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Built-in Flexibility and Sensitivity of the Tax Yields in Nepal's Tax System:

A case of Negative Elasticity of Land Tax

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Introduction

This paper primarily deals with the revenue productivity and the responsiveness of the tax yields in Nepal's tax system for the period 1964–65 to 1980–81. While measuring the productivity an attempt has been made to estimate the built-in flexibility and the sensitivity coefficients of various individual and groups of taxes for which most of the results have been obtained through the computer. Secondly, with a view to identify the actual critical points wherein the elasticity problem was acute, the period from 1964-65 to to 1980-81 (whole period) has been divided into two sub-periods: (i) From 1964-65 to 1972-73 (Period I) and (ii) From 1972-73 to 1980-81 (Period II). These sub periods may not be large enough for statististical analysis but they provide an opportunity to make a comparative study which may be useful on several grounds. For example, results of this study can be compared with those of the earlier attempts which contain only eight to nine observations. On the contrary seventeen observations and twenty-two independent and five dependent variables have been used in determining elasticity and buoyancy coefficients. Thirdly, the time rate of growth (TRG) of the yields of various taxes has also been estimated along with the significance test of the difference between buoyancy and elasticity coefficients. Finally, an effort

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has also been made to identify the factors mainly responsible for the inelasticity of tax structure specially with reference to the land tax and income taxation in Nepal.

Methodological Framework

In this study the elasticity or built-in flexibility with respect to adjusted revenue series is measured from the relation :

$$T_a = \propto Y\beta \qquad (1)$$

$$\text{or } \log T_a = \log \propto + \beta \log Y \qquad (2)$$

Similarly buoyancy or sensitivity with respect to unadjusted revenue series is estimated from the relation

$$T = \propto Y\beta_1 \qquad (3)$$

$$\text{or } \log T = \log \propto + \beta_1 \log Y \qquad (4)$$

Where, T_a and T represent net and gross tax receipts; Y stands for total GDP or GNP and β and β_1 represents elasticity and buoyancy coefficients for the corresponding period.

As an alteenative the time rate of growth (TRG) is estimated by using exponential type of function wherein the relationship would be:

$$T = \propto \beta^t_g \qquad (5)$$

$$\text{or } \log T = \log \propto + t \log \beta_g \qquad (6)$$

Where, T stands for time and β_g for the rate of growth of a tax T per cent of time (a year).

In order to make a "cleaned' revenue series "automatic or normal growth" of revenue has been separated from historical revenue series by eliminating discretionary changes. However, revenue accruing from administrative reforms is considered a part of the normal growth and, therefore, not included in discretionary change. In this paper the *Proportional Adjustment Method* has been used to arrive at the adjusted or net revenue series while estimating the built-in flexibility coefficients.[1] This method could be expressed as :

$$T_{1,j} = T_{j-1} \frac{T_{j-2,\ j-1}}{T_{j-1}} \cdots\cdots \frac{T_{2,3}}{T_3} \frac{T_{1,2}}{T_2}$$

1. The proportional adjustment method is relevant particularly in the context of developing countries where data arrangements are not good.

Where,

T_j = the actual yield in the j^{th} year,

$T_{1.j}$ = Collection of j^{th} year adjusted to the structure of i^{th} year chosen as reference or base year;

$T_{j-1.j} = T_j - D_j$

and D_j = effect (positive or negative) in the jth year of the discretionary change in that year.

Apart from this the following dependent variables were regressed with the selected independent variables and their components while estimating elasticity and buoyancy coefficients.

Dependent Variables and their Identifications			*Independent Variables and their Identifications*
ID_t	=	Indirect taxes	Y = total GDP or National income
XP_d	=	Export duties	y_{WR} = GDP from wholesale and retail trade
MP_d	=	Import duties	y_{WR} = GDP from wholesale and retail trade
E_d	=	Excise duties	y_{MC} = GDP from manufacturing and construction sector
s_t	=	Sales tax	y_{WR} = GDP from wholesale and retail trade
D_t	=	Direct taxes	Y = Total GDP
L_t	=	Land tax	Y_A = GDP from agricultural sector
I_t	=	Income tax	Y_N = GDP from non-agricultural sector
RG_d	=	Registration duties	Y = Total GDP
TR_t	=	Tax revenue	Y = Total GDP
R	=	Total revenue	Y = Total GDP

Estimation of Elasticity (β) Coefficients of Various Taxes, 1964-65 to 1980-81 (Whole Period) :

As indicated in table I the overall elasticity of the total revenue (R) in the tax structure of Nepal for the period of study equals almost unity (1.01) which is significant at one per cent level. The fit is very good between the tax revenue and GDP also. The elasticity of indirect taxes is marginally higher than unity (1·02) compared with the elasticity of direct taxes (0.68).

It is, therefore, clear that with every one per cent increase in national income the total revenue brought only about one per cent change in the tax yields during the period 1964-65 to 1980-81. Tax revenue brought only 0.92 per cent change in the tax yields. Indirect taxes have brought about one per cent change in the tax yields against 0 69 per cent change in the yield of direct taxes. This obviously reflects that the tax system as a whole could not be considered adequately revenue responsive to change in income. An efficient tax system ought to give better results and if it is progressive it should possess necessarily an elasticity greater than unity. Of course, the degree of progressivity depends on the desired level of the objective in an economy. A high degree of progressivity in the tax structure would result in an elasticity greater than 2.

Among individual taxes the elasticity of sales tax is the highest (1.96) followed by income tax (1.38), import duties (1.16), registration duties (1.13), excise duties (1 05), export duties (0.77) and land tax (-0.04). Though the elasticity of individual taxes is greater than unity in some cases its relationship with the relevent component of GDP is not satisfactory especially in the case of excise duties. The main reason behind the increasing elasticity of exise duty is the frequent revision of the tax rates to upward direction. The worst ever result is found in the case of land tax. A one per cent change in GDP has led to 0.04 per cent decline in the yield of land tax during the period 1964-65 to 1980-81. The adverse relationship between land tax and GDP from agriculture sector is a fundamental issue on which policy makers should focus their attention very seriously. The elasticity performance of the above mentioned individual and groups of taxes for the said period could be summarised as follows :

1. Elasticity of premier indirect taxes (export duties, import duties, excise duties and sales tax) which constitute 66 per cent of the total revenue and 5.5 per cent of the GDP is equal to unity (1.02);
2. Elasticity of premier direct taxes (land tax, income tax and registration duties) which constitute 18 per cent of the total revenue and 1.5 per cent of the GDP is less than unity (0 68);
3. Elasticity of sales tax which constitutes 22 per cent of the total revenue and 1.9 per cent of the GDP, is greater than unity and it is highest (1.96) in the total tax structure of Nepal ;
4. Elasticity of the most lucrative component of direct taxes i.e. income tax is

Table 1

Elasticity or Built-in Flexibility of Various Taxes, 1964-65 to 1980-81

(Whole Period)

