CHAPTER-VI

BUOYANCY AND DETERMINANTS OF SALES TAX REVENUE IN ANDHRA PRADESH
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6.1 Introduction:

An attempt is made in this chapter to examine the growing importance of sales tax revenue in major States in India with special emphasis on Andhra Pradesh during the period 1985-86 to 2004-05. Firstly, the economic factors that influence the buoyancy and determinants of sales tax have been analyzed. Secondly, review of some of the important earlier studies of buoyancy and determinants of sales taxation have been made. Lastly, the methodology adopted to estimate the buoyancy and determinants of sales taxation and the results thus obtained are presented.

The most striking feature of the trends in tax revenues is that sales tax revenue has grown faster than all-tax revenues. Sales tax is one of the most important taxes raised by the states in India and hence its importance in the fiscal structure of the Indian States. Among the major States, sales tax revenue is the mainstay, yielding around 47.51 per cent of own tax revenue on an average in 2004-05. In fact, the gross revenue from sales tax of the 15 states rose from Rs.8206.56 crores in 1985-86 to Rs.8105.4 crores in 2004-05. When analyzed as a proportion in total revenue and total own tax revenue of the 15 states, it declined from 27.50 per cent to 25.65 per cent and from 58.28 percent to 47.51 percent respectively during the same period. Similarly,
sales tax in Andhra Pradesh is the most important and ever expanding sources of revenue. It rose from Rs.761.33 crores in 1985-86 to Rs.11020.8 crores in 2004-05. As a percentage in the state’s total revenue and state’s own tax revenue, it rose from 27.45 percent to 38.33 percent and from 52.45 percent to 67.82 percent respectively during the same period.

In India, in order to finance the developmental plans, the states are required to exploit the existing tax sources as much as possible. Policy makers always give primary consideration to the revenue productivity of different taxes. Revenue productivity of a tax depends on its rate structure on the one hand and the tax base on which it operates, on the other. However, there is no uniformity in the structure of sales tax adopted by the state Governments. The tax base differs from state to state because of the differences in the level of development. The tax rates also differ among the states. The change in the tax revenue from this important source has its own bearing upon the overall development of the respective states. Therefore, a study of such changes in tax revenue from sales tax revenue assumes unquestionable importance in the state finances. The changes in tax revenue either due to the states finances thus having a crucial impact on the overall economic development or due to the changes in rate structure have their own significance for policy making. So an attempt has been made in this chapter to estimate the buoyancy and determinants of sales tax revenue in Andhra Pradesh for the period 1985-86 to 2004-05.
6.2 Buoyancy:

Buoyancy may be defined as the ratio or percentage change in the tax revenue to the percentage change in Net State Domestic Product (NSDP) or income (NSDP is usually taken as a proxy for the tax base). It refers the rate at which the revenue increases for a one percent increase in the income. It is estimated with reference to the total increase in tax revenue, whether brought about through additional tax measures such as increase in tax rate/base, or in response to the growth in income. It is stated that the following are the major factors that contribute to the growth of sales tax revenue.

1. Increase in the quantum of production of commodities subject to sales taxation.

2. Increase in the consumption of commodities (due to increase in income, nominal and real) subject to sales taxation;

3. Increase in the extent of turnover consequent upon the rise in prices of commodities subject to sales taxation;

4. Expansion in the base of taxation, i.e., addition to the existing number of commodities subject to sales taxation or removal of the tax concessions granted to certain commodities or deletion of certain commodities from the list of tax-free goods;

5. Increase in the rates of sales tax; and

6. Improvements in the efficiency of sales tax administration.
It is a difficult task to quantify the contribution of each of these factors to the sales tax revenue as most of these factors would be influencing the tax yield simultaneously. A multivariate regression analysis could be attempted, but the necessary and reliable data in relation to the above factors is not available. Therefore, alternatively the influence of the economic factors may be measured through the estimation of buoyancy coefficient. The manner in which the coefficients of buoyancy are influenced is stated in a more specific way.

Buoyancy coefficient reflects the influence of:

i. Increase in the quantum of production of Commodities subject to tax;

ii. Increase in the consumption of commodities Subject to tax;

iii. Increase in turnover due to price rise, and

iv. Improvement/deterioration in administration that may take place gradually.

v. Discretionary changes in the tax base and/or tax rates, and

vi. Any conscious attempt at improvement in Administration or a sudden change in Production, etc.

6.2.1 Review of Earlier Studies:

The elasticity and buoyancy of the Indian tax structure and its principal components were calculated for the period 1948-49 to 1957-58 by G.S. Sahota. A major finding of this study is the low degree of elasticity shown by the Indian tax system during the period 1951-52 to 1957-58. The overall
elasticity of union taxes is only 0.613, while that of union and states taxes taken together is 0.833. The author opines “our supposedly progressive (direct) taxes are in fact regressive with an elasticity of 0.7 only; while our conventionally regressive (indirect) taxes are, in effect, progressive with an elasticity of 1.6.”

