CHAPTER V
ELASTICITY AND BUOYANCY
OF SERVICE TAX: A
REVENUE ANALYSIS
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In this chapter an attempt has been made to analyse the responsiveness of service tax yield to changes in GDP of the country. For this purpose, first, growth and the trends in service tax revenue has been examined. Second, conceptual problems regarding the terms ‘Elasticity and Buoyancy’ have been discussed. Third, a review of some earlier studies of elasticity and buoyancy of tax revenue have been examined. Fourth the methodology adopted to estimate the elasticity and buoyancy of service tax in India is discussed. Finally the results are analysed and interpreted.

5.1 Importance of service tax revenue

The service tax revenue analysis made in this chapter assumes significance due to the following factors:

One, service sector in India is contributing more to the GDP. The contribution of services to GDP is ever expanding, which accounts for nearly 60 percent of the GDP. But the contribution of services to total tax revenue is merely 5 percent of total tax revenue, whereas commodity sector (industry) contributes 30 percent of total tax revenue, even though its share in the GDP is about 20 percent. This has impacted the commodity sector badly and equity principle is
severely affected. Therefore, to achieve equity in tax burden, it is necessary to bring more and more services under tax net.

Second, service tax in India was first introduced in 1994. Beginning with 3 services in 1994, the number of services brought under tax net have increased to 97 services (2006-07 budget). The service tax rate in the beginning was 5 percent on taxable services, which subsequently increased to 8 percent in .... It further increased to 10.20 percent (including education cess of 2%) and subsequently increased to 12.24 percent in 2006-07 union budget. The Union Government of India has also proposed to increase service tax of 14 percent in 2007-08 Union Budget, as a step forward to align the service tax with commodity taxes to evolve a broader goods and service tax (GST) by the year 2010.

In view of these developments, i.e., increased number of services, increased number of tax assessees and increased tax rates can be hypothesised that the revenue from service tax should increase. In otherwords, elasticity and buoyancy of service tax should be expanded.

5.2 Growth in service tax revenue

To analyse the growth in service tax revenue, i.e., percentage of growth in service tax revenue and number of assessees the compounded growth rate (CAGR) formula has been used over a period of 12 years from 1994-05 to 2005-06.
CAGR = \((y/x)^{(1/m)} - 1\)

where,

\(Y\) = value in the final period covered

\(X\) = value of the first year

\(\wedge\) = power of

\(n\) = number of years

**Table 5.1**

**Growth in service tax revenue and service tax assesses**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Year</th>
<th>Revenue (in Crores)</th>
<th>% of Growth</th>
<th>No. of Service Taxed</th>
<th>No. of Assessees</th>
<th>% of Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>1994-95</td>
<td>410</td>
<td>Base yr.</td>
<td>3</td>
<td>3943</td>
<td>Base yr.</td>
</tr>
<tr>
<td>02.</td>
<td>1995-96</td>
<td>846</td>
<td>101</td>
<td>3</td>
<td>4866</td>
<td>19</td>
</tr>
<tr>
<td>03.</td>
<td>1996-97</td>
<td>1022</td>
<td>24</td>
<td>6</td>
<td>13982</td>
<td>187</td>
</tr>
<tr>
<td>04.</td>
<td>1997-98</td>
<td>1515</td>
<td>49</td>
<td>18</td>
<td>49991</td>
<td>228</td>
</tr>
<tr>
<td>05.</td>
<td>1998-99</td>
<td>1787</td>
<td>18</td>
<td>30</td>
<td>107479</td>
<td>133</td>
</tr>
<tr>
<td>06.</td>
<td>1999-00</td>
<td>2072</td>
<td>16</td>
<td>27</td>
<td>115495</td>
<td>745</td>
</tr>
<tr>
<td>07.</td>
<td>2000-01</td>
<td>2540</td>
<td>23</td>
<td>26</td>
<td>122326</td>
<td>591</td>
</tr>
<tr>
<td>08.</td>
<td>2001-02</td>
<td>3305</td>
<td>26</td>
<td>41</td>
<td>189577</td>
<td>53</td>
</tr>
<tr>
<td>09.</td>
<td>2002-03</td>
<td>4125</td>
<td>25</td>
<td>51</td>
<td>232048</td>
<td>24</td>
</tr>
<tr>
<td>10.</td>
<td>2003-04</td>
<td>7890</td>
<td>91</td>
<td>58</td>
<td>403856</td>
<td>74</td>
</tr>
<tr>
<td>11.</td>
<td>2004-05*</td>
<td>17500</td>
<td>96</td>
<td>71</td>
<td>774998</td>
<td>91</td>
</tr>
<tr>
<td>12.</td>
<td>2005-06*</td>
<td>23500</td>
<td>--</td>
<td>94</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: http://www.service tax.govt.in

