ESTIMATION OF RELATIVE TAXABLE CAPACITY - A METHODOLOGICAL NOTE

B4.1 A major purpose of general revenue sharing in a federation is to enable every State to provide 'reasonable' standards of public services. This requires that those States with lower taxable capacities and those with additional cost disabilities should be assisted to overcome these shortcomings. The First Finance Commission, while laying down the principles governing grants-in-aid, stated that the criterion of budgetary needs should be supplemented with, inter alia, tax effort, to ensure self-help by each of the States in financing its expenditure.

B4.2 Measurement of relative taxable capacity and effort has thus acquired a pivotal significance, but presents a difficult task. The Fifth Finance Commission was the first to take account of the tax effort of the States. However, it measured "effort" merely as the ratio of tax revenue to State Domestic Product (SDP) of the States. The Seventh Finance Commission, which computed a 'revenue equalisation formula', measured it by regressing tax revenue on SDP in a linear model. Similarly, the Planning Commission, which assigns a 10 per cent weight for tax effort in the modified Gadgil formula for distributing Plan assistance to the States, takes the tax-SDP ratio as a measure of tax effort.

B4.3 Weaknesses of the tax-SDP ratio as a measure of tax effort are well-known. To recapitulate, first, this measure assumes that the taxable capacity of a State depends on only one factor, SDP. The tax bases of the States are diverse and although all taxes are ultimately paid out of incomes or wealth, SDP cannot be construed as the sole determinant. The economic structure of the States determined by such factors as degree of urbanisation, industrialisation and monetisation affects their taxable capacity. These factors can also affect administrative efficiency and, thus, tax compliance. Further, commodity taxes predominate in the States and in a tax regime marked by exemptions and high differentiation in tax rates, the distribution of consumption (income) may also determine the States' relative taxable capacity.

B4.4 Second, the assumption of proportionality between incomes and tax revenues is unlikely to hold in the Indian context because of the system of exemptions and rate differentiation introduced to impart progressivity in the States' commodity tax structure. As the proportion of tax-exempt and leniently taxed items is likely to be larger in the total consumption (income) of poorer States, the tax-SDP ratio as a measure of tax effort could impart a bias against them. Thus, this measure of tax effort does not adequately take into account the differences in per capita income among the States. Therefore, attempts have been made to develop more satisfactory approaches to measure relative taxable capacity.

Estimating Taxable Capacity – Alternative Approaches

B4.5 Broadly, there are two approaches to measuring relative tax capacity and effort [1]: (i) the Aggregate Regression (AR) approach and (ii) the Representative Tax System (RTS) approach.

B4.6 In the AR approach, tax revenue, either per capita or as a ratio of SDP, is regressed on capacity indicators such as per capita income/consumption, the structure of the economy, the level of urbanisation and monetisation and the inter-personal distribution of incomes, in a linear or a loglinear model. The regression coefficients indicate the 'average' effective rates of tax. By substituting the actual values of the independent variables in the estimated equation, taxable capacity is estimated [2].

B4.7 In the RTS approach, first, the bases for each tax levied by the States are quantified and then, by applying the all-States average effective tax rates (the total yield from the tax divided by the total value of the tax base) on the tax bases of individual States, an estimate of their taxable capacity is derived. By adding up the taxable capacity of individual taxes, the aggregate taxable capacity of a State is estimated [3].

B4.8 There are merits and flaws in both the approaches. The AR approach does not call for highly disaggregated data and also takes account of the inter-dependence of the tax bases. Sometimes, the effective rate itself can vary with the size of the tax base (the effective tax rate may be higher in a more developed State than in a less developed State), which is captured in the regression approach. However, in the regression approach the estimates are not derived by relating tax revenue to the actual or proxy tax bases, but only to macro capacity indicators. Although tax-wise analysis is possible under this method, aggregating the results from such a micro analysis takes away the advantage of taking into account the inter-dependence of the tax bases. The major weakness of the method, however, is that the residual error is taken to represent tax effort. The omission of variables representing effort in the equation may impart a bias in the regression estimates.

B4.9 On the other hand, the RTS approach has the merit of relating tax revenue to the individual tax bases or their proxies and, therefore, the logic of the method is more transparent. However, this method faces certain other problems, primarily the non-availability of data on tax bases at the required level of disaggregation. This becomes crucial given the complex tax systems in the States. In the case of Sales Tax alone, there are differences in the points of levy (first-point, last-point), the number of taxable points (single-point, double-point and multi-point) and the nominal rates of tax. In fact, the number of nominal tax rates levied ranges from six in the case of Orissa to as many as nineteen in the cases of Bihar and Gujarat. In such a situation, obtaining data on the tax bases as also the tax yield from each of the tax rate categories becomes virtually impossible. Consequently, the tax bases are aggregated into some manageable groups and tax base proxies are employed wherever the actual tax base data are not available. Because of this type of aggregation, the use of simple average effective tax rates may impart a bias against the poorer States. For example, if all the food articles are taken as one category of Sales Tax base then, given that the nominal rates on foodgrains are lower than the rates on more expensive food articles (such as packed food and dry fruits), and further that the proportion of consumption of the former in a poorer State would be higher, using a uniform average tax rate for all the food articles might work against these States.

B4.10 Considering the problems associated with the two approaches, in our first report, we adopted the Aggregate Regression approach for the major States, with one modification. This involved the pooling of cross-section observations over the period from 1980-81 to 1984-85 in a covariance model. The object was to improve the efficiency of the estimates by endogenising tax effort rather than taking it as a part of the random error term. In order to impart homogeneity in the assessment and to reduce

inequity, the States were grouped into high income, middle income and low income categories. Per capita tax revenues were regressed on per capita SDP, proportion of non-primary sectoral SDP and the Lorenz ratio of consumption expenditure distribution. By substituting the actual values of the independent variables and the average value of the State dummies (standardised to add to unity) in the equations we obtained the estimates of taxable capacity in the base year (1984-85).