The study of Jain in 1969 arrived at conclusions against the findings of Sahota. The Jain study presents the tax structure as highly buoyant with 1.853 coefficients over the period 1955-56 to 1965-66. At the state level the General sales tax with a buoyancy coefficient of 1.871 occupied a coveted place in the fiscal armory for the period 1955-56 to 1965-66. A major finding of this study is high degree of built-in flexibility during the period under review. Thus the overall elasticity, measured in terms of built-in flexibility of the tax system is 1.461. Among the central Indirect taxes, Union excises are the most elastic (2.620) and at the state level indirect taxes the general sales tax, is the most flexible (1.837) tax.

The study conducted by the National council of Applied Economic Research, New Delhi 1971 has reviewed the system of sales tax in Andhra Pradesh. The study has estimated the Andhra Pradesh sales tax elasticity coefficient as 1.7 during the period 1957-58 and 1966-67. Comparing the elasticity coefficient with other states, Mysore got 2.3, Kerala 2.1, Tamil Nadu 2.0 and all the states’ coefficient is 1.9. The committee found that the elasticity coefficient of sales tax in Andhra Pradesh is less than the elasticity of all states. The committee used multiple regression model to explain the variations in per capita sales tax revenue and to study and quantify the
influence of per capita income, per capita value added by manufacture and the proportion of urban population to total population. The committee concluded that the three select factors could jointly explain about 99 per cent of the variations in per capita sales tax revenue in the state.

In 1972 Lakdawala and Nambiar examined the structure of commodity taxation levied at the central, state and local levels in India. This study found the elasticity coefficient of the Indian tax structure to be less than unity for the period 1960-61 to 1969-70 being only 0.63 while the buoyancy coefficient works out to be 1.19. Between the two major commodity taxes—union excises and sales tax, the latter shows more buoyancy (1.40) and elasticity (1.16) than the former with buoyancy (1.29) and elasticity (0.61) over the same period (1960-61 to 1969-70).

Mansfield’s (1972) study taking Paraguay as an example analyses the growth of tax revenue over the period 1962-70. The results of this study indicate that the tax system as a whole has a buoyancy of 1.69 compared to an elasticity of 1.14. This large difference between buoyancy and elasticity indicates that discretionary changes considerably improved the performance of the tax system.

Chandrasekhar, (1974) estimated the elasticity of sales tax revenue of Andhra Pradesh with respect to state non-agriculture income. The elasticity coefficient of sales tax revenue is 1.18 for the period 1957-58 to 1966-67. While comparing this result with NCAER’s study of 1971, it may be stated that the predominance of agricultural activity considerably reduces the built-in-flexibility of sales tax revenue in the state.
M.C. Purohit conducted a study relating to different Indian states for estimating the buoyancy and elasticity of sales tax for the period 1960-61 to 1978-79. He found that these coefficients are very high in all the states. The buoyancy and elasticity estimates of sales tax in Andhra Pradesh are 1.536 and 1.480 respectively during the above period.

National Institute of Public Finance and policy, New Delhi estimated the major trends of improvement in indirect taxes levied by the Centre and State Governments, namely, union excises, import duties, sales taxes, taxes on motor vehicles, passengers and goods, entertainment tax and measured their responsiveness to changes in national income. The period covered in respect of central taxes from 1963-64 to 1974-75 and for state indirect taxes from 1960-61 to 1974-75. They found general sales tax (including sales tax on motor spirit) as highly buoyant (1.43) and income elastic (1.15). The buoyancy and elasticity coefficients estimated of sales tax in Andhra Pradesh over the period 1963-64 to 1975-76 are 1.42 and 1.26 respectively.

The buoyancy and elasticity's of direct and indirect taxes for India as a whole estimated by Rao's for the period 1960-61 to 1973-74. This study reveals that the direct taxes exhibited smaller elasticity (0.6438) as compared with the elasticity of indirect taxes (0.8988). The coefficient of direct and indirect taxes of central Government did not differ significantly. But this is not true with state taxes. The elasticity coefficient of state indirect taxes (1.2126) is almost four times the elasticity coefficient of state direct taxes (0.3527). Between the two major commodity taxes - union excises and
general sales taxes – the latter has shown more elasticity, while the elasticity coefficient of union excise duties is 0.8025 and that of sales taxes is 1.4645.