Tax Heads	Log	β	R^2	$\bar{R}^2$	F	D. W.
Indirect Taxes (ID_t)	−4.4171 (−12.4272)	1.0226** (27.0573)	0.9799	0.9786	732.0967	1.5571
Export Duty (XP_d)	−1.2956 (−1.0915)	0.7699** (3.9574)	0.5108	0.4782	15.6608	0.6124
Import Duty (MP_d)	−3.3297 (−4.0299)	1.1571** (8.5444)	0.8296	0.8182	73.0076	0.9189
Excise Duty (E_d)	−3.7086 (−1.8646)	1.0458** (3.4956)	0.4489	0.4122	12.2190	0.6746
Sales Tax (S_t)	−8.1584 (−5.9728)	(1.9633** (8.8026)	0.8469	0.8360	77.4861	0.9108
Direct Tax (D_t)	−2.0286 (−3 4937)	0.6822** (11.0498)	0.8906	0.8833	122.0978	1.3343
Land Tax (L_t)	4.1939 (3.6490)	−0.0393 (−0.3072)	0.0063	−0.0599	0.0944	1.2361
Income Tax (I_t)	−9.3298 (−8.1169)	1.3826** (10.0325)	0.8703	0.8616	100.6514	1.0077
Registration (RG_d)	−8.8048 (−16.4994)	1.1268** (19.8582)	0.9634	0.9610	394.3474	1.5965
Tax Revenue (TR_t)	−3.0965 (−11.4763)	0.9228** (32.1643)	0.9857	0.9847	1034.5413	1.5592
Total revenue (R)	−3.6714 (−11 3436)	1.0130** (29.4365)	0.9830	0.9819	866.5071	1.2651

* Significant at 5 per cent level.

**Significant at one per cent level.

(Figures in the parentheses are t-values)

greater than unity (1.38); and;

5. Elasticity of the most traditional tax i.e. land tax is negative (—0.04).

Estimation of Elasticity of Coefficients of Various Taxes, 1964-65 to 1972-73 (Period I):

In this period the elasticity (β) of premier indirect taxes is less than unity (0.93) which is significant at one per cent level (table 2). This means that a one per cent change in national income (GDP) could bring only 0.93 per cent change in the yield of indirect taxes. This poor performance of elasticity of indirect taxes clearly indicates that there is greater degree of inelasticity of indirect taxes to income (GDP) particularly in the period I (1964-65 to 1972-73).

The situation is further vulnerable in regard to direct taxes. During the period the elasticity of direct taxes is only 0.53. Though this is significant at one per cent level with reasonably higher level of $\bar{R}^2$ (0.66) its elasticity is less than unity. This means direct taxes have been able to bring only 0.53 per cent change in the tax yields when there was one per cent change in national income.

Amog the individual taxes during the period 1964-65 to 1972-73 the elasticity of sales tax (S_t) is the highest (2.32) and greater than unity having considerable progressivity. This is followed by export duties (2.30), registration duties (1.29), income tax (0.61), land tax (0·28) and import duties (0. 26). This implies that the elasticity coefficients for the above mentioned individual taxes have not been revenue responsive during this period as compared with the whole period. Further in the case of export duties the elasticity which is greater than unity has no significant relationship with GDP. In other words, the productivity of revenue of most of the taxes has been very low in this period.

In summary it could be said that; Firstly, the total revenue does not seem to be responsive to income for the last nine years because it brought only 0.87 per cent change in the tax yields while there was one per cent change in GDP. This is further justified by the existence of an elasticity less then unity for many individual taxes. Secondly, in the whole period (1964-65 to 1980-1981) the elasticity of indirect taxes (0.93) is higher than that of direct taxes (0.53). Though regression coefficients are found to be significant at one per cent level the elasticity is less than unity in both cases. In other words, there has been no significant change in the distribution of tax yields corresponding to the change in GDP. Thirdly, in this period the

Table 2

Elasticity or Built-in Flexibility of Various Taxes, 1964-65 to 1972-73

(Period I)

Tax Heads	Log	β	R^2	$\bar{R}^2$	F.	D W.
Indirect Taxes	−3 6011	0.9321**	0.8268	0.8041	33.8467	1.6866
(ID_t)	(−2.5051)	(5.8178)				
Export Duty	−10.0386	2.2969*	0.4225	0.3400	5.1209	0.7209
(XP_d)	(−1.7241)	(2 2629)				
Import Duty	1.8247	0.2611	0.0556	−0.0793	0.4119	1 2361
(MP_d)	(0.7819)	(0 6418)				
Excise Duty	−3.8285	1.0315**	0 8125	0.7857	30.3340	1.4083
(E_d)	(−3.1184)	(5.5076)				
Sales Tax	−10 2576	2.3225	0.3365	0.2259	3.0429	1.0165
(S_t)	(−1.3427)	(1.7444)				
Direct Taxes	−0.7104	0 5333**	0.7041	0.6618	16.6559	1.9779
(D_t)	(−0.6059)	(4 0811)				
Land Tax	1 4684	0.2768*	0.3535	0.2611	3.8271	2.1599
(L_t)	(1 2098)	(1.9563)				
Income Tax	−3.2758	0 6057	0.1306	0 0064	1.0513	1.5203
(I_t)	(−0.7062)	(1.0253)				
Registration	−10 2396	1.2865**	0.7939	0.7645	26.9648	1.7073
(RG_d)	(−4 6065)	(5.1927)				
Tax Revenue	−2.1941	0.8219**	0.8461	0.8241	38.4845	1.495
(TR_t)	(−1.8457)	(6.2036)				
Total Revenue	−2.3867	0 8690**	0 8354	0.8119	35.5180	1.4608
(R)	(−1.8242)	(5.9597)				

* Significant at 5 per cent level.

** Significant at 1 per cent level.

(Figure in the parentheses are t-values)

superiority of sales tax in terms of elasticity (2.32) is intact. But there is no significant correlation between sales tax (S_t) and GDP from wholesale and retial trade (Y_{WR}); between export duites (XP_d) and Y_{WR} and between income tax (I_t) and GDP from nonagricultural sector (Y_{NA}).

The level of $\bar{R}^2$ being very small the inference can be drawn that the higher elasticity is the outcome of a series of upward revision in the rate structure of these taxes. Fourthly, the elasticity of import duites and land tax is in a vulnerable position. It can be said tnat the improvment in automatic growth of these taxes have been greatly restricted with the corresponding change in the income. For example, import duties and land tax have poor elasticity with considerably low level of $\bar{R}^2$ Thus the situation is more perplexing and acute in period I (1964-65 to 1972-73) as compared with the whole period (1964-65 to 1980-81).