B4.11 For the period 1990-95, however, we stated in our first report that : "Taxable capacity will be estimated on the basis of an appropriate method such as the representative tax system approach or the regression approach". We decided in favour of the Representative Tax System approach because it gives us tax by tax estimates and as these estimates are derived by the use of relevant tax bases (actual and proxy), they are more easily understood and, therefore, find easier acceptance.

B4.12 We entrusted the National Institue of Public Finance and Policy with the task of collecting the requisite data from the States for applying the RTS approach and deriving estimates of taxable capacity. The NIPFP was also requested to carry out preliminary exercises in order to enable us to identify the more suitable methodology given data availability and other considerations. In their exploratory exercise, the NIPFP found that they could not apply the simple RTS methodology mainly due to data limitations. Their exercise showed us that we had to marry the RTS approach with the regression methodology. Using the NIPFP study as the base, we estimated tax-wise capacities by employing cross-section regression average tax rates. These estimates were presented at a meeting of experts convened by us. They expressed the view that, considering the complexities in the States' tax systems and the non-availability of reliable disaggregated data on tax bases or their proxies, the RTS method of determining taxable capacity might not be appropriate. Nor did they approve of the computation of taxable capacity on the basis of cross-section regressions for the major taxes. They suggested that the covariance method used in the first report could be used with certain improvements. While a few of the experts indicated their preference for the aggregate model that was used for the first report, but based on a longer time series with both slope and intercept dummies specified, others were of the view that a tax by tax analysis would have more information content and would be useful in identifying the problem areas for raising tax revenues in different States. They further suggested that norms should be evolved separately for the States grouped on the basis of their level of development as the variables representing per capita SDP in the equation may not adequately capture the heterogeneity among the States.

B4.13 We have sought to improve upon the model used for estimating taxable capacity in the first report by incorporating some additional variables such as road and railway length per thousand population and variance of lognormal distribution in consumer expenditures instead of the Lorenz ratio. However, there were no significant differences in the results of taxable capacity derived by this model from the results obtained in the first report. A possible improvement could have been a longer time series and introduction of slope dummies in addition to the intercept dummies for the States. However, the data on the New Series (1981) of SDP are available only for the period 1980-81 to 1984-85 and putting slope dummies in addition to intercept dummies for the States would have seriously restricted the degrees of freedom and affected the efficiency of the estimates. Also, although we are interested in only the aggregate taxable capacity estimates, the tax by tax analysis would enable us to incorporate a larger number of determinants in the analysis and choose appropriate functions for each of the taxes.

Methodology

B4.14 On a balance of considerations, we preferred to re-estimate relative taxable capacities of the States from each of the major taxes and summed them up to arrive at an estimate of aggregate taxable capacity. For the purpose, we have taken separately six major taxes, namely, (i) Sales Tax (including Central Sales Tax and Purchase Tax on Sugarcane), (ii) State Excise Duties, (iii) Stamp Duty and Registration Fees, (iv) Motor Vehicles Tax and Passengers and Goods Tax, (v) Entertainment Tax, (vi) taxes on agricultural land and incomes, and a residual category, other taxes. As the revenues from the taxes on agricultural land and incomes and other taxes were not amenable to proper statistical analysis, we preferred to make projections on the basis of the actuals. It is necessary to mention in this connection that the revenue from cess on mines and minerals has been excluded from agricultural taxes wherever it is shown under the head and included alongwith royalty on mines for the sake of uniformity. As the revenue from agricultural taxes is projected on the basis of actuals, transferring the cess to the non-tax revenue side does not affect the estimates of revenue capacity in the States.

B4.15 Taxable capacity of the States for the remaining five major taxes has been estimated by employing the model using pooled time-series and cross-section observations. Although the model is similar to the one employed in the first report, two important differences may be noted. First, as already mentioned, unlike the aggregate model used in the first report, the estimates have been made separately for the five major taxes. As the behaviour of different taxes could differ, this disaggregated analysis allows us to choose the best fitting functional form of the equations for each tax. Further, in a disaggregated analysis we can relate individual taxes to relevant bases or proxies. Thus, essentially, the method is a modified Representative Tax System approach wherein instead of the arithmetic mean effective tax rate, the regression average rate is taken as the norm. Secondly, while the first report used the quasi-restricted "fixed effects" model with a common slope but varying intercepts across the States, the present model is a completely restricted one - with both intercepts and slope parameters assumed to be common across the States. However, we have allowed the model to capture the inter-temporal shifts through intercept time dummies. In other words, in the model, we estimate the behaviourial relationships between each of the major taxes and the relevant tax base proxies, separating out the `shifts' over time through time dummies, but without separating the State-specific effects. Therefore, unlike in the earlier model where the average value of State dummies had to be substituted alongwith the actual values of capacity variables and time dummies to estimate taxable capacity, in the present model, as the State dummies have not been estimated, substitution is done only for the capacity variables and time dummies. In order to reduce heterogeneity in the sample and to evolve equitable norms the States have been grouped into high income, middle income and low income categories for the three major taxes, namely, the Sales Tax, Stamp Duty and Registration Fees and Motor Vehicles and Passengers and Goods Taxes. In the case of State Excise Duties, data on the tax base proxies were available only for three years and, therefore, to permit adequate degrees of freedom, the States have been classified into only two categories. In the case of Entertainment Tax, no grouping of the States has been resorted to. The results of the regressions of the major taxes are analysed in what follows.