* Revised Estimate

The service tax revenue yield in India has grown manifold since its inception in 1994-95, from Rs. 410 crore to Rs. 23,500 crore in
There has also been a substantial growth in the service tax base and service tax assessees. The number of services (tax base) has increased significantly from merely 3 services in 1994-95 to 94 services in 2005-06. The number of assesses also increased from 3943 in 1994-95 to 774998 in 2004-05, an increase of 91 percent over a period of 1994-95 to 2004-05. The Union Govt. of India started levying service tax on 3 important services with service tax revenue of Rs. 410 crore in 1994-95, which increased to Rs. 17500 crore, which almost increased by 96 percent of revenue over a period of 1994-95 to 2004-05.

From the Indian experience, it can be seen that the case for a reduced rate for service tax can gradually be enhanced, is not only based on sound reasoning but also has been practically demonstrated to be effective.

### 5.3 Trend in service tax revenue

One of the most important tasks before economists and businessmen these days is to make estimates for the future. For example, an economist is interested in estimating the likely tax revenue in the coming year. However, the first step in making estimates for the future consists of gathering information from the past. In this connection one usually deals with statistical data which are called observed or recorded at successive intervals of time. Such data are generally referred to as ‘time series’. Thus, when we
observe numerical data at different points of time, the set of observations shall constitute time series data.

In this chapter trend in service tax revenue with time series data are analysed with the graphic representation with the help of technique of least square method.

The method of least squares may be used to fit a straight line trend, which is represented by the equation.

\[ Ys = a + bx + c \] .... (1)

where, \( Ys \) is used to designate the calculated or estimated value of service tax revenue, \( a \) is the intercept or the value of the \( X \) variable when \( X=0 \), \( b \) represents the scope of the line or the amount of change in \( Y \) variable that is associated with a change of one unit of \( X \) variable. The \( X \) variable in time series analysis represent time.

The value of ‘\( a \)’ and ‘\( b \)’ can be determined as:

\[ a = \frac{\sum Y}{N} \] .... (2)

\[ b = \frac{\sum x - (\sum x)^2}{n (\sum x^2 - (\sum x)^2)} \] .... (3)
### Table 5.2

**Trend in service tax revenue**

<table>
<thead>
<tr>
<th>Year (x)</th>
<th>Service tax in crores (y)</th>
<th>x</th>
<th>x^2</th>
<th>xy</th>
<th>Trend y=a+bx</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-95</td>
<td>410</td>
<td>-6</td>
<td>36</td>
<td>-2460</td>
<td>-5609</td>
</tr>
<tr>
<td>95-96</td>
<td>860</td>
<td>-5</td>
<td>25</td>
<td>-4300</td>
<td>-3397</td>
</tr>
<tr>
<td>96-97</td>
<td>1060</td>
<td>-4</td>
<td>16</td>
<td>-4240</td>
<td>-1186</td>
</tr>
<tr>
<td>97-98</td>
<td>1590</td>
<td>-3</td>
<td>9</td>
<td>-4770</td>
<td>1026</td>
</tr>
<tr>
<td>98-99</td>
<td>1960</td>
<td>-2</td>
<td>4</td>
<td>-3920</td>
<td>3237</td>
</tr>
<tr>
<td>99-00</td>
<td>2130</td>
<td>-1</td>
<td>1</td>
<td>-2130</td>
<td>5449</td>
</tr>
<tr>
<td>2000-01</td>
<td>2610</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7660</td>
</tr>
<tr>
<td>2001-02</td>
<td>3300</td>
<td>1</td>
<td>1</td>
<td>3300</td>
<td>9871</td>
</tr>
<tr>
<td>2002-03</td>
<td>4120</td>
<td>2</td>
<td>4</td>
<td>8240</td>
<td>12083</td>
</tr>
<tr>
<td>2003-04</td>
<td>7890</td>
<td>3</td>
<td>9</td>
<td>23670</td>
<td>14294</td>
</tr>
<tr>
<td>2004-05</td>
<td>14150</td>
<td>4</td>
<td>16</td>
<td>56600</td>
<td>16506</td>
</tr>
<tr>
<td>2005-06</td>
<td>23500</td>
<td>5</td>
<td>25</td>
<td>117500</td>
<td>18717</td>
</tr>
<tr>
<td>2006-07</td>
<td>34000</td>
<td>6</td>
<td>36</td>
<td>204000</td>
<td>20929</td>
</tr>
<tr>
<td>Total</td>
<td>97580</td>
<td>182</td>
<td>389000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2 and the Graph 5.2 (see next page) explains the trends in the service tax collection in India from 1994-95 to 2006-07. In the beginning, upto 1996-97 the trend value (Table 5.2) is negative, therefore, trend line (Series 2 in Graph 5.2) penetrates below the Ox horizontal axis, and revenue curve (series 1) almost remain flatter to the Ox horizontal line. It is only after 1997-98, the trend values have become positive, as a result, the trend line (series 2) has been positive and slopes upward. The revenue curve (series 1) has become steeper after 2002-03, indicating a sharp rise in service tax revenue collection almost by 91 percent (Table 5.1) after 2002-03. Therefore, service tax revenue curve is sloping upward indicating a sharp increase in service tax revenue over a period.
5.5 Elasticity versus buoyancy of service tax revenue