Estimation of Elasticity Coefficients of Various Taxes 1972-73 to 1980-81 (Period II):

During these period the total revenue has 0.98 elasticity with high level of $\bar{R}^2$ (0.98). All elasticity coefficients are signficant at one per cent level except in the case of excise duties (E_d) and land tax (L_t). The total tax revenue (TR_t) has also strong positive relationship with income having very high level of $\bar{R}^2$ (0.99). Its elasticity coefficient is 0. 92. In both cases the elasticity is less than unity (table 3)

During this period also as in the whole period and period I the elasticity of indirect taxes (1.04) is higher than that of direct taxes (0.64). The level of $\bar{R}^2$ also differs significantly.

Among the individual taxes as in the previous cases sales tax has highest elasticity (1.54) followed by import duties (1.39), income tax (1.38) and registration duties (0.94) In this period too the elasticity performance of excise duties (-0.12) and land tax (-0.34) have been negative. The corresponding level of $\bar{R}^2$ is also negative in both cases(table3). In this period the elasicity of export duties, sales tax, land tax and registration duties have higher elasticies compared with the whole period (1964-65 to 1980-81) while othere taxes have comparatively smaller elasticites.

Table 3

Elasticity or Built-in Flexibitity of Various Taxes, 1972-73 to 1980-81

(Period II)

Tax Heads	Log	β	R^2	$\bar{R}^2$	F.	D. W.
Indirect Taxes	−4.6129	1.0430**	0.9633	0.0615	200.8472	0.9483
(ID_t)	(−6.3972)	(14.1721)				
Export Duty	−0.1311	0.5864**	0.6490	0.5989	12.9436	1.6101
(XP_d)	(−0.1253)	(3.5977)				
Import Duty	−4.8422	1.3912**	0.7948	0.7655	27.1155	1.0367
(MP_d)	(−2.8248)	(5.2073)				
Excise Duty	4.3587	−0.1179	0.0451	−0.0913	0.3306	0.4888
(E_d)	(3.1431)	(−0 5750)				
Sales Tax	−5.3994	1.5422**	0.9361	0.9269	102.6242	2.1110
(S_t)	(−5.5278)	(10.1303)				
Direct Taxes	−1.6365	0.6431**	0.6402	0.5888	12.4536	1.2257
(D_t)	(−0.9167)	(3.5289)				
Land Tax	6.9838	−0.3369	0.0972	−0.0318	0.6984	1.4263
(L_t)	(1 8541)	(−0.8357)				
Income Tax	−9.3231	1.3846**	0 8156	0 7893	30.9704	0.7389
(I_t)	(−4 2680)	(5 5651)				
Registration Duty	-6.9148	0.9357**	0.9544	0.9497	146.5227	2.0063
(RG_d)	(−9.1302)	(12.1047)				
Tax Revenue	−3.0597	0.9196**	0.9902	0.9888	708.6307	1.7633
(TR_t)	(−9.0396)	(26.6201)				
Total Revenue	−3.3110	0.9775**	0.9809	0.9782	358.8814	1.1391
(R)	(−6.5497)	(18.9442)				

* Significant at 5 per cent level

**Significant at 1 per cent level

(Figures in the parentheses are t − Values)

Buoyancy Coefficients (β_1) of Various Taxes, 1964-65 to1980-81 (Whole Period)

The overall buoyancy coefficients are significantly greater than that of elasticity coefficients during this period. The range of buoyancy as recorded in the table 4 for individual and groups of taxes are between 2.56 and 0.31.

The buoyancy coefficient (β_1) for total revenue (R) is 1.54 which is significant at one per cent level. For total tax revenue also the coefficient is greater than unity (1.52) with sufficiently high level of $\bar{R}^2$ (0.96).

The indirect taxes (ID_t) have considerably higher buoyancy coefficient (1.63) than that of direct taxes (1.23). Both the buoyancy coefficients are significant at one per cent level.

In the group of individual taxes the buoyancy coefficient for sales tax is highest (2.56) as in the case of elasticity. Sales tax has maintained its status quo in all but the period I. During the period buoyancywise the second position is occupied by excise duties (2 23). The heirarchy is followed by income tax (1.86), import duties (1 79), export duties (1.14) and land tax (0.31). In the case of excise duties and land tax no significant relationship is found with the relevant compenent of GDP (table 4).

Buoyancy Coefficients (β_1) of Various Taxes, 1964—65 to 1972—73 (Period I)

During the period 1964-65 to 1972-73 the range of buoyancy coefficients varies from 3.94 to 0 99. Registration duties have the highest (3.94) buoyancy coefficient in the total tax structure of Nepal in this period. This is followed by sales tax (3.75); income tax (2.71), excise duties (2 05), import duties (1 38), export duties (1 27) and land tax (0 98). Except in the case of the registration duties, income tax and excise duties no significant relationship is found between individual taxes and corresponding components of GDP The level of $\bar{R}^2$ of these taxes (table 5) is also low.

The buoyancy coefficient of indirect taxes is comparatively higher (2.19) with respect to direct taxes (1.61). Similarly the buoyancy coefficients of total revenue (1.94) and total tax revenue (2 01) are found to be higher as compared with the whole period (1964 65 to 1980-81). The buoyancy coefficients of overall indirect

Table 4

Buoyancy or Sensitivity of Various Taxes, 1964–65 to 1980–81

(Whole Period)

Tax Heads	Log	β_1	R^2	$\bar{R}^2$	F.	D.W.
Indirect Taxes	−9.2684	1.6272**	0 9721	0.9702	532.5731	1.1801
(ID_t)	(−13 8576)	(22.8817)				
Export Duty	(−3 6406)	1.1436**	0.7774	0.7626	52.3917	1.2883
(XP_d)	(−3.7767)	(7.2382)				
Import Duty	−5.8919	1.7892**	0.7469	0.7300	44.2601	0.7909
(MP_d)	(−3.5907)	(6.6528)				
Excise Duty	−10.6413	2.2343**	0.3831	0.3420	9.3144	0.4897
(E_d)	(−2.1865)	(3 0520)				
Sales Tax	−11.1519	2.5649**	0.8159	0 8028	62.0389	0.7080
(S_t)	(−5.5917)	(7.8761)				
Direct Taxes	− 6.4637	1.2293**	0.9383	0.9343	228.2833	1.1093
(D_t)	(−8 4468)	(15.1090)				
Land Tax	1.5247	0.3124	0.3077	0.2615	6.6656	0.9266
(L_t)	(1.4033)	(2.5818)				
Income Tax	−12 0071	1 8602**	0.9400	0.9360	235.1454	0.5242
(I_t)	(−11.8676)	(15.3344)				
Registration	−17.8526	2.2093**	0.9030	0.8965	139.7169	0 6543
(RG_d)	(−10.559)	(11.8202)				
Tax Revenue	−7.8988	1.5173**	0.9715	0 9616	511.7832	1 0507
(TR_t)	(−12.5218)	(22.6226)				
Total Revenue	−7.9684	1.5435**	0.9796	0.9782	721 6961	1 2295
(R)	(−14.7469)	(26.8644)				

* Significant at 5 per cent Level.