Analysis Of The Results

(i) Sales Tax:

B4.16 The closest tax base proxy for the Sales Tax is the State Domestic Product and its sectoral composition. Other variables such as proportion of urban population, electricity consumption, road and railway length per thousand persons or thousand sq. km. area and inter-State price differences could also be important in determining the Sales Tax revenues in different States. However, the New Series [1981] data on SDP are available only for the period 1980-81 to 1984-85 and, therefore, we have confined our analysis to this period.

B4.17 For the reasons mentioned earlier, we have grouped the States into three categories. The results of regression

analysis are presented in Table B.4.1. In the case of high income States, it may be seen that total SDP and proportion of non-primary sectoral SDP together explain about 98 per cent of variations in the Sales Tax revenues among the States, with the latter variable being significant at one per cent level in a log-linear equation. In the case of middle income States, per capita Sales Tax revenue is found to be significantly related to the road and railway length per thousand sq. km. area and per capita electricity consumption in a log-linear model. Both the variables are found to be significant at one per cent level and the R-Bar-Squared of the equation is 0.96. In the case of low income States, variation in total Sales Tax revenue is explained by SDP, road and railway length per thousand sq. km. area and per capita electricity consumption. All the three variables are significant at one per cent level and explain about 90 per cent of variations in the tax revenue.

(II) Stamp Duties And Registration Fees:

B4.18 Although the value of property transactions, particularly immovable property transactions, should be taken as the tax base, reliable information on the variable is not available. We have, therefore, been constrained to use proxies such as SDP, its sectoral composition, and road and railway length per thousand sq. km. area. The larger the SDP, the higher should be the volume and value of property transactions. In the States where the proportion of non-primary sectoral SDP is higher, the volume and value of immovable property transactions is expected to be higher. Road and railway length per thousand sq. km. area, which denotes connectivity, also can be taken to determine both the volume of property transactions and the price of property transacted.

B4.19 As in the case of Sales Tax, since the SDP is an important variable, the analysis is confined to the period from 1980-81 to 1984-85. Here too, we have analysed the behaviour of the tax separately in high income, middle income and low income States.

B4.20 It may be seen from Table B.4.1 that in the cases of both high income and middle income States, SDP and road and railway length per thousand sq. km. area are found to be significant. For the high income States about 90 per cent of variations in tax revenues is explained by the two variables whereas for the middle income States, the R-Bar-Squared is 0.65. In the case of low income States, SDP is found to be the significant factor but we have also retained the proportion of non-primary sectoral SDP and road and railway length per thousand population in the equation. The R-Bar-Squared of the equation is 0.97.

(III) Tax On Motor Vehicles And Goods And Passengers:

B4.21 The revenue from the tax essentially depends upon the number and the types of motor vehicles registered in different States. Information on motor vehicles by types of vehicles registered in the States is available only upto 1985-86. We have, therefore, confined our analysis to the period from 1980-81 to 1985-86.

B4.22 Taking types of motor vehicles rather than their total number as explanatory variables in the equations does not lead to any specific advantage in revenue forecasting and may even result in multicollinearity. After various trials, the total number of vehicles and the proportion of heavy vehicles to total vehicles were found to explain the variations in tax revenue significantly at one per cent level and the equations for the two categories have very high explanatory power. In the case of low income States, however, only the total number of vehicles was found to be significant, perhaps, because the composition of types of vehicles in different States within the group is not very different. In the case of these States, the equation has an R-Bar Squared of over 0.86.

(Iv) State Excise Duties:

B4.23 Consumption of different types of liquor has been taken as the base of State Excise Duties. The NIPFP study has collected information on consumption of country spirit, Indian made foreign liquor (IMFL) and beer in the major States for the years 1982-83 to 1984-85. We have, therefore, confined our analysis to these three years.

B4.24 In this connection, it is necessary to mention that of the 14 major States, Gujarat has been following prohibition policy and revenue accrues under this head only on account of duty on medicinal and toilet preparations. Therefore, we have confined our statistical analysis to 13 States. Considering this and given that the data are available only for three years, we have classified the States into only two categories, that is, States having above and below average per capita SDP. Andhra Pradesh, Haryana, Karnataka, Kerala, Maharashtra, Punjab and West Bengal fall into the first category. The second category consists of six States - Bihar, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh.

B4.25 The regression results presented in Table B.4.1 show that tax revenue variations among more developed States are explained by the consumption of country spirit and road and railway length per thousand population. Both the variables are significant at one per cent level and the R-Bar-Squared of the equation is 0.78. In the case of less developed States, however, the two significant variables are consumption of country spirit and SDP of the State, with the equation having an R-Bar-Squared of 0.89.

(v) Entertainment Tax:

B4.26 Entertainment Tax mainly accrues from Cinema although there are some receipts from betting, horse racing and such other recreational activities. Among the 14 major States, Kerala has transferred the taxing power under this head to the local bodies and, therefore, significant revenues are collected only in the other 13 States. The NIPFP study has collected information on seating capacity in cinema halls in various States for the three years, 1982-83 to 1984-85. This being the tax base proxy, we have confined our analysis to these three years.

B4.27 In the case of Entertainment Tax, after considerable experiment, we have preferred to make the analysis for all the 13 States without resorting to any grouping to avoid spurious results. Our analysis shows that the tax revenue is significantly related to seating capacity, SDP and the proportion of urban population to total population in the States. While the seating capacity is the overall capacity indicator, the other two variables proxy both the occupancy ratio and the proportion of higher denomination seats occupied. The equation is significant at one per cent level with an R-Bar Squared of 0.91.