The concept of tax buoyancy and tax elasticity are vital ingredients of modern theory of taxation. As they measure the responsiveness of tax yield to changes in national income they are associated with the flow of revenue to the government exchequer, which is of special importance in developing countries.

The term income elasticity with respect to a given tax or categories of taxes may be defined as the ratio of percentage change in tax yield to a given percentage change in national income or related component thereof. But the growth in tax revenue may come about either through automatic response or discretionary changes. "Changes in the tax yield resulting from modifying the parameter such as tax rates, tax base etc. are called 'discretionary change'. They are the result of legislative action. With tax parameters held constant (i.e., discretionary changes being removed) automatic changes in tax yield resulting from variations in national income measures the 'elasticity' or 'built in flexibility' of a tax system. However, change in the tax yield flowing from the combined effects 'automatic' response and 'discretionary' changes are a measure of the 'buoyancy' of a tax or a tax system.\(^2\)

The distinction between the two in brief, is: "while built in flexibility quantities what would have happened to the tax revenues had no tax law changes been attempted over a period, tax buoyancy
measures what has actually happened. In a way, the former measures can therefore be viewed as a partial account of tax responsiveness to changes in national income and the latter as an account of total responsiveness. Sometimes, these are also viewed as indicators of static and dynamic characteristics of a system. Built in flexibility is interpreted as a static function, for it measures the growth of tax revenues over a 'constant tax base', and tax buoyancy as a dynamic function for it measures growth of tax revenues unadjusted for any change in rates bases etc.³

Accordingly, the term ‘buoyancy’ denoted here the overall responsiveness of tax revenue to the changes in its major determinants, which involved in widening or expansion of tax base, increase in tax rates and additions to the number of taxes.

5.6 Overview of earlier studies of elasticity and buoyancy

Musgrave R.A. (1959)⁴ has analysed the theoretical frame work for estimating built-in-flexibility and buoyancy of tax structure. He has discussed at length the mathematical tools to be used for estimating elasticity and buoyancy of tax system.

Mansfield (1972)⁵ studying Paraguay as an example, analyses the growth of tax revenue over the period 1962-70. The results of the study reveal that the tax system as a whole had a buoyancy of 1.69 compared to an elasticity of 1.14. This large difference between the
buoyancy and elasticity indicates that discretionary changes considerably improved the performance of tax system.

Sahota (1961) estimated the elasticity and buoyancy of the Indian tax structure for the period 1948-49 to 1957-58. The overall elasticity of union taxes is only 0.613, while that of union and state taken together is only 0.8333. The author remarked that "our supposedly progressive (direct) taxes are in fact regressive with an elasticity of 0.7 only; while our conventional regressive (indirect) taxes are, in fact progressive with an elasticity of 1.6".

Jain S. (1969)'s study of Indian tax system is quite contradictory to the findings of Sahota (1961). His study shows that Indian tax structure has been highly buoyant (1.858) over the period 1955-56 to 1965-66. At the state level the general sales tax is buoyant with coefficient of 1.871, in the same period. Among the indirect taxes, union excise duties are the most elastic with the coefficient of 2.620. The overall elasticity of the tax system is measured with the coefficient of 1.461.