** Significant at 1 per cent level

(Figures in the parentheses are t—values).

Table 5

Buoyancy or Sensitivity of Varions Taxes, 1964-65 to 1972-73

(Period I)

Tax Heads	Log	β	R^2	$\bar{R}^2$	F.	D. W.
Indirect Taxes (ID_t)	−14.3356 (−6.1257)	2.1947** (8.4143)	0.9100	0.8971	70.8007	2.2062
Export Duty (XP_d)	−4.3739 (−0.7934)	1.2741 (1.3261)	0.2008	0.0866	1.7585	1.1303
Import Duty (MP_d)	−3.5529 (−0.3917)	1.3799 (0.8726)	0.0981	−0.0307	0.7615	1.4283
Excise Duty (E_d)	−9.9769 (−7.1102)	2.0500** (9.5777)	0.9291	0.9189	91.7324	1.8694
Sales Tax (S_t)	−18.0025 (−1.6298)	3.7525* (1.9493)	0.3877	0.2857	3.7997	1.0130
Direct Tax (D_t)	−9.8975 (−3.8809)	1.6127 (5.6735)	0.8214	0.7956	32.1882	1.4916
Land Tax (L_t)	−4.2558 (1.5201)	0.9878** (−3.0899)	0.5769	0.5165	9.5479	1.1471
Income Tax (I_t)	−18.7014 (−8.4354)	2.7707** (9.6004)	0.9224	0.9193	92.1674	0.6942
Registration (RG_d)	−33.3409 (−6.3848)	3.9391** (6.7678)	0.8674	0.8485	45.8005	2.1009
Tax Revenue (TR_t)	−12.3207 (−5.3715)	2.0123** (7.8715)	0.8985	0.8840	69.9612	1.8582
Total revenue (R)	−11.4641 (−6.0405)	1.9364** (9.1459)	0.9228	0.9118	83.6474	2.1714

* Significant at 5 per cent level.

**Significant at one per cent level.

(Figures in the parentheses are t—values)

taxes and its components, export duties and sales tax, have been higher in comparison to the early period and that of direct taxes and its components i.e. land tax, income tax, registration duties have also been comparatively higher than the earlier period.

Buoyancy Coefficients (β_1) of Various Taxes, 1972-73 to 1980-81 (Period II)

As shown in table 6 the buoyancy of total revenue for this period is 1.37 with a high level of $\bar{R}^2$ (0.97). Total tax revenue has buoyancy coefficient equal to 1.34. The level of $\bar{R}^2$ is also very high (0.97). During this period all buoyancy coefficients except for excise duties and land tax are significant at one per cent level (table 6).

As shown in the table during the period 1972-73 to 1980-81 the buoyancy coefficients for indrect taxes (1.43) is higher as compared to direct taxes (1 08). Among the individual taxes the buoyancy coefficient of sales tax is highest (1.77) followed by import duites (1.58), income tax (1.51) and registration duties (1.38), export duties (1.35) and land tax (0.03). Surprisingly the buoyancy coefficient for excise duties is negative (— 0.52) in this period.

During the period the level of $\bar{R}^2$ is found not only very low but also negative for land tax and excise duties Rest of the taxes have considerably higher level of $\bar{R}^2$.

Despite a series of changes in the rate structure there has been only 1.37 percent change in the total tax yield corresponding to a one per cent change in the income. This may be due to ineffective tax administration and evasion.

Time Rate of Growth (TRG) of Yields of Various Taxes, 1964-65 to 1980-81 (Whole Period)

Whenever no significant relationship is found between dependent and independent variables the time rate of growth technique has been employed to examine the significance of their relationship. The method would be more relevant to use in a combination where the level of $\bar{R}^2$ is unacceptable. In this study although most of the elasticity and buoyancy results are statistically significant an analysis of the time rate of growth for all individual and groups of taxes, assuming time as

Table 6

Buoyancy or Sensitivity of Various Taxes, 1972-73 to 1980-81

(Period II)

Tax Heads	log	β_1	R^2	$\bar{R}^2$	F	D.W.
Indirect Taxes (ID_t)	—7.3084 (—7.1235)	1 4275★★ (13 6321)	0.9636	0.9584	185.8342	1.3253
Export Duty (XP_d)	—5.0358 (—6.5393)	1.3551★★ (11.2909)	0.9479	0.9405	127.4844	3.4336
Import Duty (MP_d)	—4.5281 (—2.4261)	1.5839★★ (5.4451)	0 8089	0.7816	29.6486	1.4745
Excise Duty (E_d)	8.4863 (1.6562)	—0.5226 (-0.6845)	0.0629	—0.0709	0.4698	0.4745
Sales Tax (S_t)	—5.9596 (—5. 297)	1.7706★★ (9.5881)	0.9292	0.9191	91.9320	2.0364
Direct Taxes (D_t)	—4.9401 (—3.0952)	1.0739★★ (6.5923)	0.8613	0.8415	43.4584	1.3835
Land Tax (L_t)	4.1637 (1.6851)	9.0291 (0 1100)	0.0017	—0.1409	0 0121	1.5045
Income Tax (I_t)	—8.9441 (—3.9171)	1.5135★★ (5.8198)	0.8287	0.8042	33.8702	0.7953
Registration (RG_d)	—9.7592 (—13.9496	1.3857★★ (19.4056)	0 9818	0.9792	376.5754	2.1660
Tax Revenue (TR_t)	—6.1921 (—7.0178)	1.3433★★ (14.9162)	0.9695	0.9651	222.4935	1.3898
Total Revenue (R)	—6.2375 (—6.7273)	1.3675★★ (14.4498)	0.8676	0.9630	208.7954	1.1358

★ Significant at 5 per cent level.
★★ Significant at 1 per cent level.
(Figures in parentheses are t—values).

Table 7

Time Rate of Growth of Various Taxes for the Period 1964—65 to 1980—81 ; 1964—65 to 1972—73 and 1972—73 to 1980—81

S.N	TAX HEADS (T)	*Adjusted Series*			*Unadjusted Series*		
		Whole Period 1964-65 to 1980-81	Period I 1964-65 to 1972-73	Period II 1972-73 to 1980-81	Whole Period 1964-65 to 1980-81	Period I 1964-65 to 1972-73	Period II 1972-73 to 1980-81
1	ID_t	10.24	7.03	12.14	16.62	16.99	16.90
2	XP_d	7.45	14.33	6.74	9.82	7.08	16 84
3	MP_d	9.86	2.91	19.12	17.15	19.27	21.70
4	E_d	7.70	10.65	3.72	18.58	20.77	15.55
5	S_t	19.27	21.69	19.18	25.68	34.63	22.70
6	D_t	6.78	3.71	7.16	12.57	12.51	12.46
7	L_t	—0.67	1.69	—5.92	2.91	7.84	—1.27
8	I_t	15.15	3.19	19.25	21.52	19.89	21.14
9	RG_d	11.47	10.06	11.09	22.85	30.31	16.03
10	TR_t	9.24	6.12	10.64	15.50	15.60	15.85
11	R	10.15	6.49	11.36	15.73	14.98	16.14

independent variable and considering same dependent variables as in the case of elasticity and buoyancy, has been made (table 7). In time rate of growth analysis different parameters have been estimated using an exponential type of function.

