of aggregation of tax revenues is an important problem that an analysis of tax performance has to face. Generally, experience in developing countries seems to suggest that a few taxes will contribute the bulk of total tax revenues. Therefore, it is these major taxes which should be earmarked for detailed study. Although the availability of information will normally determine the degree of disaggregation of these taxes, attempts have to be made to ensure that the breakdown will distinguish the major tax categories.

When selecting the level of aggregation of taxes it is also necessary to consider the statistical requirements of efficient estimation, see (1). Reliable tax functions cannot be derived if the tax category in question exhibits wide fluctuations in collections over the years. A highly disaggregated tax series will have a higher probability of exhibiting fluctuations of an increasingly random nature. In general, however, greater disaggregation may facilitate the analysis since the frequency of discretionary changes may be less in a single tax than in groups of taxes. Obviously, in classifying and aggregating the tax revenues, there is an important tradeoff between the minimization of the influence of random fluctuations and discretionary changes in the tax series.

For measuring tax elasticity it is necessary to exclude from tax revenue the portion that could be attributable to discretionary changes. These relate to changes in tax revenue resulting from legal changes in tax rates, tax base and improvements in tax administration. The yield effects of trend improvements in tax collections which are not accompanied by legal changes are attributed to the automatic response of the system. One method of separating the effects of discretionary change is to apply the reference year tax rates, allowances etc. to the bases of other years' tax structures. However, the data requirements for this exercise are quite substantial. It is necessary to have information on the rates, base and distribution of the base by rate categories. In developing countries, it is very hard to get this information for a sufficiently long period of time.

The proportional data adjestment method (8) permits the correction of a series of tax revenue figures for changes in tax rate factors without recourse to any information on the tax base. Apart from the actual tax revenue collections, the only additional data required are the estimates of discretionary changes in tax revenue for the years in which these changes occurred. The major problem of the proportional data adjustment method is with these estimates of the revenue impact of discretionary tax rate changes. Some figures are often published in the budget estimates[3].

Usually, no ex-post revision of these figures is undertaken. It is often the case, however, that the actual revenue outcome is different from the ex-ante budget estimate. One possible approach to obtain a more realistic estimate of the extent of discretionary changes is to scale down the budget estimates with the ratio of actual revenue outturn to the budget estimate for the particular year. The assumption here is that effects of discretionary changes in tax rate factors move in the same direction and proportion as actual outturn compared with budgeted. Additional difficulties connected with the method are the apportionment for one year the effects of a single discretionary change extending over several years and estimation of the effect of discretionary changes introduced part way through one year[4].

When a revenue series has been adjusted for discretionary changes it is possible to proceed to the estimation of tax elasticity. Given a sufficient number of observations, econometric methods could be used for the purpose. One of the most convenient working hypothesis in using econometric methods is to postulate that the relationship between adjusted revenue (T) and GDP (Y) is proportional.

$$T = a\,Y^{e} \qquad (1)$$

where a and e are parameters. Taking logarithms:

$$\text{Log } T = \text{Log } a + e \text{ Log } Y \qquad (2),$$

it is seen that

$$e = \frac{d \text{ Log } T}{d \text{ Log } Y} \qquad (3)$$

measures the built-in income elasticity of the tax system, i.e. the percentage change in tax revenue brought about by a 1 percent change in income.

In the case of the individual taxes, the estimating equations are of the following form:

$$\text{Log } T_i = \text{Log } a_i + e_i \text{ Log } Y + U_i$$

where

T_i - i - th tax, adjusted series

e_i - elasticity of i - th tax

U_i - error term.

Buoyancy can be estimated by postulating a similar relationship between the unadjusted revenue series (UT) and the income variable (Y). For the individual tax categories, the estimating equations take the following form:

$$\text{Log } UT_i = \text{Log } a_i + b_i \text{ Log } Y + U_i$$

where UT_i - i - th tax, unadjusted series

b_i - buoyancy of i - th tax

u_i - error term.

Standard statistical tests are helpful in drawing inferences about the goodness of fit ot the tax functions considered in this study. The adjusted coefficient of determination ($\bar{R}^2$adj) shows the extent of variation in the dependent variable that is explained by the variations in the independent variable. The t - test indicates the significance of the estimated parameters of the tax functions at a given level of significance. Finally, the Durbin-Watson test (DW statistic) indicates the extent of autocorrelation in the residuals of the estimated functions.