The buoyancy for the total tax revenue works out to be 1.2274 for the period 1960-61 to 1973-74. The buoyancy coefficient of direct taxes is 0.9076 and for indirect taxes is 1.3512. In Andhra Pradesh coefficients of buoyancy and elasticity of sales tax are found to be 1.4122 and 1.3706 respectively during the above period.

National Institute of Public Finance and policy, New Delhi10 led by Dr.Raja J.Chelliah estimated the sales tax revenue in Bihar and calculated the buoyancy and elasticity’s of sales tax during the period 1963-64 to 1975-76 as 1.285 and 1.095 and with respect to State non-agricultural income as 1.361 and 1.155 respectively. The team opined that the high coefficients could be due to among other factors, the rapid expansion of coverage and growth in trade.

The Department of Finance and planning, Government of Andhra Pradesh11 has estimated buoyancy coefficients for different taxes of different States over the period 1969-1978. They estimated the buoyancy and elasticity by fitting a least square regression equation, i.e. $T=aY^b$.

Where $T =$ Total yield from a given tax

$Y =$ SDP

The estimated ‘b’ will give the elasticity or buoyancy of a tax to a change in state income.
If 'b' =1 it indicates that a one per cent increase in income will lead to a one percent increase in tax revenue. If b is more than one it indicates that one per cent increase in income will lead to more than one percent increase in tax revenue.

In respect of sales tax, the buoyancy coefficient is higher than one in all the states implying thereby that one percent increase in the state domestic product results in a more than one percent increase in the sales tax revenue. It varies from 1.30 in Orissa to 2.06 in Haryana. The states where the buoyancy of sales tax is relatively higher are Haryana, UP, J&K and Tamil Nadu. The buoyancy of sales tax in Andhra Pradesh occupies the 9th place among all the States. Among the buoyancy of State taxes sales tax is higher followed by motor vehicles tax, State excise, entertainment tax and stamps and registration.

The coefficients of elasticity of the State tax revenues are generally more than one except in the states of Bihar, Gujarat, Madhya Pradesh and Orissa. In these States the growth of the tax revenues is more on account of discretionary changes in the tax rates rather than due to automatic increase in tax revenue as a result of the increase in the domestic product. The estimates of buoyancy are substantially higher than one in these states as compared to the estimates of elasticity. Among the States which have elasticity coefficients of more than one, Haryana occupies the first place followed by Andhra Pradesh, Kerala and Karnataka in the second, third and fourth places respectively.
A comparison of elasticities and buoyancies of various taxes reveals that the elasticity coefficients are lower than buoyancy coefficients as expected. However in few cases, the elasticity coefficients are higher. This indicates that the growth in the tax revenue on account of automatic increases is higher than on account of changes in the tax rates or levy of new taxes. A comparison of buoyancy and elasticity is made tax-wise in respect of four southern states like, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Taking all the tax revenues, the buoyancy coefficient is found to be higher in Tamil Nadu (1.46) followed by Karnataka (1.39), Andhra Pradesh (1.36) and Kerala (1.24). The buoyancy coefficient of sales tax is also found to be higher in Tamil Nadu (1.68) followed by Karnataka (1.65), Andhra Pradesh (1.53) and Kerala (1.35).

Venkata Rayudu estimated the buoyancy and elasticity of sales tax revenue in Andhra Pradesh over the period of 1960-61 to 1978-79. The variations in sales tax revenue are explained by the variations in State Net Domestic Product by the coefficient 1.5342, when State income from non-agricultural sector is used, the coefficient has turned out to be 1.3651. While state income from secondary sector yielded a buoyancy coefficient of 1.3073.

The elasticity of sales tax revenue has been estimated for the same period. The sales tax revenue elasticity coefficient with respect to State Net Domestic Product is 1.5149. The sales tax revenue is more responsive to changes in State Net Domestic Product than to changes in either state Non-agriculture income (1.3493) or income from secondary sector (1.2921).
The buoyancy and elasticity coefficients of sales tax revenue did not differ much as the respective coefficients are 1.5342 and 1.5149. According to the study, there are not many discretionary changes in the sales tax structure in Andhra Pradesh during the study period.

A study team led by Raja J. Chelliah and K.N. Reddy of National Institute of Public Finance and policy, New Delhi\textsuperscript{13} has estimated the coefficients of buoyancy and elasticity of sales tax of Delhi and 16 major states during the period 1970-71 to 1980-81. The coefficient of buoyancy of sales tax revenue of Delhi has been estimated to be 1.40 as against 1.63 in Haryana, 1.66 in Uttar Pradesh, 1.67 in Rajasthan and 2.77 in Himachal Pradesh.