Estimate Of Taxable Capacity And Projections

B4.28 As mentioned earlier, taxable capacity is estimated by substituting the values of the independent variables for the last year of observation and the coefficient of time dummy variable for the same year[4]. For all the taxes except Motor Vehicles and Passengers and Goods Taxes, the estimates have been made for 1984-85 and for the latter, for 1985-86.

B4.29 The taxable capacity estimates made for the initial year is projected to the base year 1989-90. Agricultural taxes and other taxes for which no normative estimates are made are projected to 1989-90 on the basis of the trend rates of growth. As for the other items of tax revenue, we generated two alternative projections by applying two sets of growth rates, the first, on the basis of buoyancies of various taxes in high, middle and low income groups of States multiplied by the trend rate of growth of SDP in each State, and the second, by applying the trend rates of growth in tax revenue observed in the respective States. Generally, as in the States where the performance in the initial year was below average, the trend rates of growth too were lower. Therefore, the application of normative growth computed with the first method would have required these States to raise revenues even by a higher percentage than was indicated in the estimates of the initial year. To be more realistic, therefore, we applied the

second method. According to this, the performance of the States in 1989-90 shows an improvement over the initial year if the rate of growth of tax revenue during the period is faster than its own trend rate of growth of the tax.

B4.30 It may be recalled that, for ensuring comparability, the cess on mines and minerals levied in the States under the Major Head 'Land Revenue' has been treated as non-tax revenue. However, it is possible to argue that for the purpose of assessing the tax performance, the cess should be considered as tax revenue. In the case of agricultural taxes, as we have not made any normative estimates, but merely projected the revenue on the basis of actuals, from the point of view of estimates of taxable capacity, transferring cess on mines and minerals to the non-tax revenue side does not matter. However, in assessing tax performance, it may be preferable to transfer the cess to the tax revenue side. As the cess on mines and minerals has been projected for the period of our recommendation on the basis of budget estimates of 1989-90 (B.E), we have added the yield to tax revenue both in the potential and actual figures for the year 1989-90. The resulting relative performance of different States is shown in Table B.4.2.

B4.31 It may be noted that the taxable capacity estimates for Gujarat do not include any revenue from State Excise Duties other than on medicinal and toilet preparations, due to the State's prohibition policy. At the same time, the estimates for Tamil Nadu include revenue from country liquor because prohibition was introduced there only in 1987-88. The Commission, after considering the issues involved, decided to take into account 30 per cent of revenue that would have accrued to these States had there been no prohibition in them. Accordingly, in the base year (1989-90) estimates of taxable capacity from State Excise Duties, we have added Rs.72 crore in the case of Gujarat (as the estimates do not include revenue from State Excise Duties), and deducted Rs.272 crore in the case of Tamil Nadu (as the estimates already include revenue from State Excise Duties).

B4.32 From the taxable capacity estimates for the base year 1989-90, we made projections for the period of our recommendation, 1990-91 to 1994-95. This has been done by assuming a real SDP growth of 6 per cent per annum and an increase in the price level of 5 per cent per annum. Keeping these in the background, we have assumed the tax revenues to grow normatively at 11.5 per cent per annum. Individual taxes are projected on the basis of their past behaviour and adjusted pro rata to conform to the aggregate.

B4.33 It has been pointed out that the observed undertaxation in the States where it prevails is the result of the operation of the tax systems for a number of years and cannot be remedied overnight. In order to provide adequate time for adjustment, we have reckoned normative tax revenues in a phased manner starting from the trend levels in 1989-90 and reaching the normative levels in 1994-95. Under this plan, no State is suddenly put to any undue hardship and can adopt appropriate policies to reach normative levels of tax revenue by the terminal year of our recommendation. The projected normative levels of tax revenues are presented in Table B.4.3.

Notes:

1. For a review of the two approaches, see Bahl [1971, 1972] and Akin [1973].

2. For studies using regression approach in the Indian context, see Nambiar and Rao [1972], Reddy [1975], Prasad [1988] and Oommen [1987].

3. The two important studies measuring taxable capacity using the Representative Tax System approach are : Thimmaiah [1979] and Chelliah and Sinha [1982].

4. We have adjusted the constant term so that the total estimated revenue equals the total observed revenue in respect of each of the taxes as is suggested in Intriligator [1980].

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Regression Results

Dependent Variable	Total Tax Revenue from from Sales Tax		
Income Category	High Income States		
Number Of Observations	20 Degrees Of Freedom		13

Regressor	Coefficient	Standard Error	T-Ratio
1 State Domestic Product at Factor Cost	0.3769	0.2169	1.7378
2 Proportion of income originating from non-primary sector to total income originating	2.8775	0.7326	3.9279
Time period (1980-81)	6.7832	3.3084	2.0503
Time period (1981-82)	6.9494	3.3456	2.0772
Time period (1982-83)	6.9281	3.3367	2.0763
Time period (1983-84)	6.9650	3.3601	2.0729
Time period (1984-85)	6.9340	3.3666	2.0596

R - Squared	0.9852	Residual Sum of Squares	0.1755
R - Bar - Squared	0.9784	S.E. of Regression	0.1162

Dependent Variable	Per Capita Tax Revenue from Sales Tax		
Income Category	Middle Income States		
Number Of Observations	25 Degrees Of Freedom		18

Regressor	Coefficient	Standard Error	T-Ratio
1 Road/railway length per 1000 square kilometre area	0.4472	0.0327	13.6831
2 Per capita energy sales to ultimate consumers	0.4304	0.0572	7.5212
Time period (1980-81)	-0.5235	0.2992	-1.7496
Time period (1981-82)	-0.3564	0.3030	-1.1761
Time period (1982-83)	-0.2836	0.3038	-0.9335
Time period (1983-84)	-0.1669	0.3030	-0.5508
Time period (1984-85)	-0.0772	0.3105	-0.2485