For the logarithmic version of the total tax function the estimated $\bar{R}^2$adj is 0. 94 (see table 5). It indicates that 94 percent of the variation in total taxes can be explained by changes in income i. e. GDP. The estimated regression coefficient in this case is highly significant. In addition, the DW test indicates the lack of autocorrelation in the residuals. Therefore, it would appear that the logarithmic version of the aggregate tax function estimated can be treated as satisfactory[5].

An examination of individual tax functions shows that in the majority of the cases the $\bar{R}^2$adj is quite low. The only exceptional cases are personal and corporate income taxes, general sales and turnover taxes and selective sales taxes. The estimated $\bar{R}^2$adj for these taxes are moderately high. The regression coefficients in the respective functions for these three categories are also highly significant. Autocorrelation does not seem to be a serious problem except in the case of general sales and turnover taxes.

In the case of the other tax categories the explanatory power of the income variable is quite now. For example, only 67 per cent of the variations in export taxes can be accounted for by changes in GDP. In the case of licence taxes only 52 per cent of the variation can be explained by GDP. However, the estimated regression coefficients in most cases are significant at the 95 percent level. Also, in most cases there is little evidence to suspect the presence of autocorrelation. On the basis of these considerations, it can be asserted that the estimates obtained in this study are reasonable. However, the analysis points to the need for finding additional explanatory variables for individual taxes for improving the goodness of fit[6].

The results for the estimates of buoyancy (see table 6) follow the same pattern as those for elasticities. Reasonably high $\bar{R}^2$adj are observed for personal and corporate income taxes, general sales and turnover taxes and selective sales taxes. The DW test indicates the presence of autocorrelation in the

case of the equation for general sales and turnover taxes. In the case of the other taxes, there seems to be the necessity to include additional explanatory variables for improving the fit of the equations.

4. APPLICATION OF ANALYSIS TO SRI LANKA

For the purpose of the present study the individual taxes have been aggregated into 11 major categories. For the period 1963-76, the historical data on these tax aggregates were obtained from the Annual Reports of the Central Bank of Sri Lanka. The level of aggregation has been largely determined by the availability of data for a sufficiently long period of time.

Before analysing the estimated elasticities and buoyancies a brief description of the tax structure is given here. The ratio of tax to GDP has declined marginally from 0.21 in 1963 to 0.19 in 1976 (see table 1). However, the share of total taxes in current revenue had increased from 82 percent to 84 percent during the same period with a peak of 85 percent in 1970. Several significant changes have taken place in the structure of tax revenue during the period under consideration (see table 2): First, revenue from Foreign Exchange Entitlement Certificates (FEEC) increased from nearly 1 percent in 1967 to over 22 percent in 1976[7]. Second, the share of general sales and turnover taxes increased from 1 persent in 1963 to nealry 16 percent in 1976. Third, the share of selective sales taxes increased from nearly 11 percent in 1963 to over 19 percent in 1976. Fourth, there was a marked decline in the share of revenue from taxes on international trade. For example, import duties which were nearly 29 percent of all tax revenues in 1963 accounted for only 10 percent of total taxes in 1976. Similarly, the share of export taxes declined from 15 percent in 1963 to nearly 9 percent in 1976. It is observed that these decreases in the share of import and export duties were offset by increases in the share of FEEC revenue.

In Sri Lanka as in most developing countries, estimates are not available for assessing the changes in tax revenue due principally to discretionary changes. As such approximations are required for estimating these changes. An attempt was made to elucidate these discretionary changes from the information given in successive Budget estimates where the contemplated tax policies and their expected yield effects are often indicated. It would have been possible to correct these estimates by a factor which takes into account the short-fall in actual revenue as against budgeted. In the case of Sri Lanka, such a correction procedure would result in a series of discretionary changes which would be small in the majority of cases. For this reason the budgeted tax changes

were taken in toto (see table 3) thereby considerably pronouncint the effect of discretionary changes in the revenue series[8].

Table 3 shows that in the case of taxes on personal and corporate income, the most important changes had been introduced in 1971 when the proposed additional taxes amounted to over 23 percent of the actual collection for 1970[9]. The other significant development seems to have been in 1976 when a substantial reduction in income taxes was contemplated. Considered together, general sales and turnover taxes and selective sales taxes exibit almost persistent year to year changes during the period 1963-76. Such frequent changes in these categories indicate eagerness of the government to bolster its dwindling revenues through taxes, which are relatively easy to administer. Similarly, import duties have been subject to annual revisions until the year 1969.