The above review of earlier studies explains that quite a good number of studies have been made by academicians either individually or associating themselves with the institutions specializing in the coveted area of Public Finance. As it is evident, most of the studies undertaken with reference to sales tax in Andhra Pradesh are confined to the period until the early 80's. It is pertinent to note that several political and fiscal changes have taken place in Andhra Pradesh after 1985. After 1985 these developments may be expected to have an important bearing on the State Finances. In this context the study of sales tax in Andhra Pradesh assumes greater significance. It may be noted that during this period only several changes like imposition of additional sales tax, introduction of turnover tax etc. have taken place which may have influenced the trends in the yields. Therefore, it is necessary to analyse the
buoyancy of sales tax in Andhra Pradesh to explain the variations in tax revenue either due to the discretionary changes relating to sales tax or due to the automatic changes in state income.

6.2.2 Methodology:

The following Methodology has been adopted in estimating the buoyancy of sales tax in the present study.

The buoyancy of a tax measures the change in the tax revenue consequent to a change in the Net State Domestic product. For this purpose two regression models, viz.,

\[ Y = a + bX \quad \ldots \quad (1) \]

\[ \text{and } \log Y = a + b \log X \quad \ldots \quad (ii) \]

where,

\( Y \) is the Total Yield from a given tax

\( X \) is the State Domestic Product

and 'a' and 'b' are the parameters as estimated by the method of least squares and the results based on the best fitted form are used in the analysis.

The coefficient \( b \) in equation (i) indicates the change in tax yield per a unit change in State Domestic Product. The buoyancy coefficient based on it is computed at the mean values i.e. buoyancy is equal to \( b \cdot X/Y \). The coefficient 'b' in equation (ii) is the buoyancy coefficient.
6.2.3 Period of Study:

The study confines to the period 1985-86 to 2004-05. The study period is structured on the basis of availability of data and information. The study does not cover the period earlier to 1985-86 in view of its less significance.

6.2.4 Sources of Data:

Sales tax revenue figures in Andhra Pradesh are drawn from Reserve Bank of India bulletins and Centre for Monitoring Indian Economy (CMIE) publications. Net State Domestic Product figures are obtained from estimates of State Domestic product 1985-86 to 2004-05 from various issues published by Central Statistical Organisation, Government of India.

6.3 Buoyancy of Tax Revenue:

Before discussing about the buoyancy of sales tax revenue in Andhra Pradesh, buoyancy rates for own tax revenue in different states and buoyancies of central and state tax revenues are discussed hereunder.
**Table-6.1: Selected State-wise Buoyancy Rates for Own Tax Revenue in India (1960-2002)**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>0.34</td>
<td>0.69</td>
<td>0.13</td>
<td>0.81</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Assam</td>
<td>0.01</td>
<td>-0.81</td>
<td>0.94</td>
<td>1.60</td>
<td>0.59</td>
<td>0.59</td>
</tr>
<tr>
<td>Bihar</td>
<td>-0.51</td>
<td>0.70</td>
<td>0.28</td>
<td>-1.85</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td>Gujarat</td>
<td>0.47</td>
<td>0.17</td>
<td>0.77</td>
<td>0.80</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Haryana</td>
<td>0.42</td>
<td>1.15</td>
<td>-1.50</td>
<td>0.39</td>
<td>0.38</td>
<td>0.36</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>-0.30</td>
<td>0.24</td>
<td>0.61</td>
<td>-0.96</td>
<td>0.35</td>
<td>0.33</td>
</tr>
<tr>
<td>Karnataka</td>
<td>0.41</td>
<td>0.30</td>
<td>0.78</td>
<td>0.55</td>
<td>0.53</td>
<td>0.51</td>
</tr>
<tr>
<td>Kerala</td>
<td>0.28</td>
<td>0.72</td>
<td>1.24</td>
<td>0.85</td>
<td>0.52</td>
<td>0.51</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>-0.28</td>
<td>0.46</td>
<td>0.63</td>
<td>-0.55</td>
<td>0.51</td>
<td>0.52</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>0.25</td>
<td>0.44</td>
<td>1.00</td>
<td>1.00</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Orissa</td>
<td>-0.50</td>
<td>1.27</td>
<td>2.72</td>
<td>-0.51</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Punjab</td>
<td>-0.06</td>
<td>0.21</td>
<td>0.03</td>
<td>0.23</td>
<td>0.38</td>
<td>0.39</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>0.17</td>
<td>0.14</td>
<td>0.64</td>
<td>0.02</td>
<td>0.53</td>
<td>0.54</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>-0.36</td>
<td>0.49</td>
<td>0.51</td>
<td>0.64</td>
<td>0.51</td>
<td>0.51</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>-0.01</td>
<td>0.85</td>
<td>0.39</td>
<td>0.61</td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td>West Bengal</td>
<td>-0.42</td>
<td>0.79</td>
<td>3.69</td>
<td>1.74</td>
<td>0.66</td>
<td>0.66</td>
</tr>
<tr>
<td>India*</td>
<td>0.02</td>
<td>0.48</td>
<td>1.18</td>
<td>1.02</td>
<td>0.62</td>
<td>0.62</td>
</tr>
</tbody>
</table>