R - Squared	0.9698	Residual Sum of Squares	0.0634
R - Bar - Squared	0.9597	S.E. of Regression	0.0594

Dependent Variable	Total Tax Revenue from Sales Tax		
Income Category	Low Income States		
Number Of Observations	25 Degrees Of Freedom		18

Regressor	Coefficient	Standard Error	T-Ratio
1 State Domestic Product at Factor Cost	0.7414	0.0684	10.8323
2 Proportion of income originating from non-primary sector to total income originating	2.6072	0.5096	5.1163
Time period (1980-81)	1.9193	1.2380	1.5503
Time period (1981-82)	1.9356	1.2270	1.5774
Time period (1982-83)	1.8962	1.2214	1.5525
Time period (1983-84)	1.9421	1.2429	1.5626
Time period (1984-85)	1.8708	1.2256	1.5265

R - Squared	0.9678	Residual Sum of Squares	0.2383
R - Bar - Squared	0.9571	S.E. of Regression	0.1151

Dependent Variable	Total Tax Revenue from Stamps and Registration		
Income Category	High Income States		
Number Of Observations	20 Degrees Of Freedom		13

Regressor	Coefficient	Standard Error	T-Ratio
1 State Domestic Product at Factor Cost	0.5633	0.0542	10.4006
2 Road/railway length per 1000 square kilometre area	0.3408	0.0756	4.5050
Time period (1980-81)	-1.5170	1.0605	-1.4305
Time period (1981-82)	-1.3938	1.0733	-1.2986
Time period (1982-83)	-1.4140	1.0806	-1.3085
Time period (1983-84)	-1.4668	1.0907	-1.3448
Time period (1984-85)	-1.4720	1.0980	-1.3406

R - Squared	0.9156	Residual Sum of Squares	0.1728
R - Bar - Squared	0.8767	S.E. of Regression	0.1153

Dependent Variable	Total Tax Revenue from Stamps and Registration		
Income Category	Middle Income States		
Number Of Observations	25 Degrees Of Freedom		18

Regressor	Coefficient	Standard Error	T-Ratio
1 State Domestic Product at Factor Cost	0.7701	0.1496	5.1487
2 Road/railway length per 1000 square kilometre area	0.4676	0.1129	4.1429
Time period (1980-81)	-5.0338	2.4890	-2.0225
Time period (1981-82)	-5.0122	2.5099	-1.9970
Time period (1982-83)	-4.9883	2.5270	-1.9740
Time period (1983-84)	-5.0250	2.5535	-1.9679
Time period (1984-85)	-4.9691	2.5722	-1.9319

R - Squared	0.7575	Residual Sum of Squares	0.4750
R - Bar - Squared	0.6766	S.E. of Regression	0.1625

Dependent Variable	Total Tax Revenue from Stamps and Registration		
Income Category	Low Income States		
Number Of Observations	25 Degrees Of Freedom		17

Regressor	Coefficient	Standard Error	T-Ratio
1 State Domestic Product at Factor Cost	1.4339	0.0871	16.4542
2 Proportion of income originating from non-primary sector to total income originating	0.7756	0.6511	1.1913
3 Road/railway length per 1000 population	0.0702	0.0823	0.8529
Time period (1980-81)	-10.9559	1.5894	-6.8928
Time period (1981-82)	-10.9979	1.5750	-6.9828
Time period (1982-83)	-10.9343	1.5678	-6.9741
Time period (1983-84)	-11.0640	1.5960	-6.9323
Time period (1984-85)	-11.1049	1.5728	-7.0605

R - Squared	0.9805	Residual Sum of Squares	0.2914
R - Bar - Squared	0.9725	S.E. of Regression	0.1309

Note: *Income categories :*
  a) *High Income States : Gujarat, Haryana, Maharashtra, Punjab.*
  b) *Middle Income States : Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, West Bengal.*
  c) *Low Income States : Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh.*

Note: *Income categories :*
  a) *High Income States : Gujarat, Haryana, Maharashtra, Punjab.*
  b) *Middle Income States : Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, West Bengal.*
  c) *Low Income States : Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh.-*

Dependent Variable	Revenue from Motor Vehicles and Passenger Goods Taxes		
Income Category	High Income States		
Number Of Observations	24 Degrees Of Freedom		16

	Regressor	Coefficient	Standard Error	T-Ratio
1	Total registered motor vehicles	0.3877	0.0517	7.4921
2	Proportion of heavy vehicles to total vehicles	0.9000	0.1495	6.0220
	Time period (1980-81)	5.6257	0.7305	7.7016
	Time period (1981-82)	5.5621	0.7315	7.6032
	Time period (1982-83)	5.9292	0.7397	8.0157
	Time period (1983-84)	5.9925	0.7524	7.9643
	Time period (1984-85)	5.9945	0.7623	7.8634
	Time period (1985-86)	6.0493	0.7711	7.8450

R - Squared	0.8968	Residual Sum of Squares	0.5007
R - Bar - Squared	0.8516	S.E. of Regression	0.1769

Dependent Variable	Revenue from Motor Vehicles and Passenger Goods Taxes		
Income Category	Middle Income States		
Number Of Observations	30 Degrees Of Freedom		22

	Regressor	Coefficient	Standard Error	T-Ratio
1	Total registered motor vehicles	1.5207	0.1705	8.9216
2	Proportion of heavy vehicles to total vehicles	0.5556	0.1830	3.0359
	Time period (1980-81)	-9.6157	1.9735	-4.8723
	Time period (1981-82)	-9.7024	1.9920	-4.8706
	Time period (1982-83)	-9.7840	2.0110	-4.8653
	Time period (1983-84)	-9.7768	2.0262	-4.8252
	Time period (1984-85)	-9.8064	2.0473	-4.7898
	Time period (1985-86)	-9.8303	2.0671	-4.7555