4.1. Elasticity of the Tax System and Individual Taxes, 1963-76

The income variable considered in this study is Gross Domestic Product. The estimated income elasticities of the tax system are summarized in table 4 while the estimated tax functions are given in table 5. The system as a whole had an elasticity of 0.7, which is low by most international standards[10]. However, for individual taxes there were widely different elasticities. General sales and turnover taxes exhibit a very high elasticity of 1.97 while FECC revenue had an elasticity of 1.77. Apparently, the trend improvements of tax collections from these tax categories had been much faster than GDP growth during the period in question. Almost unitary elasticities are observed for selective sales taxes and receipts of Government monopolies. It has already been mentioned that the relative significance of general sales and turnover taxes, selective sales taxes and FEEC revenue had increased quite substantically since 1970. Personal and corporate income taxes had an elasticity of approximately 0.6. This indicates that an increase of 1 percent in the GDP would induce only a 0.6 percent increase in the revenue from this source. Personal and corporate taxes have always accounted for little less than 20 percent of all tax revenues although there were slight variations in their share over the years. In part, the low elasticity here can be explained in terms of the outdated tax administration in the country and the high rates of tax evasion especially among non-organized business.

Export duties, an important source of revenue, had an elasticity of 0.66, which can be considered as low. Apparently, GDP has risen more rapidly than taxes on exports. The major contributory factor for a low elasticity of export tax revenue must surely be the great instability of export earnings of the country over the period 1963-1976. The instability in export earnings in turn had been caused by the wide fluctuations in the prices of Sri Lanka's

exports of primary commodities in the face of competition from other countries and growth of substitutes.

With the introduction of the dual exchange rate system (FEEC system) in 1967, the share of import duties in total tax revenue declined and was recorded to be around 10 percent in 1976. Surprisingly, however, the estimated elasticity of import duties is negative. Perhaps, a low but positive elasticity for import duties could have been explained in terms of the import and exchange restrictions that came into force during the early seventies. First, it should be remembered that there was a severe curtailment of consumer imports during the period under consideration. Second, other imports were virtually state controlled in view of the foreign exchange allocation system practiced in the country in the face of an escalating balance of payments crises. Because of import bans domestic import substitution activities increased at a very high rate thereby increasing GDP much faster than imports and consequently tax collections from imports.

The elasticity of the property transfer tax is estimated to be 0.44 while for capital transfers the elasticity is found to be 0.58. A significant reason for the low elasticity could be low property assessments in relation to the existing market prices for such properties. Another important factor seems to be the indifferent administration of the tax. Elasticities of taxes on wealth are generally low in the developing countries. Sri Lanka does not seem to be an exception here.

4.2. Buoyancy of the Tax System and Individual Taxes, 1963-76

The estimated buoyancy of the Sri Lanka tax system is close to unity (see table 4). This indicates that a 1 percent increase in GDP would lead to an equal increase in tax revenue. As stated earlier the measure of buoyancy indicates the induced effects of both automatic and discretionary factors on tax revenue. Of the individual taxes, FEEC revenue and general sales and turnover taxes recorded the highest estimated buoyancies i.e. approximately over 2.8 (see table 6). A comparision of the elasticities and buoyancies in table 4 shows that both automatic and discretionary changes were instrumental in keeping the buoyancy of receipts from FEEC and general sales and turnover taxes at a very high level. A moderately high buoyancy has been recorded for selective sales taxes. It should be noted that the share of general and selective sales categories in total tax revenue has increased from 12 percent in 1963 to 35 percent in 1976 which indicates the rapid growth of these taxes over the period in consideration. The largest number of discretionary tax changes have also been recorded in respect of these two types. However, considering the elasticities estimated for these categories it would

appear that automatic factors were more important than discretionary changes in determining the extent of collection. Finally, it would appear that in the majority of the tax categories considered here discretionary changes were relatively less significant in raising tax revenues as against automatic changes.

5. SOME CONCLUDING REMARKS

The results given above show that Sri Lanka's Tax/GDP ratio was more or less constant during the period 1963 to 1976 and was around 0.2. On average, taxes accounted for over 84 percent of all revenues. The built-in elasticity of the tax system was approximately 0.7. The quantitative results obtained in the study point to a picture of tax bases whose responsiveness to changes in income is quite low in comparison with other developing countries[11]. It also points to the possibly high rates of tax evasion, of tax exemptions and above all the deficiencies in tax collections. In part these negative influences have been offset by the introduction of discretionary changes especially in the case of indirect taxes which are relatively easy to administer. These discretionary changes resulted in a buoyancy of the system close to unity. The more important discretionary changes have taken place in respect of FEEC receipts, general sales and turnover taxes and selective sales taxes.