As mentioned in table 7 the time rate of growth for total revenue (R) for adjusted series for the period 1964-65 to 1980-81 is 10.15 per cent against 15.73 per cent for unadjusted series. As in the case of elasticity and buoyancy the time rate of growth has been taken for the whole period (1964-65 to 1980—81) and it has been further divided into two sub periods i e. from 1964-65 to 1972-73 (period I) and from 1972-73 to 1980-81 (period II). The table 7 indicates that the time rate of growth of indirect taxes (10.24 and 16.62 per cent) for both adjusted and unadjusted series have been faster in the whole period as compared with direct taxes (6.78 and 12.57. per cent).

During the period I and period II also these ratios are higher. The time rate of growth of indirect taxes for adjusted series during 1964-65 to 1972-73 is 7 03 per cent against 3.71 per cent of direct direct taxes. Similary the time rate of of growth for unadjusted series for the same period for indirect taxes is 12.14 per cent as against 7.16 per cent of direct taxes.

During the period 1964-65 to 1980-81 in the total tax structure the time rate of growth of sales tax is highest for both adjusted (19.27 per cent) and unadjusted (25.68 per cent) series as compared with other individual taxes. Next to sales tax, the time rate of growth of income tax is 15.15 per cent for adjusted series and 21.52 per cent for unadjusted series. This is followed by registration duties (11.47 and 22.35 per cent), import duties (9 86 and 17.15 per cent), excise duties (7.70 anb 18 85 per cent) and export duty (7.45 and 9.32 per cent). The time rate of growth of land tax for the same period is negative (—0.67 per cent) for adjusted series and 2.91 per cent for unadjusted series.

In this period indirect taxes and one of its major components, sales tax increased at a faster rate than the total tax revenue and total revenue for both adjusted and unadjusted series. On the other hand direct taxes and its one of the major components i. e. land tax, have increased at a slower rate than the total revenue. The other important components of direct taxes like income tax and registration duties have a faster growth rate as compared with total revenue and total tax revenue for both series.

In the long run the inference can be drawn that the increase in total revenue is more affected by the income tax and registration duties in the group of direct taxes and considerably affected by sales tax in the group of indirect taxes, because their growth rate is comparatively higher in the tax structure. In other words, total revenue has been the function of selective components of direct and indirect taxes like sales tax, income tax and registration duties.

Time Rate of Growth (TRG) of GDP and its Various Components, 1964-65 to 1980-81

The time rate of growth of national income (GDP) is slow as against that of total revenue in all periods except in the case of period I (1964-65 to 1972-73). GDP has time growth rate ranging between 7.31 to 11.33 per cent at current market prices for different periods against the growth rates of total revenue (6.49 to 11.36 per cent for adjusted series and 14.98 to 16.14 per cent for unadjusted series). In other words, tax revenue has increased at a faster rate than the growth in GDP.

The share of non-agricultural sector in GDP (7.28 to 14.61 per cent) has moved faster than the share of agricultural sector (7.34 to 9.50 per cent). Paradoxically the increase in the growth rate of GDP from agricultural sector has not been observed fully in relation to land tax because GDP from agricultural sector has been moving very slowly. The GDP from manufacturing sector (y_{MC}) is also declining at a faster rate The growth rate of y_{MC} is concentrated especially in the period II (table 8).

The range of growth rate of GDP from wholesale and retail trade Y_{WR} varied between 2.73 to 8.12 per cent for the different periods. In other words, the increase in the growth rate of GDP from wholesale and retail trade (Y_{WR}) is comparatively less than the total GDP (Y). Same is the case with Y_{WR}.

The growth rate of GDP is higher as against the growth rate of the components of GDP except in the case of GDP from non-agriculture sector (Y_N). The growth rates of all taxes for adjusted series is greater than that of total GDP. However the increases in export duty and land tax have been small in relation to GDP.

Table 8

Time rate of Growth of GDP and Various Components of GDP for the Period 1964-65 to 1980-81; 1964-65 to 1972-73 and 1972-73 to 1980-81

S. No.	GDP and Components of GDP	1964-65 to 1980-81	1964-65 to 1972-73	1972-73 to 1980 81
1	Y_{WR}	8.12	2.73	12 07
	$Y_{WR\bigstar}$	8.83	3.78	12.07
2	Y_{MC}	3 26	9.70	—0.20
3	Y_A	9.24	7.34	9 50
4	Y_N	11.35	7.28	14.61
5	Y	10.00	7.31	11.33

★ Since the contribution of sales tax in the tax structure of Nepal is available only from the fiscal year 1965-66, two separate results for the time rate of growth have been obtained wherein gross domestic product from wholesale and retail trade (Y_{WR}) is inclusive of the period 1964-65 in one case and excluded in the other ($Y_{WR\bigstar}$).

Identifications : Y_{WR} = GDP from wholesale and retail trade;
Y_{MC} = GDP from manufacturing sector;
Y_A = GDP from agricultural sector;
Y_N = GDP from non-agricultural sector;
Y = Total gross domestic product.

Time Rate Elasticity and Buoyancy for the period 1964-65 to 1980-81 (whole period); 1964-65 to 1972-73 (Period I); and 1972-73 to 1980-81 (Period II)

The ratio as shown in table 9 could be considered as *Time Rate of Elasticity.* Here the time rate of growth of individual and groups of taxes have been divied by the time rate of growth of GDP. Since most of the taxes have higher growth rates with respect to the growth rate of elasticities appear to be less than unity and *time rate of buoyancy* in many cases have gone above the unity indicating sufficiently to be revenue buoyant.

The time rate elasticity of total revenue is equal to unity (1.01) for the whole period and second period (1.00) except in the period I (0.89). The corresponding rates for unadjuated series or Time Rate Buoyancies are 1.57; 2.05 and 1.42 respectively for the same period (table 9).

The range of time rate elasticity varies from 0.96 to 1.07 per cent for indirect taxes for adjusted series whereas the ratio is between 1.49 to 2.32 per cent for unadjusted series. These ratios are comparatively higher than the ratios of direct taxes (0.51 to 0.68 per cent for adjusted series and 1.10 to 1.71 per cent for unadjusted series). The time rate of elasticity of indirect taxes is higher in the period II (1972-73 to 1980-81) as compared with the whole and the period I whereas its buoyancy is comparatively higher in the first period.