**Note:** *: Includes other states and union territories not mentioned above.

**Source:** Directorate of Economic and Statistics, Govt. of Andhra Pradesh.

The data on buoyancy rates for own tax revenue is presented in Table 6.1. A cursory glance of the table reveals that the buoyancy of own tax revenue for India worked out to be 0.62 for the period 1990-91 to 2001-02.

Among the states, the buoyancy rate is observed to be the highest for West Bengal (0.66) followed by Assam (0.59), Gujarat (0.57) and Orissa (0.57). The buoyancy rate for own tax revenue is 0.56 for the state of Andhra...
Pradesh, while it is the lowest for Jammu and Kashmir (0.33) and Haryana (0.36). Temporal analysis indicates that the buoyancy rate of own tax revenue declined for the period of 1995-96 to 2001-02 in comparison with the previous period for the states of Andhra Pradesh, Assam, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh and West Bengal while the revenue is noticed in other states for India as a whole, the buoyancy of own tax revenue increased from 1960-61 to 1990-91 and later declined to 1.02 for the period 1990-91 to 1995-96, and to 0.62 for the period 1995-96 to 2001-02.

Table-6.2: Decade-wise Buoyancies of Central and State Tax Revenues in India (1950-1951 to 2001-2002)

<table>
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<tbody>
<tr>
<td>Central Taxes: Gross Revenues</td>
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<tr>
<td>Direct</td>
<td>0.94</td>
<td>0.96</td>
<td>1.18</td>
<td>0.94</td>
<td>1.30</td>
<td>1.09</td>
</tr>
<tr>
<td>Indirect</td>
<td>1.65</td>
<td>1.24</td>
<td>1.30</td>
<td>1.20</td>
<td>0.72</td>
<td>1.16</td>
</tr>
<tr>
<td>Total</td>
<td>1.38</td>
<td>1.15</td>
<td>1.27</td>
<td>1.14</td>
<td>0.89</td>
<td>1.14</td>
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<tr>
<td>States Own Tax Revenues</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Direct</td>
<td>-8.43</td>
<td>3.61</td>
<td>-6.32</td>
<td>-8.20</td>
<td>-4.34</td>
<td>-2.46</td>
</tr>
<tr>
<td>Indirect</td>
<td>1.41</td>
<td>1.37</td>
<td>1.37</td>
<td>1.11</td>
<td>1.02</td>
<td>1.23</td>
</tr>
<tr>
<td>Total</td>
<td>1.39</td>
<td>1.17</td>
<td>1.35</td>
<td>1.11</td>
<td>1.02</td>
<td>1.17</td>
</tr>
<tr>
<td>Total Tax Revenues</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>1.05</td>
<td>0.79</td>
<td>1.16</td>
<td>0.96</td>
<td>1.26</td>
<td>1.03</td>
</tr>
<tr>
<td>Indirect</td>
<td>1.55</td>
<td>1.29</td>
<td>1.33</td>
<td>1.16</td>
<td>0.86</td>
<td>1.19</td>
</tr>
<tr>
<td>Total</td>
<td>1.38</td>
<td>1.16</td>
<td>1.30</td>
<td>1.13</td>
<td>0.93</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Note: Direct taxes in the case of states contribute a negligible share in total tax revenues. Negative buoyancy implies a fall in absolute terms.

The information pertaining to buoyancies of central and state tax revenue in India are given in Table 6.2. It is clear from the table that the buoyancy of indirect taxes is higher than that of direct taxes during the period 1950-51 to 2001-02. Decade-wise analysis reveals the same trend except for the decade 1990-01-2001-02. Similar trend is noticed in case of central taxes as well as states own tax revenues. It is also noticed that the buoyancy of direct taxes increased for 1.05 for the decade 1950-51 to 1960-61 to 1.26 for the decade 1991-92 to 2001-02 while the buoyancy of indirect taxes declined from 1.55 to 0.86 during the same period. However, the trend is not smooth and continuous hence some fluctuations are noticed.