Lakadawla and Nambiar (1972)'s analysis of the structure of the major items of commodity taxation levied at the central, state and local levels in India. This study found that the elasticity coefficient of the Indian tax structure has been less than unity for the period 1960-61 to 1969-70 being only 0.63, while the buoyancy co-efficient works out to be 1.19. Between the two major commodity taxes union
excises and sales taxes, the latter have been showing 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.

Purohit (1978) estimated the buoyancy and income elasticity of states in India covering the period 1960-61 to 1970-71. The results of buoyancy and income elasticity of total tax revenue of all states show that the buoyancy is to the tune of 1.904 and elasticity is of the order of 1.0659. His study suggests that half of the states in India are having elastic tax structure. These states are Andhra Pradesh (1.11953), Gujarat (1.32637), Karnataka (1.49525), Maharashtra (1.39685), Tamilnadu (1.29546), West Bengal (1.04462), Punjab (1.6738) and Haryana (1.4259). Also this study finds that only one state i.e., Andhra Pradesh which falls under the category of under developed states, has income elasticity greater than one. The buoyancy and income elasticity of sales tax of all states are 1.51844 and 1.40590 respectively. The estimated buoyancy and elasticity of sales tax in A.P. are 1.56341 and 1.51289, respectively during the reference period.

The National Institute of Public Finance and Policy, New Delhi (1985) analysed some of the indirect taxes levied by the centre and State Govts. viz., union excises, import duties, sales taxes and on passengers and goods and entertainment tax and measured their responsiveness to changes in National income. The period covered in
respect of central taxes is from 1963-64 to 1974-75 and for state indirect taxes from 1960-61 to 1974-75. The general sales tax (including sales tax as motor spirit) the most important source of revenue for state Govt.\textsuperscript{11} was highly buoyant (1.43) and it has also been income elastic (1.15).

A study by National Council of Applied Economic Research, New Delhi (1971)\textsuperscript{12} estimated the elasticity of sales tax as (1.7) in A.P. for the period 1957-58 and 1966-67. Comparing the elasticity co-efficient with the states, Mysore (2.3), Kerala (2.1), Tamilnadu (2.0) and all states (1.90), the committee found that the elasticity coefficient of sales tax in A.P. is less than those in other states. The committee also did a multi-variate regression analysis to study and quantify the influence of per capita income, per capita value added by manufacture and proportion of urban population to total population on state sales tax revenue. The committee concluded that these three factors jointly explained about 99 percent of the variations in per capita sales tax revenue of the state.

A project team led by Dr. Raja J. Chellaiah of National Institute of Public Finance and Policy, New Delhi (1981)\textsuperscript{13} has found that the revenue from sales tax in Bihar is both buoyant and income elastic for the period 1963-64 to 1975-76. This team estimated the buoyancy and elasticity of sales tax with respect to state domestic product as 1.285 and 1.095 and with respect to state non-
agricultural income as 1.361 and 1.55 respectively. The team opined that the high co-efficient could be due to, among other factors, the rapid expansion of coverage and growth in trade.

Rao's (1979) study reveals that the elasticity of Indian tax system is (all taxes) 0.8271 for the period 1960-61 to 1973-74. Among the direct and indirect taxes for India as a whole, the direct taxes had exhibited smaller elasticity (0.6438) as compared with the elasticity of indirect taxes (0.8988). One of the interesting results of the study is that the elasticities of central indirect taxes is significantly smaller than the elasticity of state indirect taxes. Union direct taxes exhibited (0.7444) and indirect taxes (0.7386), whereas state direct taxes exhibited (0.3527) and indirect taxes (1.2126). The buoyancy co-efficient for union direct taxes is (0.9076) for indirect taxes (1.3512). Buoyancy estimates for state direct tax is 0.5227, for direct taxes it is (1.4565).

The findings of all these studies can be summed up broadly into two: (i) direct taxes have less buoyancy and elasticity in comparison with indirect taxes; and (ii) between the two major commodity taxes union excises and sales taxes – the latter have been more buoyant and elastic than the former.

5.7 Methodology for estimating elasticity and buoyancy of service tax

To estimate the elasticity of service tax revenue in terms of income, it is necessary to eliminate from the total service tax
receipts, the service tax receipts, due to legislative measures. For this purpose two alternative techniques have been widely used.