R - Squared	0.8458	Residual Sum of Squares	1.0313
R - Bar - Squared	0.7967	S.E. of Regression	0.2165

Dependent Variable	Revenue from Motor Vehicles and Passenger Goods Taxes		
Income Category	Low Income States		
Number Of Observations	30 Degrees Of Freedom		23

	Regressor	Coefficient	Standard Error	T-Ratio
1	Total registered motor vehicles	0.9202	0.0725	12.7014
	Time period (1980-81)	-3.1471	0.8918	-3.5288
	Time period (1981-82)	-3.1286	0.9004	-3.4748
	Time period (1982-83)	-3.0506	0.9091	-3.3557
	Time period (1983-84)	-3.0728	0.9194	-3.3424
	Time period (1984-85)	-3.0075	0.9262	-3.2471
	Time period (1985-86)	-3.0592	0.9425	-3.2459

R - Squared	0.8917	Residual Sum of Squares	1.5534
R - Bar - Squared	0.8635	S.E. of Regression	0.2599

Note: Income categories :
  a) High Income States : Gujarat, Haryana, Maharashtra, Punjab.
  b) Middle Income States : Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, West Bengal.
  c) Low Income States : Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh.

Dependent Variable	Total Revenue from State Excise Duties		
Income Category	High Income States		
Number Of Observations	21 Degrees Of Freedom		16

	Regressor	Coefficient	Standard Error	T-Ratio
1	Consumption of Country Spirit (PL)	0.7172	0.1004	7.1403
2	Road/railway length per 1000 population	0.3819	0.1173	3.2554
	Time period (1982-83)	-2.7314	1.6699	-1.6357
	Time period (1983-84)	-2.6895	1.6806	-1.6003
	Time period (1984-85)	-2.5265	1.6831	-1.5011

R - Squared	0.8235	Residual Sum of Squares	0.9363
R - Bar - Squared	0.7794	S.E. of Regression	0.2419

Dependent Variable	Total Revenue from State Excise Duties		
Income Category	Low Income States		
Number Of Observations	18 Degrees Of Freedom		13

	Regressor	Coefficient	Standard Error	T-Ratio
1	Consumption of Country Spirit (PL)	0.8276	0.1169	7.0777
2	State Domestic Product at Factor Cost	0.8712	0.1759	4.9529
	Time period (1982-83)	-16.7964	2.2481	-7.4713
	Time period (1983-84)	-16.9020	2.2749	-7.4299
	Time period (1984-85)	-16.8711	2.2871	-7.3765

R - Squared	0.9170	Residual Sum of Squares	1.1138
R - Bar - Squared	0.8914	S.E. of Regression	0.2927

Note: Income categories :
  a) High Income States : Andhra Pradesh, Haryana, Karnataka, Kerala, Maharashtra, Punjab, West Bengal.
  b) Low Income States : Bihar, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh.

Dependent Variable	Total Tax Revenue from Entertainment Taxes		
Income Category	Major States excluding Kerala		
Number Of Observations	39 Degrees Of Freedom		33

	Regressor	Coefficient	Standard Error	T-Ratio
1	State Domestic Product at Factor Cost	0.9348	0.1497	6.2443
2	Seating capacity in cinema halls	0.2837	0.0857	3.3115
3	Proportion of urban population to total population	0.8174	0.1550	5.2728
	Time period (1982-83)	-11.4031	1.4053	-8.1141
	Time period (1983-84)	-11.5149	1.4265	-8.0719
	Time period (1984-85)	-11.5453	1.4378	-8.0298

R - Squared	0.9194	Residual Sum of Squares	2.3070
R - Bar - Squared	0.9071	S.E. of Regression	0.2644

Taxable Capacities Of The 14 Major States From Different Taxes For 1989-90

(Rs. Lakh)

STATE	Sales Tax	State Excise Duty	Motor Vehicle Tax	Stamps And Registration	Enter-tainment Tax	Agriculture And Land Revenue	Other Taxes	Normative Taxable Capacity	Tax Revenue (Trend)	Per Cent Tax Effort	Tax Revenue (B.E.)	Per Cent Tax Effort
1 Andhra Pradesh	126611	60887	16643	9343	6158	1744	7113	228499	246537	107.89	236193	103.37
2 Bihar	65108	8406	11120	7079	1570	1988	1572	96843	87653	90.51	93474	96.52
3 Gujarat	126835	8045	19264	8374	5858	2814	14908	186097	187653	100.84	164674	88.49
4 Haryana	42430	25262	13809	6096	894	233	434	89157	85178	95.54	86967	97.54
5 Karnataka	105658	38906	21650	10197	5622	2143	3388	187564	182640	97.37	181045	96.52
6 Kerala	76958	15991	10891	9264	1	3865	313	117283 ·	121929	103.96	112936	96.29
7 Madhya Pradesh	70806	17606	18241	8572	3562	1553	1481	121821	119361	97.98	127520	104.68
8 Maharashtra	261532	58961	26131	14250	16997	3600	23333	404805	405917	100.27	377484	93.25
9 Orissa	30076	3943	4054	2469	888	943	0	42373	39952	94.29	43666	103.05
10 Punjab	59173	36959	11869	9468	2006	351	926	120752	113735	94.19	117436	97.25
11 Rajasthan	55530	12159	11693	4883	1510	2453	398	88625	100293	113.17	96317	108.68
12 Tamil Nadu	181611	23289	21877	14672	7358	3815	8963	261584	243039	92.91	233802	89.38
13 Uttar Pradesh	127731	30010	24272	23799	6937	2948	13	215710	255225	118.32	216629	100.43
14 West Bengal	112357	16300	17939	10511	7096	1829	6957	172989	154309	89.20	198112	114.52
14 Major States	1442417	356723	229452	138977	66457	30277	69800	2334103	2343421	100.40	2286255	97.95

Note : 1. Thirty per cent of the presumed loss on account of the prohibition policy has been added to the taxable capacity estimates of Gujarat and Tamil Nadu.