Table-6.3: Buoyancy of Tax Revenue in Andhra Pradesh (1960-2002)

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Sales Tax</td>
<td>1.49</td>
<td>1.76</td>
<td>1.18</td>
<td>0.87</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>State Excise Duties</td>
<td>1.38</td>
<td>1.61</td>
<td>1.10</td>
<td>-2.10</td>
<td>0.67</td>
<td>0.69</td>
</tr>
<tr>
<td>Motor Vehicle Tax</td>
<td>1.90</td>
<td>1.29</td>
<td>1.05</td>
<td>1.04</td>
<td>0.69</td>
<td>0.68</td>
</tr>
<tr>
<td>Land Revenue</td>
<td>0.34</td>
<td>0.69</td>
<td>0.13</td>
<td>0.81</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Stamps and Registration Fees</td>
<td>1.13</td>
<td>1.26</td>
<td>1.08</td>
<td>0.97</td>
<td>0.67</td>
<td>0.66</td>
</tr>
<tr>
<td>Other Taxes and Duties</td>
<td>0.80</td>
<td>1.62</td>
<td>1.35</td>
<td>0.67</td>
<td>0.65</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Source: Directorate of Economic and Statistics, Govt. of Andhra Pradesh.

The data on buoyancy of different taxes for the state of Andhra Pradesh are presented in Table 6.3. A bird’s eye view of the table indicates that the buoyancy of sales tax revenue is highest in comparison with other taxes after 1970. For the period 1960-61 to 1970-71, the buoyancy of motor
vehicle taxation is highest (1.90) followed by sales tax (1.49). During the periods, sales tax ranked first in terms of buoyancy of revenue in remaining Andhra Pradesh, which implies that sales tax is more responsive development than the other taxes.

6.4 Analysis of the Results:

The estimated values of the parameters of the linear and log linear models are presented in Table 6.4. The log linear form is found to be better than the linear form. Therefore, the results based on the log linear form are used in the analysis. The buoyancy coefficient is 1.018. It is statistically significant at one per cent level. It indicates that the buoyancy of sales tax yield is responsive to changes in Net State Domestic product along with the discretionary changes in taxation during the period 1985-86 to 2004-05.

Table 6.4: Buoyancy Estimates of Sales Tax in Andhra Pradesh (1985-86 to 2004-05)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>a</th>
<th>b</th>
<th>R²</th>
<th>Elasticity Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Sales</td>
<td>Net State Domestic</td>
<td>-463.332</td>
<td>0.00059 (30.563)</td>
<td>0.981</td>
<td>1.087*</td>
</tr>
<tr>
<td>Tax Revenue</td>
<td>Product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log linear Sales</td>
<td>Net State Domestic</td>
<td>-7.865</td>
<td>1.018 (32.000)</td>
<td>0.983</td>
<td>1.018*</td>
</tr>
<tr>
<td>Tax Revenue</td>
<td>Product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in the brackets are 't' values

- Significant at 1 per cent level
6.5 Determinants of Sales Tax Revenue:

It has already been noted that sales tax is the most important and expanding source of revenue in Andhra Pradesh throughout the study period. It may be noted that sales tax revenue increases in tune with an increase in over all development and economic growth of the State. Moreover, the nature and structure of development of economy will also have considerable influence on the yield from sales tax. In other words, certain economic characteristics influence the yield from sales tax in any economy. So it is pertinent to make an attempt to quantify such determinants that explain the variations in sales tax revenue in Andhra Pradesh during the study period.

6.5.1 Review of Earlier Studies:

National Council of Applied Economic Research (NCAER), New Delhi has made a comparative analysis of variations of per capita sales tax revenue in Andhra Pradesh and Mysore during the period 1957-58 - 1967-68. They used multiple regression method to estimate the variations of per capita sales tax revenue. According to this study the per capita sales tax revenue has been influenced by three factors – (1) increase in state income, value added by manufacture and urbanisation. These factors together have accounted for almost the entire increase in sales tax revenue in both Andhra Pradesh and Mysore.

Venkata Rayudu estimated the determinants of sales tax revenue in Andhra Pradesh during the period 1960-61 to 1977-78. According to his study, the sales tax revenue mainly depends on proportion of urban population
to total population and non-agricultural sector income. State income from secondary sector and sales tax turnover are the other important factors chosen as explanatory variables to explain variations of sales tax revenue. The important finding of the study is that per capita sales tax revenue has been influenced by per capita income and proportion of urban population to total population. It may be noted that though the earlier studies are successful in identifying the determinants and quantifying the variations, they only relate to the periods of 1960s and 1970s. Hence the present attempt assumes significance.