The comparison of buoyancy and elasticity for individual taxes has shown that base and rate changes were more frequent in the case of indirect taxes as against direct taxes. Revenue gains from direct taxes cannot be achieved without a significant administrative effort for collection. It is because of this reason perhaps, that significant base and rate changes in direct taxes were not realized on a scale which would have increased the buoyancy of direct taxes. It should also be noted that frequent changes in easily administered indirect taxes occassioned by the necessity of raising government revenues to meet increased demands for public expenditures, may lead to a lopsided development of the tax system. This may result from the neglect of taxes that are difficult to administer.

The importance of public revenue can hardly be exaggerated especially in developing countries such as Sri Lanka where successive governments have committed themselves to a steady expansion of non-revenue yielding services such as education and health (5). During the period 1963-1976, Sri Lanka's development policy seems to have had a negative impact on the mobilization of resources through taxation. On the one hand, the import substitution policies seem to have adversely affected the elasticity and buoyancy of the system

because of income tax concessions and other fiscal incentives provided for import substituting activities. On the other, rather severe exchange and import controls have resulted in a considerable loss of revenue to the state. A significant outcome of the inability of the state to increase tax revenues at the same rate as public expenditures has been the relatively greater increases in money supply recorded especially in recent years and the inflationary pressures resulting from this. Because of the low buoyancy of tax revenues the entire burden of financing successive budget deficits has fallen on the non-tax financial sector. These considerations point to the conclusion that in Sri Lanka mobilization of additional resources through tax policy is of paramount importance for economic growth. However, under the existing tax system it will be difficult for the government to increase the revenues required to maintain the demand for social goods associated with economic growth.

Notes

+) This article is based on a study completed by the author in 1978. Ravindra Senanayake of the Treasury, Sri Lanka, rendered valuable assistance in the preparation of the data required for the study. However, the author takes full responsibility for any remaining errors.

1) It must be noted, however, that tax buoyancy is a measure of the effective tax revenue related to GDP and not a criterion for the desired or potential tax revenues.

2) A low income elasticity of a tax results when the growth in revenue collections from the particular tax is substantially lower than the growth in GDP.

3) It is well known that budget estimates of revenue collections are usually optimistic and hence the tax revenue yields from discretionary changes are over estimated in such documents.

4) It is also possible to use the dummy variable technique to take into consideration the discretionary changes (see 9). The advantage of this method is that it combines in one step the data adjustment and estimation of the tax to base relationship. However, the method is not very useful in cases where there have been frequent changes in rates, bases or administration and where time series data on taxes are available only for a short period.

5) Linear tax functions were also estimated for purposes of comparison. These, however, yielded comparatively inferior results and therefore have not been reported here.

6) No attempt has been made in this analysis to experiment with more realistic tax functions containing additional independent variables such as lagged income, comsumption, population etc.

7) Foreign Exchange Entitlement Certificates (FEEC) scheme was essentially a dual exchange rate system. The series on FEEC revenue has not been adjusted for FEEC payments on foreign debt amortization because of the lack of data for the earlier years of the study.

8) However, the empirical results show that the over estimation of the effects of discretionary changes does not lead to implausible estimates of buoyancies.

9) Table 3 is a summary of estimates of tax yields contained in successive budget documents. The legal enactments and administrative regulations governing the changes in taxes are to be found in separate documents. In compiling table 3, it has been assumed that the proposed change in taxes came into force during the fiscal year for which additional revenue proposals were made.

10) For example, see (3), (7), (10).

11) As far as Sri Lanka is concerned, data availability severely limits the scope of a decomposition analysis designed to show the separate effects of the changes in income on the relevant base and the changes in the base on the tax. Although tax revenue data could be collected on a detailed basis there is a paucity of data on the tax or the proxy base. For this reason, an attempted disaggregated analysis had been restricted to few tax categories. For example, it has been found that a high income elasticity for general sales and tournover taxes was the product of a high tax to base (private consumption) and almost unitary base to income elasticities.