2. Revenue from "Agriculture and Land Revenue" and "Other Taxes" have been projected on the basis of actuals for the year 1986-87.

Projections Of Normative Tax Revenue Of The 14 Major States

(Rs. Lakh)

Revenue Category : Sales Tax

	1989-90 (1)	1990-91 (2)	1991-92 (3)	1992-93 (4)	1993-94 (5)	1994-95 (6)	1990-91 to 1994-95 (7)
1 Andhra Pradesh	135084	149191	164598	181378	199592	219278	914036
2 Bihar	66323	74418	83324	93055	103472	113297	467566
3 Gujarat	138709	154054	170771	188754	207312	220715	941606
4 Haryana	42155	47112	52633	58780	65622	73235	297383
5 Karnataka	106551	118920	132612	147765	164530	183074	746902
6 Kerala	81997	90629	100075	110393	121641	133876	556612
7 Madhya Pradesh	67064	76635	87246	98979	111688	122835	497384
8 Maharashtra	272655	302976	336072	372120	411288	453734	1876189
9 Orissa	27489	31842	36320	41329	46890	52358	208738
10 Punjab	57739	64945	73041	82123	92183	102175	414466
11 Rajasthan	61731	68049	74835	82127	89848	96895	411754
12 Tamil Nadu	163799	188219	215980	247471	282601	315028	1249298
13 Uttar Pradesh	124848	144205	163548	183837	204987	221618	918196
14 West Bengal	105555	120696	137768	156949	177935	194774	788123
14 Major States	1451699	1631890	1828822	2045059	2279589	2502892	10288252

Revenue Category : State Excise Duty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Andhra Pradesh	68273	74656	81551	88976	96943	105450	447577
2 Bihar	7030	8205	9557	11103	12842	14628	56335
3 Gujarat	1108	1862	3124	5227	8688	13999	32901
4 Haryana	21935	25184	28903	33160	38031	43602	168880
5 Karnataka	32368	37543	43508	50381	58297	67412	257140
6 Kerala	19641	21100	22646	24280	26004	27817	121848
7 Madhya Pradesh	23558	25123	26692	28259	29759	30543	140376
8 Maharashtra	44268	52529	62221	73569	86830	102291	377440
9 Orissa	3378	3963	4580	5279	6068	6864	26754
10 Punjab	36193	40680	45719	51366	57617	63817	259199
11 Rajasthan	16911	17825	18743	19668	20574	21216	98027
12 Tamil Nadu	25678	28344	31244	34390	37725	40398	172102
13 Uttar Pradesh	65006	64037	61940	59380	56470	52068	293895
14 West Bengal	9791	12243	15283	19040	23605	28257	98427
14 Major States	375137	414572	458154	506317	559543	618364	2550903

Note : Thirty per cent of the presumed loss on account of the prohibition policy has been taken account of in the taxable capacity estimates of Gujarat and Tamil Nadu.

Revenue Category : Motor Vehicles And Passenger Goods Taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Andhra Pradesh	18535	20296	22201	24255	26463	28825	122040
2 Bihar	4505	6078	8184	10990	14696	19350	59298
3 Gujarat	24294	26223	28252	30349	32397	33522	150743
4 Haryana	12544	14272	16233	18457	20978	23835	93775
5 Karnataka	19459	22224	25360	28915	32946	37513	146958
6 Kerala	6999	8559	10457	12762	15559	18946	66283
7 Madhya Pradesh	12976	15702	18930	22741	27173	31646	116191
8 Maharashtra	33689	35879	38143	40477	42877	45334	202710
9 Orissa	4578	5083	5558	6062	6593	7057	30353
10 Punjab	10242	11807	13609	15682	18041	20494	79632
11 Rajasthan	11471	12965	14618	16449	18451	20402	82886
12 Tamil Nadu	17702	20788	24377	28544	33311	37948	144968
13 Uttar Pradesh	20653	24526	28598	33049	37887	42112	166172
14 West Bengal	16745	19172	21912	24994	28373	31098	125548
14 Major States	214393	243573	276430	313728	355744	398082	158755

Revenue Category : Stamps and Registration

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	15040	15299	15546	15778	15991	16181	78794
2	Bihar	6736	7662	8696	9846	11098	12319	49621
3	Gujarat	8936	9973	11110	12340	13621	14573	61617
4	Haryana	6769	7398	8063	8829	9640	10521	44471
5	Karnataka	12451	13375	14355	15395	16498	17669	77291
6	Kerala	10936	11842	12811	13845	14945	16115	69557
7	Madhya Pradesh	8817	9911	11098	12385	13746	14871	62011
8	Maharashtra	19911	20867	21830	22796	23762	24723	113978
9	Orissa	2825	3128	3412	3712	4026	4299	18576
10	Punjab	8411	9640	11047	12656	14475	16348	64165
11	Rajasthan	5386	5947	6550	7199	7888	8520	36105
12	Tamil Nadu	23522	24091	24640	25165	25614	25450	124960
13	Uttar Pradesh	34528	36852	38621	40115	41333	41293	198214
14	West Bengal	8835	10330	12056	14044	16280	18221	70930
14	Major States	173102	186314	199854	214103	228917	241101	1070290