According to the first technique which has been used by Mansfield, "Figures of actual tax receipts, as well as data on the monetary value of the legal tax bases and their corresponding tax rates are collected for a series of years. Figures for actual tax receipts are then divided by indices of base and rate of changes, yielding a series of net of discretionary changes". This method is based on assumption of a zero elasticity of demand. That is, further changes in tax rates or in the tax bases are supposed to yield a proportionate change in tax revenue. This method is particularly useful where data on the legal tax bases are available and the rate structure is not complex. But this technique is of little practical value in under-developed countries due to non-availability of data.

The second method of separating discretionary effects was adopted by Prest (1962) in studying the personal income tax in the United Kingdom. This method starts with estimates of effect of discretionary tax changes on the year's receipts, often prepared by treasury officials. Two approaches may be followed for this purpose. One is just to subtract from the actual yield for each year the effects of budgetary proposals for that year. The second is to take into account the cumulative impact of the discretionary changes in the yields of all the years in future. Under consideration, the present study also adopts this second method, or Prest methodology.
The responsiveness of service tax structure is studied by estimating the following equation:

\[ \log Y = \log a + b \log x + u \]  

.....(1)

where, \( y \) = tax revenue
\( x \) = Gross Domestic Product (GDP) of the country
\( b \) = The slope co-efficient appropriated with the explanatory variables
\( u \) = Error term

While estimating the buoyancy – \( Y \) (service tax revenue) in the above equation (1) denotes tax revenue gross of changes in rates coverage of tax i.e., \( y_1 \).

While estimating the elasticity – \( Y \) in the above equation (1) denotes adjusted service tax yield i.e., \( y_2 \).

In this present study \( y_2 \) adjusted service tax revenue series are estimated by eliminating the effects of tax changes in each of the years.

Assume \( D_1 \) is the additional yield from an increase in the rates of service tax in the year 1. The automatic increase in the tax revenue in year 1 would be \((T_1 - D_1)\), where \( T_1 \) is the actual tax yield in year 1. Similarly for the year 2, it will be,

\[
\frac{T_1 - D_1}{T_1 - D_2} - \text{------}\frac{\text{------}}{T_1}
\]
where, \( D_2 \) is the budget proposal for the year 2. Thus, the total increase in the tax revenue in the second year comprises of 3 components viz.,

a) Budget proposal in the second year  

b) Effect of tax measures in the first year  

c) An automatic increase in tax revenue

On this basis a services showing the adjusted yield from the service tax has been obtained as follows:

\[ NT_1 = (T_1 - D_1) \]

\[ NT_2 = (T_2 - D_2) \times \frac{T_1 - D_1}{T_1} \]

\[ NT_3 = (T_3 - D_3) \times \frac{T_2 - D_2}{T_1} \times \frac{T_1 - D_1}{T_1} \]

\[ NT_4 = (T_4 - D_4) \times \frac{T_3 - D_3}{T_2} \times \frac{T_2 - D_2}{T_3} \times \frac{T_1 - D_1}{T_1} \]

\[ \vdots \]

\[ NT_n = (T_n - D_n) \times \frac{T_{n-1} - D_{n-1}}{T_{n-2}} \times \frac{T_{n-2} - D_{n-2}}{T_n} \times \frac{T_1 - D_1}{T_1} \]

where, \( T_1, T_2, T_3, T_4, \ldots \) are actual service tax yield for a series of years; \( D_1, D_2, D_3, D_4, \ldots \) are effects of discretionary changes in the years 1, 2, 3, 4, \ldots \( n \).
NTn = indicates the nth year's actual yield adjusted to the tax structure that existed in year 1.

By excluding the effect of discretionary change in this manner we get a series of service tax revenue. If such a series of service tax revenue is related to GDP thereof will give us the coefficient of elasticity.

5.8 Period of study and sources of data

The period considered for the analysis is from 1994-95 to 2005-06.

The service tax revenue figures and the expected service tax yield out of the annual discretionary changes are obtained from the various issues of Reserve Bank of India Bulletin, and various budget documents. The data on GDP at current prices, income from secondary sector (industry) and income from services sector (revised series) are obtained from ‘Hand Book of Statistics on Indian Economy’ by RBI, Mumbai, various issues of ‘Economic Survey’ of India, various issues of statistical abstract from Central Statistical Organisations have also been used.

5.9 Determinants of service tax revenue

The revenue from service tax has been related to the Gross Domestic Product of the country, income from industrial sector and income from service sector. Besides, the service tax rates and
coverage of service tax base (no. of services) are also considered as relevant explanatory variables.