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Table 1: Ratios of Tax/GDP and Tax/Total Revenue for Selected Years

	1963	1967	1970	1973	1976[a]
Gross Domestic Product at Current Factor Cost (Rs. Mn)	6849.2	8318.0	11703.5	15278.5	24258.3
Total Taxes (Rs. Mn)	1456.7	1815.2	2468.8	3331.0	4725.7
Total Current Revenue (Rs. Mn)	1769.1	2235.8	2902.6	3928.6	5598.1
Total Taxes/GDP	0.2127	0.2182	0.2109	0.2180	0.1948
Total Taxes/Total Current Revenue	0.8234	0.8119	0.8505	0.8479	0.8422

Note: a) 1976 figures are provisional.

Source: Annual Reports of the Central Bank of Sri Lanka

Table 2: Structure of Tax Revenue for Selected Years

	1963		1967		1970		1973		1976[a]	
	Rs. Mn.	%	Rs. Mn.	%	Rs. Mn	%	Rs. Mn.	%	Rs. Mn.	%
Taxes on personal and corporate income	283.0	19.43	313.6	17.28	441.9	17.90	699.9	21.01	935.5	19.80
General sales and turnover taxes	15.9	1.09	74.0	4.08	270.8	10.97	564.8	16.96	749.4	15.86
Selective sales taxes	156.5	10.74	209.1	11.52	282.4	11.44	407.7	12.24	918.4	19.43
Import duties	418.8	28.75	536.7	29.56	300.4	12.17	222.0	6.66	475.9	10.07
Export duties	218.5	15.00	203.2	11.19	311.9	12.63	386.4	11.60	420.8	8.90
Licence taxes	54.4	3.73	40.9	2.25	41.7	1.69	57.5	1.73	64.1	1.36
Property transfer taxes	14.1	0.97	19.7	1.09	19.2	0.78	22.3	0.67	28.7	0.61
Other capital taxes	18.0	1.24	13.9	0.77	19.4	0.79	41.3	1.24	45.8	0.97
Receipts from sales of FEEC	-	-	19.3	1.06	433.5	17.55	673.7	20.23	1073.5	22.71
Surplus of Government monopolies	95.5	6.56	107.6	5.93	130.6	5.29	220.0	6.60	-	-
Death duties	8.3	0.57	8.9	0.49	12.6	0.51	13.6	0.41	13.6	0.29
Profits from food sales	173.7	11.92	268.3	14.78	204.4	8.28	21.8	0.65	-	-
Total taxes and duties	1456.7	100.00	1815.2	100.00	2468.8	100.00	3331.0	100.00	4725.7	100.00

Note: a) Figures for 1976 are provisional
Source: Annual Reports of the Central Bank of Sri Lanka

Table 3: Discretionary Changes in Taxes and Duties, 1963-1976 (in Rs. Mn.)

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Taxes on personal and corporate income	+10.0		-3.5	-1.4		+15.0			+100.0		+25.0		+23.0	-45.0
General sales and turnover taxes				-6.6	+30.0		+12.0	+50.0	+ 49.0	+25.0	+59.0	-49.0	+15.0	
Selective sales taxes	+30.0		+13.6			+15.0	+20.0		+ 35.0		+45.0			+95.0
Import duties	+27.4	+31.0	+15.0	+28.6	+45.0	+80.0	-15.0		+60.0					-15.0
Export duties			+ 0.2					+20.0	+ 1.0					-40.0
Licence taxes									+ 7.0	+11.0	+10.0			
Property transfer taxes														
Other capital taxes		+ 2.0	+11.5											
Receipts from sale of FEEC											+362.0			
Surplus of Government monopolies		+ 4.0	+ 1.0	+ 1.4										+50.0
Death duties			+ 2.0											

Source: Budget Estimates, 1962-1977

Table 4: The Comparison of Estimated Buoyancy and Elasticity of Taxes , 1963-76

	SYMBOLS USED FOR		ESTIMATES		
	Unadjusted Data	Adjusted Data	Buoyancy	Elasticity	Difference
Taxes on personal and corporate income	UPECOI	CPRPES	0.9342	0.5987	0.3355
General sales and turnover taxes	UGSTUX	SALTUN	2.8633	1.9723	0.8910
Selective sales taxes	USELET	SELECT	1.3931	0.9655	0.4276
Import duties	UIMPOT	IMPORT	-0.3319	-0.8307	0.4988
Export duties	UEXPOT	EXPORT	0.6995	0.6569	0.0426
Licence taxes	ULICEN	LICENS	0.0905	-0.4839	0.5744
Property transfer taxes	UPROPT	TRFPRO	0.4446	0.4446	0.0000
Other capital taxes	UCAPTX	CAPTRF	1.0152	0.5827	0.4325
Receipts from sales of FEEC	UFEEC	FEECS	2.8436	1.7692	1.0744
Surplus of Government monopolies	UGOVMN	GOVMON	1.1209	1.0741	0.0468
Death duties	UDEATH	DEATH	0.3166	0.1943	0.1223
Total taxes and duties	UTOTAL	TOTAL	1.0243	0.6967	0.3276