Among the individual taxes as in the case of elasticity and buoyancy the time rate elasticity is highest of sales tax (1.93; 2.97 and 1.69) for the different periods and its time rate buoyancy is 2.57; 3.73 and 2.00 per cent respectively for the same period. The time rate of elasticities of export, import and excise duties for the whole period are 0.74; 0.99 and 0.77 per cent where as for income tax and registration duties it is 1.51 and 1.15 per cent for the same period Land tax has negative time rate of elasticity (-0.07 per cent). The time rate buoyancy for export, import and excise are 0.98; 1.70 and 1.86 respectively for the period 1964-65 to 1980-81 while it is 2.15 and 2.28 for income tax and registration duties Except in the case of land tax the time rate of buoyancy of various taxes is found to be higher.

Table 9

Time Rate of Elasticity and Buoyancy for the period 1964-65 to 1980-81; 1964-65 to 1972-73 and 1972-73 to 1980-81

S No.	Tax Heads	Adjusted Series			Unadjusted Series		
		1964-65 to 1980-81	1964-65 to 1972-73	1972-73 to 1980-81	1964-65 to 1980-81	1964-65 to 1972-73	1972-73 to 1980-81
1	ID	1.02	0.96	1.07	1.66	2.32	1.49
2	XP_d	0 74	1.96	0.59	0.98	0.97	1.49
3	MP_d	0.99	0.39	1.69	1.70	2.63	1.92
4	E_d	0.77	1.45	0.33	1.86	2.84	1.37
5	S_t	1.93	2.97	1.69	2.57	4.73	2.00
6	D_t	0.68	0.51	0.63	1.26	1.71	1.10
7	L_t	-0.07	0 22	—0.52	0.29	1.07	—0.12
8	I_t	1.51	0.44	1.70	2.15	2.72	1.42
9	RG_d	1.15	1.37	0.98	2.28	4.14	1 42
10	TR_t	0.92	0.84	0.94	1.55	2.13	1.39
11	R	1.01	0.89	1.00	1.57	2.05	1.42

Significance Test of the Difference Between Buoyancy and Elasticity Coefficients

In this section an attempt has been made to measure whether the difference between buoyancy and elasticity coefficients are significant. In other words, our composite alternative hypothesis is $\beta_1 \neq \beta$. Since most of the t- values are greater than 2 we accept the alternative hypothesis (table 10). But in case of import duty, excise duty, sales tax, land tax and incom tax we reject our hypothesis under the assumption that t-values are less than 2 and, therefore, the case of $\beta_1 = \beta$ clearly exists.

From table 10 it is clear that the t-value for total revenue and total tax revenue is greater than 4. In the case of indirect taxes it is greater than 3 while it is more than 6 in the case of export duties. Likewise direct taxes have t-value just greater than 2. On the other hand import duty has 0.66 t-value. This is followed by excise duties (—0.53), land tax (1.31) and income tax (0.49). In other words, in the total tax structure of Nepal no structural change is found so far as these taxes are concerned. Even the most elastic and revenue buoyant tax i. e. sales tax has t-value less than 2(i.e. 1.2). From this observation the inference can be drawn that the taxes seemed to be revenue buoyant purely because of the series of upward revisions.

Anomaly of Elasticities and Buoyancies

As reflected in tables 1,2 and 3 direct taxes have smaller elasticities as compared with indirect taxes. The importance of smaller or greater elasticity in relation to GDP or components of GDP could be realised from the following statement:

> "Quite apart from what may be done to mobilise resources at the beginning, there remains the problem of sustaining development, i. e. how to plough back the increment resulting from growth. To ascertain this objective, we need a tax structure which will automatically achieve this result. This means that the tax base must grow as income grows. Since rates will only be a fraction of the base, the base must grow faster than state income in order to recapture a substantial part of the increment" (**W.W. Heller, 1954**).

The results recorded in various tables indicate that the direct taxes are responisble for the sluggishness of aggregate tax yields. The elasticities of direct taxes

Table 10

Significance Test of the Difference Between Buoyancy and Elasticity coefficients for the period 1964-65 to 1980-81 ; 1964-65 to 1972-73 and 1972-73 to 1980-81

S. No.	Tax Heads	1964-65 to 1980-81		1964-65 to 1972-73		1972-73 to 1980-81	
		d	t	d	t	d	t
1	ID_t	0.6047	8.5028**	1.2626	4.8406**	0.3844	3.6712**
2	XP_d	0.3737	2.3653*	—1.0228	—1.1079	0.7687	6.4052**
3	MP_d	0.6321	5.3503*	1.1189	0.7075	0.1927	0.6626
4	E_d	1.1885	1.6234	1.0186	0.8046	— 0.4048	— 0.5308
5	S_t	0.6016	1.8473*	1.4300	0.7428	0.2284	1.2369
6	D_t	0.5472	6.7248**	1.0794	3.7973**	0.4308	2.6448**
7	L_t	0.3517	2.9068**	0.7110	2.2240*	0.3659	1.3840
8	I_t	0.4778	3.9368**	2.1049	7.4551**	0.1289	0.4958
9	RG_d	1.0825	5.7917**	2.6526	4.5573**	0.4499	6.3018**
10	TR_t	0.5946	8.8647**	1.1904	4.6564**	0.4237	4.7044**
11	R	0.5304	9.2324**	1.0656	5.0375**	0.3899	4.1210**

★ Significant at 5 per cent level.
★★ Significant al 1 per cent level.

Note :

d = difference between buoyancy and elasticity coefficients $(\beta_i - \beta)$; and

t = t—values where $t = d/S.E.(\beta_i)$ and $S.E.(\beta_i) = \sqrt{V(\beta_i)}$

S. E. = Standard Error.

$V(\beta_i)$ = estimated Variable of β.

are smaller for all the periods. In other words, the supposedly more progressive and more elastic taxes are in fact less elastic. The other anomaly found in the tax income relationship is the low elasticity of land tax. The negative elasticity coefficient for land tax is the result of non-responsiveness of this tax to income. In other words, the productivity of land tax has been negative. This is surprising in a country like Nepal where more than 65 per cent of GDP comes from the agricultural sector. The same is the case with the export duties also.

The elasticity estimates of total revenue (1.01) for the whole period (1964-65 to 1980-81) gives rise to the conclusion that there has been marginal increment of elasticity over the national income. In other words, one per cent change in national income has brought only 1.01 per cent change in the overall tax yied. This result has definitely led to the conclusion that there is considerable inelasticity in the tax yelds.

Is Our Tax System Buoyant ?

When tax system is not sufficiently elastic the government usually attempts to make it more responsive or productive to national income by mobilising resources with additional tax efforts. The gap between the desired level of tax revenue and actual amount could be caused with the strategy to make the tax system highly revenue buoyant. Accordingly, the buoyancy estimates at no time should be considered as a substitute of elasticities or built-in flexibilities.

