Methodology For Projection of Tax Revenues

1. The method that has been used for projecting tax revenues of the Centre and the States is in the genre of tax-income reponse models viz. a buoyancy model.

2. This method has been preferred to the elasticity approach which measures changes in tax yield owing to automatic growth, without discretionary changes. The elasticity method entails adjusting the tax yield of any year to the simulated yield for that year, if a base year rate-structure had prevailed. The actual tax yield is to be 'cleaned' by a sequence of adjustments intended to remove the effects of discretionary changes. The cleaned tax series is regressed upon the relevant tax base or a suitable proxy like state domestic product using a double log function to estimate elasticity coefficients. Buoyancy, it may noted measures the relative changes in tax yield due to both built in flexibility and due to discretionary changes. The use of buoyancy coefficient has a different role to play than the elasticity coefficient as it indicates how the actual growth of revenue compares with the growth in nominal income.

3. The buoyancy of individual taxes, for the Centre and all the States (except the North Eastern States) has been estimated by regressing tax revenue on nominal Gross domestic product and state domestic product respectively using a double log function. The coefficient has been estimated using the equation:

$$R = a\, Y^b\, u.$$

In the log form the equation would be:

$$\log R = \log a + b \log Y + \log u$$

where, **R** - tax revenue, is the dependent variable, and **Y** - domestic product in nominal terms, is the independent variable and u is a random term.

4. By using the buoyancy coefficients and relating these with the assumed rate of growth of GDP or SDP, one can project future tax-yields. Thus for purposes of making projections the buoyancy coefficient is applied to the rate of growth of income and the rate of growth of tax-revenue is estimated as follows:

$$\dots\dots\frac{\overset{\bullet}{R}}{R} = y \cdot b$$

Where R is tax revenue, 'y' is growth rate of domestic product and 'b' is buoyancy coefficient.

5. On this basis, tax yield in a given year may be projected by applying the estimated rate of growth of tax revenue to the base year figures.

6. The base year, 1994-95, figures to which the growth rate is applied have been arrived at on the basis of a trend rate of growth for the period 1983-84 to 1992-93 estimated using a semi long function.

7. The buoyancy coefficients for individual taxes of the States are given in Tables 1 to 4 and that for the Central taxes in Table 5.

8. Revenue forecasting models with full specifications of tax rates and individual tax bases were not used due to lack of detailed data on the tax bases and multiplicity of tax-rates. Also, the purpose of the exercise was to relate projections of tax yields to the assumed profile of growth of nominal income, which was commonly applied to all the States and the Centre.

9. These estimated buoyancies have been moderated in the case of both the Centre and the States. The moderated buoyancies are placed at Annexure III.1 to III.4 and IV.1.

Table 1

Sales Tax

States	Buoyancy Coefficient	t-statistic	R Squared
Andhra Pradesh	1.177	10.960	0.930
Assam	1.535	17.132	0.970
Bihar	1.057	25.826	0.987
Goa	1.069	25.820	0.987
Gujarat	1.250	12.688	0.947
Haryana	1.092	25.243	0.986
Himachal Pradesh	1.216	16.560	0.968
Jammu & Kashmir	1.023	12.572	0.946
Karanataka	1.291	31.709	0.991
Kerala	1.290	24.387	0.985
Madhya Pradesh	0.955	15.754	0.965
Maharashtra	1.069	25.820	0.987
Orissa	1.222	19.644	0.977
Punjab	0.986	24.100	0.985
Rajasthan	1.062	15.512	0.964
Tamil Nadu	1.108	28.770	0.989
Uttar Pradesh	1.175	32.089	0.991
West Bengal	1.101	28.722	0.989

Table 2

State Excise

States	Buoyancy Coefficient	t-statistic	R Squared
Andhra Pradesh	1.101	11.740	0.939
Assam	0.910	6.386	0.918
Bihar	1.353	27.211	0.988
Goa	1.343	23.808	0.984
Gujarat	1.089	8.440	0.888
Haryana	1.408	23.021	0.983
Himachal Pradesh	1.265	23.469	0.984
Jammu & Kashmir	1.245	5.131	0.745
Karanataka	1.051	23.193	0.984
Kerala	1.067	13.905	0.956
Madhya Pradesh	1.217	23.242	0.984
Maharashtra	1.343	23.808	0.984
Orissa	1.261	19.566	0.977
Punjab	1.165	50.953	0.997
Rajasthan	1.773	9.266	0.905
Tamil Nadu	1.447	2.620	0.432
Uttar Pradesh	1.558	9.421	0.908
West Bengal	0.877	9.939	0.916

Table 3

Motor Vehicle Tax

States	Buoyancy Coefficient	t-statistic	R Squared
Andhra Pradesh	1.020	11.627	0.994
Assam	1.010	33.441	0.992
Bihar	1.497	6.967	0.844
Goa	1.164	13.083	0.950
Gujarat	1.186	5.654	0.780
Haryana	0.786	10.376	0.923
Himachal Pradesh	1.343	22.993	0.983
Jammu & Kashmir	0.827	4.732	0.713
Karanataka	1.136	14.828	0.961
Kerala	1.207	15.357	0.963
Madhya Pradesh	0.802	10.159	0.920
Maharashtra	1.164	13.083	0.950
Orissa	1.408	12.520	0.946
Punjab	0.872	12.167	0.943
Rajasthan	1.421	5.768	0.787
Tamil Nadu	0.905	12.532	0.946
Uttar Pradesh	0.941	8.129	0.880
West Bengal	0.981	17.918	0.973

Table 4

Stamps and Registration Fee

States	Buoyancy Coefficient	t-statistic	R Squared
Andhra Pradesh	1.074	16.522	0.968
Assam	1.117	9.564	0.910
Bihar	1.281	10.798	0.928
Goa	1.539	25.751	0.987
Gujarat	1.301	9.996	0.917
Haryana	1.248	23.339	0.984
Himachal Pradesh	0.858	9.983	0.917
Jammu & Kashmir	0.539	2.330	0.376
Karanataka	1.364	19.190	0.976
Kerala	1.401	17.188	0.970
Madhya Pradesh	1.165	24.724	0.985
Maharashtra	1.539	25.751	0.987
Orissa	1.156	15.463	0.964
Punjab	0.833	8.160	0.881
Rajasthan	1.286	16.412	0.968
Tamil Nadu	1.292	34.551	0.993
Uttar Pradesh	1.309	18.627	0.975
West Bengal	1.246	27.330	0.988

Table 5

Buoyancy of Major Central Taxes

Taxes of Centre	Buoyancy Coefficient	t-statistic	R Squared
Union Excise Duties	1.013	43.398	0.995
Income tax	1.103	16.721	0.968
Corporation tax	1.310	18.890	0.975
Customs Duties	1.389	21.787	0.981