Table 5: Logarithmic Tax Functions with Adjusted Tax Revenue Series for Discretionary Changes 1963-1976

Period	Dependent Variable	Constant Term	Regression Coefficient	R^2 Adjusted	D. W. Statistic
1963 - 1976	Log CPRPES	0.62745 (0.92428)[a]	0.59873 (8.25792)	0.82542	2.3939
1963 - 1976	Log SALTUN	-12.9467 (6.11586)	1.97234 (8.7236)	0.84109	0.58397
1963 - 1976	Log SELECT	-2.9506 (4.41728)	0.96549 (13.5335)	0.92826	1.77228
1963 - 1976	Log IMPORT	13.9015 (6.40956)	-0.83072 (3.5862)	0.43686	0.46389
1963 - 1976	Log EXPORT	-0.5072 (0.45332)	0.6569 (5.49729)	0.6684	1.712
1963 - 1976	Log LICENS	8.87233 (8.07705)	-0.48386 (4.12433)	0.5174	0.96154
1963 - 1976	Log TRFPRO	-1.18052 (1.25344)	0.44461 (4.42008)	0.55607	2.08668
1963 - 1976	Log DEATH	0.6109 (0.64066)	0.19426[b] (1.90749)	0.10477	1.45897
1963 - 1976	Log CAPTRF	-2.18849 (0.71714)	0.58266[b] (1.7877)	0.07869	0.53683
1967 - 1976	Log FEECS	-10.4318 (1.40748)	1.76918[b] (2.27748)	0.24167	0.72515
1963 - 1973	Log GOVMON	-4.99607 (2.5327)	1.07411 (4.99984)	0.67645	1.16638
1963 - 1976	Log TOTAL	1.43819 (3.34006)	0.69667 (15.149)	0.94202	1.30456

Notes: a) Figures in parenthesis are the respective t - ratios
b) Not significant at the 95 percent level

Table 6: Logarithmic Functions with Unadjusted Tax Revenue Series, 1963 - 1976

Period	Dependent Variable	Constant Term	Regression Coefficient	R^2 Adjusted	D. W. Statistic
1963 - 1976	Log UPECOI	-2.67977 (4.23744)[a]	0.9342 (13.8313)	0.93113	2.39305
1963 - 1976	Log UGSTUX	-21.7055 (7.34523)	2.86331 (9.07237)	0.85155	0.47036
1963 - 1976	Log USELET	-7.26702 (14.782)	1.39314 (26.5331)	0.98044	1.94846
1963 - 1976	Log UIMPOT	9.02834 (5.48627)	-0.33191[b] (1.38848)	0.10062	0.55032
1963 - 1976	Log UEXPOT	-0.85655 (0.7717)	0.69947 (5.39637)	0.70064	1.70439
1963 - 1976	Log ULICEN	3.12386 (2.29613)	0.09046[b] (0.52262)	-0.13015	0.61023
1963 - 1976	Log UPROPT	-1.18052 (1.25344)	0.44461 (4.42008)	0.55607	2.08668
1963 - 1976	Log UDEATH	-0.5745 (0.56524)	0.31657 (2.91633)	0.31723	1.02791
1963 - 1976	Log UCAPTX	-6.38058 (4.52946)	1.01523 (6.74793)	0.75666	1.266
1967 - 1976	Log UFEEC	-21.1784 (3.30826)	2.84356 (4.23809)	0.61481	0.66071
1963 - 1973	Log UGOVMN	-5.43482 (2.82025)	1.12089 (5.34093)	0.70686	1.20775
1963 - 1976	Log UTOTAL	-1.88193 (5.19091)	1.02429 (26.4533)	0.98033	1.93641

Notes: a) Figures in parenthesis are the respective t - ratios
b) Not significant at the 95 percent level