5.10 Methodology to study the determinants of service tax revenue

\[
\log y = \log a + b_1 \log x_1 + y_1 \quad \ldots \quad (2)
\]

\[
\log y = \log a + b_1 \log x_2 + y_2 \quad \ldots \quad (3)
\]

\[
\log y = \log a + b_1 \log x_3 + y_3 \quad \ldots \quad (4)
\]

where, \( x_1 = \text{GDP} \)

\( x_2 = \text{income from industries} \)

\( x_3 = \text{income from services} \)

\( a = \text{interceptor} \)

\( b = \text{coefficients of the independent variables} \)

Further it is proposed to quantify the influence of tax rates and tax base on service tax revenue, the following equations are estimated.

\[
\log y = \log a + b_1 \log x_1 + b_2 \log x_4 + b_3 \log x_5 + u_4 \quad \ldots \quad (5)
\]

\[
\log y = \log a + b_1 \log x_2 + b_2 \log x_4 + b_2 \log x_5 + u_5 \quad \ldots \quad (6)
\]

\[
\log y = \log a + b_1 \log x_3 + b_2 \log x_4 + b_2 \log x_5 + u_6 \quad \ldots \quad (7)
\]

where, \( x_4 = \text{service tax rates} \)

\( x_5 = \text{service tax base} \)

As already stated the methodology adopted for estimating buoyancy and elasticity and the period under consideration, the regression results are given in Table 5.3 and 5.4.
Table 5.3

Estimates of Elasticity

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>a</th>
<th>b</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted service tax</td>
<td>Gross domestic product ((x_1))</td>
<td>-70.64</td>
<td>5.62* (24.61)</td>
<td>0.98</td>
</tr>
<tr>
<td>Adjusted service tax</td>
<td>Income from Industry sector ((x_2))</td>
<td>-13.19</td>
<td>1.72 (1.19)</td>
<td>0.12 (Non-significant)</td>
</tr>
<tr>
<td>Adjusted service tax</td>
<td>Income from Services sector ((x_3))</td>
<td>-30.75</td>
<td>2.93* (5.33)</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Note: 1. Figures in the brackets are ‘t’ value.
   * Significant at 1 percentage level.
2. Since the data on 2004-05 and 2005-06 on industrial services are not available we obtained the data by using extrapolation technique.

Elasticity co-efficient for service tax revenue in the country between 1994-95 to 2005-06 has been presented in the Table 5.3. The elasticity of service tax revenue with respect to gross domestic product \((x_1)\) was more responsive, the elasticity coefficient is as high as 5.62. The elasticity coefficient of service tax revenue with regard to service sector was also quite significant. It was as high as 2.93. But the elasticity coefficient for industry is not significant. In general the elasticity of service tax revenue is more responsive to GDP \((x_1)\).
### Table 5.4

**Buoyancy of Service Tax**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>a</th>
<th>b</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service tax revenue</td>
<td>Gross domestic product ($x_1$)</td>
<td>-75.06</td>
<td>5.94* (5.80)</td>
<td>0.98</td>
</tr>
<tr>
<td>Service tax revenue</td>
<td>Income from industry ($x_2$)</td>
<td>-2.42</td>
<td>2.67* (3.77)</td>
<td>0.91</td>
</tr>
<tr>
<td>Service tax revenue</td>
<td>Income from service</td>
<td>-8.09</td>
<td>2.59* (3.61)</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Note: Figures in the brackets are ‘t’ value.

* Significant at 1 percentage level.

The inferences can be drawn from the above table 5.4 that, buoyancy estimate for service tax revenue of the Union Government of India between 1994-95 and 2005-06 works out to be 5.94. This would mean that for every 1 per cent increase in the Gross Domestic Product in the country, service tax revenue to the Government increased by 5.9 per cent. Income from industry or secondary sector and service or tertiary sector are also used as explanatory variables. The estimated buoyancy co-efficients are turned out to be 2.67 and 2.59 respectively. This would mean that for every 1 per cent increase in income from secondary and tertiary sector, the service tax revenue increased by 2.6 per cent and 2.5 per cent respectively. Therefore, it is clear that the variation in service tax revenue is explained to greater extent by the variation in GDP.