As shown in tables 4,5 and 6 buoyancy coefficients of direct taxes are smaller as in the case of elasticities. Surprisingly buoyancy coefficient for land tax for the whole period (1964-65 to 1980-81) is only 0.31 and no significant relationship is found with the relevant component of GDP ($R^2 = 0.31$). The buoyancy coefficients for overall tax revenue is 1.54. This means that in Nepal's tax system during the last fifteen years (i. e. from Third Five Year Plan to Fifth Five Year Plan) a one per cent change in national income could bring only 1.54 per cent change in the tax yield. What is wrong with the long exercises of our Planning Commission ?

It is due to the inelasticity and less buoyant nature of tax yields in the tax system that there is always large amount of deficits in our budgets. Consequently dependency on foregin aid and loans has considerably increased. Most of the plans have been dependent by 50 per cent or more on foreign aids and loans. Thus a clear inference could be drawn that the National Planning Commission of Nepal

has not been able to give particular attention to make the tax system more elastic and revenue buoyant. Unfortunately it has indulged for more than 25 years in calculating the growth rates and more recently with a new series of GDP[2]. Although HMG has been trying its best to mobilise domestic resources, the Planning Commission is indifferent. Without a proper evaluation and assessment of the present tax structure of Nepal it would be difficult for the Planning Commission to achieve 5 per cent growth rate during the Sixth Plan Period (1980-85).

Conclusion

From the above discussion it is evident that the inelasticity of taxes in the tax structure of Nepal is primarily concentrated on land tax, export duty, import duty, excise duty and to some extent on income tax (table 1, 2 and 3). We have also seen that the bouyancy for excise duty for the period 1972-73 to 1980-81 is negative. Though overall indireet taxes are nevertheless elastic and buoyant, the trouble lies apparently with direct taxes and its premier and lucrative components i. e. land tax and income tax which are distressingly inelastic.

In the case of export and import duties and excise duties a variety of reasons could be given for the sluggishness In fact the inelastic nature of tax systems in developing countries is an inherent characteristic resulting from heavy reliance placed on indirect taxes. But the present result, contrary to this statement, shows that indirect taxes in general contain better automatic growth potentialities. The export and import duties are based on the volume of incoming and outgoing commodities. Looking at the present pattern of consumption where more than 40 per cent households are below the poverty line[3] it could be said that unless there is drastic change in the pattern of consumption, revenue maximisation from import duties would be a crucial task. The only alternative is to make an autonomous change in the base. As such legislative changes in the base of export and import duties themselves may be regarded as a function of the tax system. In Nepal, more than 80 per cent of the imports consist of consumer goods against 18 per cent of capital goods

2 Central Bureau of statistics has started a new series of GDP data from 1973-74 for which argument has been given that there has been expansion of bases.

3 See HMG, *A Survey of Employment, Income Distribution and Consumption Patterns in Nepal, Summary Report Vol. IV. 1976-77* (Kathmadu: National Planning Commission, Sept. 1978); p. 171. According to the estimation of NPC the population below poverty line as per minimum subsistence consumption approach is 31.54 per cent and as per minimum subsistence income approach is 36 20 per cent.

and intermediate products. Though large imports of capital goods and intermediate products are a reflection of the greater efforts by the country to accelerate the pace of development, consumer goods in excess of consumption capacity may lead to tax evasion and loss of revenue due to the existence of parallel economy. Trade deflection between Nepal and India is one of the serious examples of this kind. Import liberalization could be helpful to defuse the present tension.

Likewise if the base of export duties is expanded perhaps the present level of inelasticity could be reduced significantly. Further its burden also could be shifted to foreigners. Unfortunately for the last many years exportable items are confined largely on agricultural products and agriculture-base manufactured products and thus large revenue could not be collected.

Excise duties would become more revenue responsive to income only when industrialisation of the country gathers momentum. Under the circumstances then more and more commodities would be brought under the purview of excise duties. Though in Nepal excise duties are levied on a large number of industrial products, only a very few commodities are of revenue importance. Thus the inelasticity of excise duties is the outcome of the slow growth of industrialization.

With respect to land tax the problems of high inelasticity in the tax structure of Nepal could be analysed on the basis of the following questions :

1. Why is the importance of traditionally stronghold land tax relegated to its minimum in the present tax structure of Nepal with respect to its contribution to the total revenue and GDP ?
2. Is inelasticity due to low productivity or production ?
3. Is inefficiency of the administration a reason for inelasticity ?
4. Are any other non-economic factors responsible for inelasticity of land tax ?

These questions are very important in regard to the inelasticity of land tax and its implication in the tax structure of Nepal. The rigidity of the tax structure and the inflexibility of the tax base are two important factors leading to an increasingly greater degree of inelasticity. Further land tax is not subjected to productivity and production but based on units. The high degree of inelasticity also indicates that the government has not been able to mobilise effectively resources from the agricultural sector. This is why land revenue has been an insignificant source of revenue for the period 1964-65 to 1980-81.

Land revenue in Nepal lacks progressivity in rate structure because it has a flat rate and its base does not increase at a rate which is anywhere near the growth of national income. Whenever a base is constant a progressive rate sturucture cannot alone fetch high amounts of revenue. Thus unless the base on which land tax is levied is changed, increase in tax yields cannot be expected in future. Under the circumstances the base of the land tax can be expanded either by bringing uncultivable land under cultivation or by increasing the productivity of major crops. But there is li'tle hope whether any of the above said propositions will materialise.

Under the present rate and base structure the inelasticity of land revenue will continue and its contribution to total revenue will be even more sluggish in future. Further as long as absentee land ownership will have a favour in the production process the nature and magnitude of present inelasticity may continue till it reaches its worst phase. The main problem of land revenue system is that it fails to take into consideration the differences in the productivity of land.

With respect to income tax the following questions might be relevant in regard to its inelasticity:

1. Is our slab structure and rate schedule defective ?
2. Is inelasticity an inherent characteristic of an underdeveloped economy ?
3. Is tax evasion or administrative inefficiency responsible for its inelasticity ?

The present range of personal income tax rate in Nepal for seven different slabs varies from 5 to 55 per cent of the income after exemption limit. The exemption limit is Rs. 10,000 for individuals and Rs. 15,000 for family effective from the fiscal year 1981-82. The slab structure for personal income tax varies from Rs 5,000 after exemption to Rs. 30,000 and above and for corporate income the range of the six slabs is between Rs. 10,000 after the exemption to Rs. 1,00,000 and above.[4]

The important factor leading to inelasticity of income tax is that the exemption limit for individuals is 5.2 per cent and for couple and family it is 7.7 per cent as proportion or multiple of per capita income (table 13). Secondly, the income from agricultural sector does not come under the purview of income tax. Thirdly, the existing rates are to be changed moderately.