In view of the earlier studies, factors such as State Net Domestic product (SNDP), State income from non-agricultural sector, and state income from secondary sector and proportion of urban population to total population are considered to be responsible for the variations in the sales tax revenue. State income is taken as an index of economic development and sales tax revenue is supposed to increase as state income increases. The structure of development cannot be over emphasized in any economy. In other words, an economy with a higher degree of industrialisation will have a greater influence on the sales tax yields. So income from non-agricultural sector and secondary sector are chosen to indicate the influence of non-agriculture sector and the level of industrialisation respectively. Hence a positive relationship is expected between these two variants of state income and sales tax revenue on a prior ground. The consumption pattern and the higher degree of monetisation prevailing in the urban sector are conducive for greater yields from sales tax. Therefore, a positive relationship between the degree of
urbanisation and sales tax revenue is expected. So the proportion of urban population to total population has been chosen as an index of the degree of urbanisation.

An attempt has been made to quantify the influence of these factors in different combinations on sales tax revenue. A multi-variant regression analysis has been carried out considering the above mentioned factors as explanatory variables and sales tax revenue as the dependent variable. A similar analysis is also made using the dependent and independent factors in per capita terms in combination with the proportion of urban population to total population factor.

6.5.2 Methodology:

Sales tax revenue of the state depends on net state domestic product, non-agricultural income, secondary sector income and proportion of urban population to total population. Since secondary sector income is a component of non-agricultural income, and non-agricultural income is a component of Net State Domestic product, these three income variables, together cannot be used in a single regression equation for explaining the sales tax revenues. Therefore these three income variables are alternatively used along with the proportion of urban population as explanatory variables in the regression models. The linear and log-linear form of the three regression models are estimated by the method of least square and the best fitted form is chosen for the analysis.
i). \( Y = f(x_1 \times x_4) \)

ii). \( Y = f(x_2 \times x_4) \)

iii). \( Y = f(x_3 \times x_4) \)

iv). \( Y_1 = f(x_5 \times x_4) \)

v). \( Y_1 = f(x_6 \times x_4) \)

vi). \( Y_1 = f(x_7 \times x_4) \)

Where,

\[ Y = \text{Sales Tax Revenue} \]

\[ X_1 = \text{Net state domestic product} \]

\[ X_2 = \text{Non-agricultural income} \]

\[ X_3 = \text{Secondary sector income} \]

\[ X_4 = \text{Proportion of urban population to population} \]

\[ Y_1 = \text{per capita sales tax revenue} \]

\[ X_5 = \text{per capita net state domestic product} \]

\[ X_6 = \text{per capita Non-agricultural income} \]

\[ X_7 = \text{per capita secondary sector income} \]

The linear and log-linear form of the above specified models replacing sales tax revenues by per capita sales tax revenue and income by per capita income are also estimated by the method of least square and the best fitted form is chosen for the analysis.

6.5.3 Results:

The coefficients of the determinants of sales tax revenue in Andhra Pradesh for the period 1995-96 to 2004-05 are presented in Table 5.20. In all the cases linear form is found to be better than the log linear form. Therefore, the result based on the linear form is used in the analysis. Following equation (1) it may be seen that the coefficient of the variable of the proportion of urban population to total population is 179.081. Similarly, the coefficient of the variable Net State Domestic Product is 0.0659. It may be noted that NSDP
coefficient is significant at one percent level and R2, the coefficient of multiple correlation is 0.99. This shows that 99 per cent of the variations in sales tax revenue are jointly explained by these two variables.

In equation (2), the coefficients of non-agricultural sector income is 0.08187 which is significant at one percent level but it is insignificant in the case of proportion of urban population to total population. In equation (3), both the coefficients of secondary sector income and the proportion of urban population to total population is 23.088 and 825.086 respectively which is significant at one per cent level.

It may be observed from the Table 6.5 that the variable proportion of urban population to total population is insignificant in most of the functional forms both in equation (1) and (2). Hence, the effect of proportion of urban population to total population in sales tax revenue is insignificant and it is significant in equation (3). It can also be inferred from the coefficients that income from secondary sector and non-agriculture sector are found to have more impact on the variations in sales tax revenue than the Net State Domestic Product when used in combination with the proportion of urban population factor. The statistical analysis also reveals that almost 99 per cent of the variations are explained by the chosen variables.

More or less similar inferences could be drawn from the regression analysis using the chosen variables in per capita terms. Table 6.6 shows that the variable of per capita secondary sector income has a co-efficient of 118.772 while the co-efficient of variable of proportion of urban population to total population is 20.936. Equation (4) shows that the variable per capita Net State Domestic product has a co-efficient of 0.0598 and the co-efficient of the variable of proportion of urban population to total population is 48.379.
Similarly, it may be seen from equation (5) that the coefficient of the variable of per capita non-agricultural income (X6) is 0.0803 while the co-efficient estimated of the explanatory variable of proportion of urban population to total population is 45.372.