Thus, service tax yield in India is more responsive to changes in income from Gross Domestic Product than to changes in income from secondary and tertiary sector.
5.10 Comparison with earlier studies

Buoyancy and elasticity of direct and indirect taxes, along with general sales tax have been estimated in India, from time to time, by different people. Here an attempt has been made to compare our regression results of service tax with the results of indirect taxes done by NIPFP,\textsuperscript{17} and Rao V.G.\textsuperscript{18}, the indirect taxation committee,\textsuperscript{19} M.M. Sury\textsuperscript{20} and Tenth Finance Commission.\textsuperscript{21} Therefore, the estimated buoyancy and elasticity of earlier studies with special reference to indirect taxes in comparison with service tax is presented in the Table 5.5.

Table 5.5

Elasticity and buoyancy of indirect taxes of Union Govt. of India – A comparison with service tax

<table>
<thead>
<tr>
<th>Author</th>
<th>Period of Study</th>
<th>Tax Group</th>
<th>Elasticity</th>
<th>Buoyancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Union excise duties</td>
<td>1.17</td>
<td>0.80</td>
</tr>
<tr>
<td>Rao V.G. (1979)</td>
<td>1960-61 to 1973-74</td>
<td>1. Corp tax</td>
<td>0.7685</td>
<td>0.9780</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Union excise duties</td>
<td>0.8025</td>
<td>1.3732</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Customs duties</td>
<td>0.5249</td>
<td>1.1117</td>
</tr>
<tr>
<td>Indirect tax enquiry committee (1978)</td>
<td>1963-64 to 1975-76</td>
<td>1. Union excise duties</td>
<td>0.75</td>
<td>1.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Import duties</td>
<td>1.72</td>
<td>2.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Union excise duties</td>
<td>1.27</td>
<td>0.73</td>
</tr>
<tr>
<td>Tenth Finance Commission</td>
<td>1983-84 to 1992-93</td>
<td>1. Union excise duties</td>
<td>--</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Corp tax</td>
<td>--</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Custom duties</td>
<td>--</td>
<td>1.38</td>
</tr>
</tbody>
</table>
The inferences that can be drawn from the table 5.5 is that our estimates of elasticity and buoyancy is greater than all other earlier studies, as mentioned in the above table.

V.G. Rao (1979) has estimated the elasticity and buoyancy of corp tax as less than unity, while buoyancy coefficients for union excise duties and customs duties is greater than unity, but, elasticity coefficients for these two taxes is less than unity.

According to Indirect Tax Enquiry Committee (1988) elasticity coefficient for union excise is less than unity and buoyancy estimation is greater than unity. In case of import duties elasticity coefficient is greater than one, but it is more buoyant with 2.31 percent of buoyancy coefficient.

M.M. Sury (2000) estimates the elasticity coefficient for union excise duties at 3.2 percent and buoyancy at 1.86 percent for the period 1964-65 to 1980-81. But the elasticity and buoyancy coefficients for the union excise duties has declined to 1.27 percent and 0.73 percent for the period of 1965-66 to 1980-81.

Tenth Finance Commission (1994) has estimated the buoyancy coefficients at greater than unity for union excise, corporation tax and custom duties for the period 1983-84 to 1992-93.
Chapter Summary

The trend analysis of service tax revenue reveals that, the trend value in the beginning (1996-97), is negative. As a result, the trend line (Series 2 in Diagram 5.1) penetrates below the horizontal line. It is only after 1997-98, the trend values have become positive, as a result, the trend line series 2 has become positive and slopes upward. The shape of the revenue curve (Series 1 in Diagram 5.1) is steeper which indicates the service tax revenue has increased almost by 91 per cent after 2002-03.

The estimated elasticity and buoyancy co-efficient of service tax revenue in India, with respect to, GDP are 5.62 and 5.94 respectively during the period 1994-95 and 2005-06. This study also estimates elasticity and buoyancy of service tax revenue with respect to, the secondary (industry) and tertiary (services) sectors. Elasticity coefficient for secondary and tertiary sector is estimated at 1.72 and 2.93 respectively. Buoyancy coefficient for secondary and tertiary sector is estimated at 2.67 and 2.59 respectively, for the same period. This shows that elasticity and buoyancy coefficient of service tax revenue in India is more responsive to GDP.

Notes and References:

1. “A time series is a set of observations taken at specific times, usually at ‘equal intervals’, Mathematically a time series is defined by the value y1, y2 of a variable y. Thus y is a function of ‘t’ symbolised by y=f(t).


11. Fourteen States viz., Andhra Pradesh, Assam, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh and West Bengal.