4 HMG/Nepal, *Budget Speech 1982-83* (Kathmandu: ministry of Finance)

"Moreover there is the general proposition that except in the case of corporations and people with 'large incomes', these taxes mostly absorb consumption expenditure. In other words, while very high tax rates on upper income brackets may adversely affect the incentives to save, invest and take risks and create temptation to avoid taxes, the middle income classes will probably suffer cuts in their consumption standards and try to keep up their savings. Whatever the social reasons for semi confiscatory rates on high income brackets, and low rates on low income brackets, from the standpoint of revenue these rates are disappointing though might be justifiable from equity point of view."[5] (Sahota: 1961)

Though it is very difficult to estimate which rate would be appropriate for income tax in a developing country like Nepal, it is practically significant that the exemption limits and rate and slab schedules should be revised corresponding to the increase in national income. The income tax exemption limit and the per capita income of selected countries for the period 1977-78 has been given in the tabel 11.

The existence of a non-monetary sector may be a strong reason why there is inelasticity of income tax. Lastly the underdevelopment of tax administration is another important reason why there is inelasticity of income tax in Nepal.

An alternative strategy as to how income tax is to be made more elastic and revenue buoyant, if possible, is to change it into mass tax. What is important for this purpose is the rephrasing of the definition of income currently being used for arriving at a taxable income. Then only the concept of mass tax could be successfully implemented. Further unless these problems are handled properly it would be difficult to make suddenly a particular tax system elastic and revenue buoyant, out of a defective tax structure.

5. G. S. Sahota, *Indian Tax Structure and Economic Development* (Bombay : Asia Publishing House, 1961).

Table 11

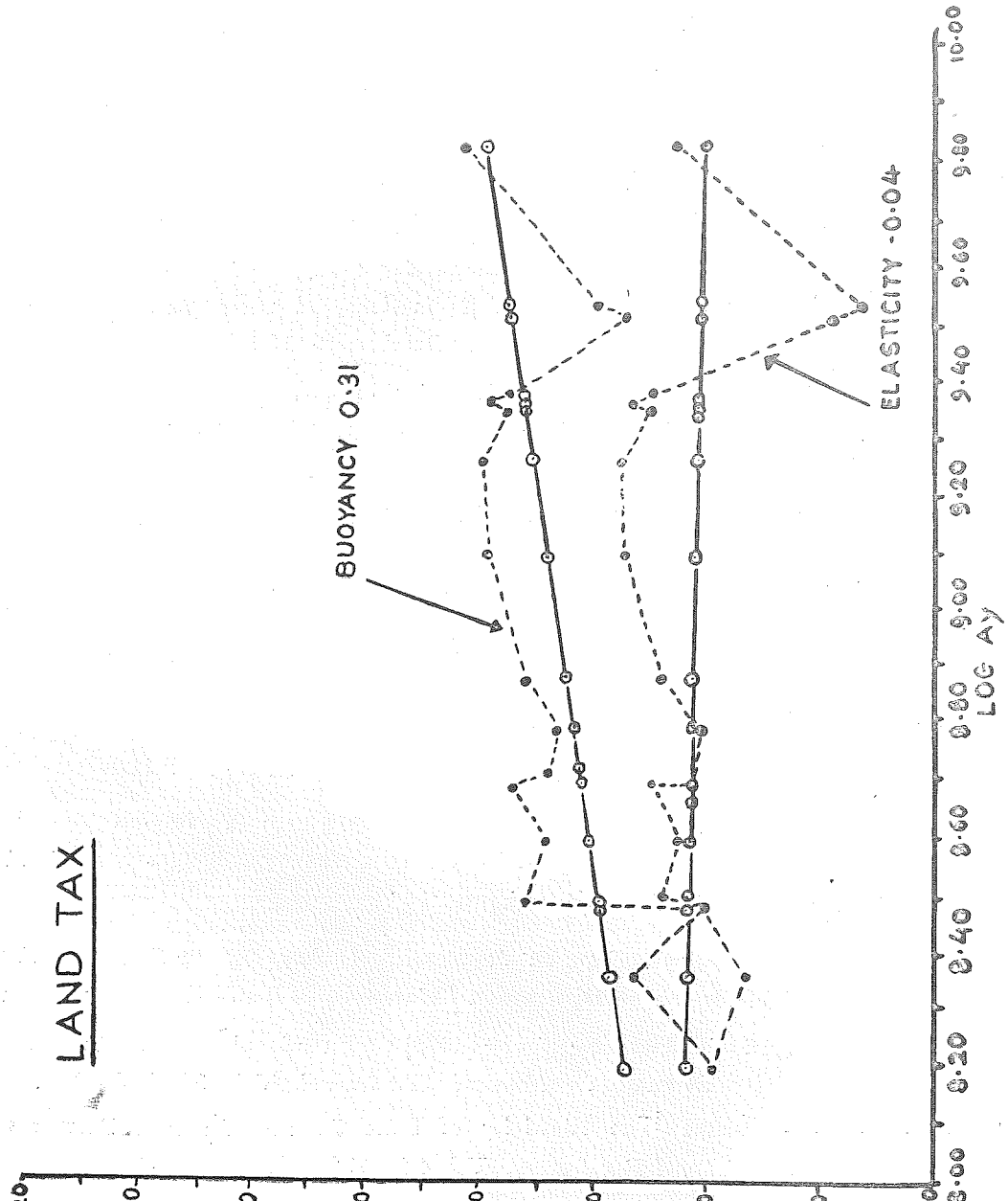
Income Tax Exemption Limit and Per Capita Income of Selected Countries For the Period 1977-78

S.No.	Country	Exemption limit*	Per Capita Income*	(2) as Proportion of (3)
	(1)	(2)	(3)	(4)
1	Australia	1,790	6,336	0.3
2	Belgium	1,64,000	2,92,230	0.6
3	Canada	5,120	8,941	0.6
4	Denmark	21,600	53,894	0.4
5	Fiji	1,800	399	4.5
6	France	15,200	35,392	0.4
7	W. Germany	6,058	19,517	0.3
8	Ghana	3,000	1,547	1.9
9	India**	12,000	1,536	7.8
10	Israel	14,400	41,620	0.3
11	Italy	1,23,000	2,53,653	0.5
12	Japan	11,60,000	16,41,173	0.7
13	Malaysia	2,000	2,398	0.8
14	Nepal ψ	15,000	1,936	7.7
15	Netherland	13,838	18,882	0.7
16	Pakistan	13,500	2,016	6.7
17	Singapore	4,500	4,000	1.1
18	Sri Lanka	4,800	913	5.3
19	Thailand	14,000	8,796	1.6
20	Trinidad & Tobago	4,020	6,302	0.6
21	U. K.***	1,875	3,615	0.5
22	U. S. A.	4,700	10,630	0.4

* In national currencies ** Fiscal year 1980—81 *** Fiscal year 1979—80

ψ for couple and family; the exemption limit for individual is Rs. 10,000/—

Source: *World Tables* (World Bank, 1980).


LAND TAX
BUOYANCY 0·31
ELASTICITY - 0·04
LOG Lt
LOG Ay
6·20
5·60
5·40
5·00
4·60
4·20
3·80
3·40
3·00
8·00
8·20
8·40
8·60
8·80
9·00
9·20
9·40
9·60
9·80
10·00

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