Revenue Category : Entertainment Tax

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	5871	6592	7395	8285	9269	10353	41894
2	Bihar	0	0	4	35	306	2652	2998
3	Gujarat	0	1	7	78	890	9896	10871
4	Haryana	999	1084	1176	1275	1382	1497	6413
5	Karnataka	4736	5447	6260	7188	8247	9456	36598
6	Kerala	0	0	0	1	1	2	4
7	Madhya Pradesh	0	1	5	57	594	5999	6656
8	Maharashtra	7916	10274	13310	17212	22219	28628	91643
9	Orissa	0	0	3	25	195	1501	1724
10	Punjab	0	0	4	40	368	3363	3776
11	Rajasthan	0	0	4	34	297	2557	2892
12	Tamil Nadu	0	1	7	88	1057	12390	13543
13	Uttar Pradesh	0	1	7	87	1023	11685	12803
14	West Bengal	0	1	7	87	1036	11942	13072
14	Major States	19523	23402	28189	34490	46882	111923	244886

Revenue Category : Agriculture and Land Revenue

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	1390	1454	1521	1591	1663	1740	7969
2	Bihar	1451	1546	1648	1755	1870	1993	8812
3	Gujarat	2274	2374	2479	2588	2702	2821	12963
4	Haryana	46	64	88	122	168	232	673
5	Karnataka	3157	2993	2836	2688	2548	2415	13481
6	Kerala	1964	2352	2817	3373	4039	4836	17417
7	Madhya Pradesh	1876	1807	1739	1675	1612	1552	8385
8	Maharashtra	5537	5084	4668	4286	3935	3613	21584
9	Orissa	989	981	972	963	955	946	4816
10	Punjab	311	318	326	333	341	349	1667
11	Rajasthan	2537	2522	2508	2494	2480	2465	12469
12	Tamil Nadu	3985	4082	4181	4282	4386	4493	21423
13	Uttar Pradesh	3439	3334	3233	3135	3039	2947	15688
14	West Bengal	1460	1573	1695	1827	1969	2122	9187
14	Major States	30418	30484	30710	31111	31707	32523	156534

Revenue Category : Other Taxes

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	2344	3255	4515	6256	8657	11959	34642
2	Bihar	1609	1793	1994	2211	2442	2656	11095
3	Gujarat	12332	14397	16776	19492	22503	25184	98353
4	Haryana	731	731	731	730	729	727	3648
5	Karnataka	3917	4229	4561	4916	5295	5699	24700
6	Kerala	392	417	443	470	499	528	2358
7	Madhya Pradesh	5069	4454	3898	3400	2949	2494	17195
8	Maharashtra	21940	24741	27851	31295	35102	39299	158288
9	Orissa	693	76	8	1	0	0	85
10	Punjab	839	952	1081	1226	1389	1553	6200
11	Rajasthan	2257	1786	1410	1110	872	675	5853
12	Tamil Nadu	8353	9479	10743	12156	13710	15093	61181
13	Uttar Pradesh	6751	2206	708	225	71	22	3231
14	West Bengal	11923	12017	12092	12142	12134	11709	60094
14	Major States	79150	80533	86809	95632	106352	117598	486924

Revenue Category : All Taxes (Exclusive of Cess on Mines and Minerals)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	246537	270743	297326	326519	358578	393785	1646952
2	Bihar	87653	99702	113406	128995	146726	166895	655725
3	Gujarat	187653	208885	232519	258827	288112	320711	1309055
4	Haryana	85178	95845	107847	121353	136549	153649	615243
5	Karnataka	182640	204730	229492	257248	288362	323238	1303069
6	Kerala	121929	134899	149248	165124	182688	202121	834079
7	Madhya Pradesh	119361	133632	149608	167495	187521	209941	848197
8	Maharashtra	405917	452349	504093	561755	626013	697622	2841832
9	Orissa	39952	45074	50852	57371	64726	73024	291047
10	Punjab	113735	128342	144825	163425	184414	208099	829105
11	Rajasthan	100293	109094	118668	129082	140410	152732	649986
12	Tamil Nadu	243039	275003	311171	352096	398404	450801	1787475
13	Uttar Pradesh	255225	275161	296655	319828	344810	371744	1608198
14	West Bengal	154309	176032	200813	229083	261332	298122	1165383
14	Major States	2343421	2609491	2906524	3238202	3608647	4022484	16385347

Revenue Category : All Taxes (Inclusive of Cess on Mines and Minerals)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Andhra Pradesh	251547	276304	303499	333371	366184	402227	1681585
2	Bihar	137371	154889	174664	196991	222202	250673	999419
3	Gujarat	187653	208885	232519	258827	288112	320711	1309055
4	Haryana	85178	95845	107847	121353	136549	153649	615243
5	Karnataka	182846	204959	229745	257530	288674	323586	1304494
6	Kerala	121929	134899	149248	165124	182688	202121	834079
7	Madhya Pradesh	130569	146072	163418	182824	204535	228827	925675
8	Maharashtra	405917	452349	504093	561755	626013	697622	2841832
9	Orissa	41333	46606	52553	59259	66822	75350	300590
10	Punjab	113750	128359	144844	163446	184437	208125	829212
11	Rajasthan	100293	109094	118668	129082	140410	152732	649986
12	Tamil Nadu	243039	275003	311171	352096	398404	450801	1787475
13	Uttar Pradesh	255246	275185	296681	319856	344842	371780	1608345
14	West Bengal	173813	197682	224845	255758	290942	330988	1300214
14	Major States	2430484	2706131	3013795	3357272	3740815	4169191	16987204