Table- 6.5: Determinants of Sales Tax Revenue in Andhra Pradesh
(1995-96 to 2004-05)

<table>
<thead>
<tr>
<th>Equation No.</th>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Functional Form</th>
<th>a</th>
<th>b1</th>
<th>b2</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sales Tax Revenue</td>
<td>Net State Domestic Product (X1)</td>
<td>Linear</td>
<td>-6901.6</td>
<td>0.0659</td>
<td>179.081 (0.301)</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion of Urban Population to Total Population (X4)</td>
<td>Log Linear</td>
<td>-3.908</td>
<td>1.276</td>
<td>0.828 (0.191)</td>
<td>0.984</td>
</tr>
</tbody>
</table>

| 2.           | Sales Tax Revenue  | Non-agricultural income (X2) | Linear          | -9599   | 0.08187  | 310.561 (0.712) | 0.993 |
|              |                    | Proportion of Urban Population to Total Population (X4) | Log Linear      | 0.719   | -3.464   | 1.682 (2.941)   | 0.988 |

| 3.           | Sales Tax Revenue  | Secondary Sector Income (X3) | Linear          | -24216  | 23.088   | 825.086 (2.596) | 0.992 |
|              |                    | Proportion of Urban Population to Total Population (X4) | Log Linear      | -4.612  | 4.282    | 0.861 (1.690)   | 0.981 |

Note: Figures in the brackets are 't' values.
* Significant at 1 per cent level

It may be observed from the co-efficient of multiple correlation that per capita Net State Domestic Product and per capita non-agricultural income in combination with proportion of urban population to total population as shown in equations (4) and (5) together could not explain a greater proportion of variations in per capita sales tax revenue than the combination of per capita
secondary sector income and proportion of urban population to total population.

It follows that the combination of proportion of urban population to total population and secondary sector is found to be the dominant factor influencing the sales tax revenue in Andhra Pradesh during 1995-96 to 2004-05.

Table 6.6: Determinants of Sales Tax Revenue in Andhra Pradesh (1995-96 to 2004-05)

<table>
<thead>
<tr>
<th>Equation No.</th>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Functional Form</th>
<th>a</th>
<th>b 1</th>
<th>b 2</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Percapita Sales Tax</td>
<td>Percapita Net State Domestic Product (X5) Proportion of Urban Population to Total Population (X4)</td>
<td>Linear</td>
<td>-1573.9</td>
<td>0.0598</td>
<td>48.379</td>
<td>0.985</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Linear</td>
<td>-4.094</td>
<td>1.185</td>
<td>1.251</td>
<td>0.981</td>
</tr>
<tr>
<td>5.</td>
<td>Percapita Sales Tax</td>
<td>Percapita Non-agricultural income (X6) Proportion of Urban Population to Total Population (X4)</td>
<td>Linear</td>
<td>13986.8</td>
<td>0.0803</td>
<td>45.372</td>
<td>0.991</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Linear</td>
<td>2.015</td>
<td>-4.497</td>
<td>1.891</td>
<td>0.987</td>
</tr>
<tr>
<td>6.</td>
<td>Percapita Sales Tax</td>
<td>Percapita Secondary Sector Income (X7) Proportion of Urban Population to Total Population (X4)</td>
<td>Linear</td>
<td>-3436</td>
<td>118.772</td>
<td>20.936</td>
<td>0.991</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Linear</td>
<td>-4.635</td>
<td>4.222</td>
<td>0.854</td>
<td>0.978</td>
</tr>
</tbody>
</table>

Note: Figures in the brackets aren’t t’ values.
* Significant at 1 per cent level
Conclusion:

As sales tax has emerged as an important source of tax revenue, any change in its revenue will have its own bearing upon the State finances. So an attempt is made in the present study to estimate buoyancy of sales tax revenue in Andhra Pradesh for the period 1985-86 to 2004-05.

The buoyancy of sales tax revenue has been estimated by using both linear and log linear regression methods. The coefficient of buoyancy of sales tax with respect to Net State using the logerthem regression method is 1.018., which is lower than the coefficient under the log linear regression method. However, both the coefficient is significant at 1 percent level.

Thus it is concluded that the tax yield is more due to the overall development of the state, especially in the non-farm sector due to the discretionary changes initiated by the Government. This calls for an urgent need to increase the tax base, rationalize the exemption and concessions and restructuring the tax rates, which may help in evolving a rational and efficient sales tax structure in Andhra Pradesh.

In view of the importance of sales tax revenue, it has been attempted to quantify the determinants of sales tax revenue in Andhra Pradesh during 1995-96 to 2004-05. It is observed that the combination of proportion of urban population to total population and Net State Domestic Product and secondary sector income and non-agricultural income are found to be the dominant factors influencing the sales tax revenue in Andhra Pradesh during 1995-96 to 2004-05.
REFERENCES:
