CHAPTER - 6

Elasticity and Buoyancy of Tax Revenue

Introduction

As the economy grows more and more resources are needed. To meet the resource requirement, an increasing part of income needs to be siphoned off through taxation. The growth of taxes is generally judged in relation to increase in income. The relative growth of tax revenue can be measured by calculating the percentage change in tax revenue that has taken place for a percentage change in income. The increase in tax revenue can take place either through automatic response of the tax yield to growth of income or through discretionary changes in the tax system such as introduction of new taxes or revision of rates of existing taxes.

In order to measure the degree of automatic response of a tax system, we require a time series of the tax yields which is free from the impact of discretionary changes. The impact of “automatic response”, as provided by the coefficient given by the relationship between the changes in the tax receipts to those in income is termed as built-in-flexibility or elasticity measure of the tax system. The combined effects of automatic response and discretionary changes, as given by the coefficient of the relationship between changes in total tax receipts to changes in income is a measure of total responsiveness or tax buoyancy of the tax system.¹
The term income elasticity with respect to a given tax or a group of taxes may be defined as the ratio of percentage change in tax yield to a given percentage change in national income or to a related component thereof.²

But the change in tax revenue may be automatic or discretionary. For estimating elasticity of tax revenue in term of income, one has to adjust the figures of actual tax receipts for the effect of the discretionary changes. In other words, it is necessary to eliminate from total tax receipt the tax receipts due to legislative measures.³ However, such adjustment poses difficulties to the researchers to generate a series of tax receipts net of the impact of discretionary changes. Separate figures on changes in tax receipts due to changes in taxes are not always available at National, State or Local levels. A number of methods have been used for generating a series of tax receipts net of the impact of discretionary changes.³⁴ Prest⁵ (1962) developed a method which was later developed by Mansfield⁶ (1972) and Chaudhary⁷ (1979). The method removes the cumulative impact of discretionary action on tax yields of all subsequent years with reference to the base year. The method assumes that:

- Legislative measures contain the same element of progressivity as the tax structure they modify;
- The budget estimates are always realized;
- Taxes are independent of each other;
The averages do not alter or alter only marginally from year to year.

The following equations have been used to estimate income elasticity and buoyancy coefficients from tax revenue and individual taxes:

\[
\log AT = \log \alpha_1 + \beta_1 \log X + u_1 \quad (1)
\]

\[
\log T = \log \alpha_2 + \beta_2 \log X + u_2 \quad (2)
\]

Where AT stands for adjusted tax revenue; T denotes actual tax revenue and X represents State income or base; \( u_1 \) and \( u_2 \) are stochastic error terms. Elasticity is given by the regression coefficient \( \beta_1 \) whereas the regression coefficient \( \beta_2 \) stands for buoyancy.

As income may not always directly influence the revenue originating from a given tax, therefore, in measuring the elasticity of a tax, it may not be appropriate to use income as the proximate base. The growth of revenue from a tax depends upon the expansion of its base. However, such basis being an integral part of the overall economic system, usually have a close relationship with State income. Hence, segmenting an elasticity coefficient into the response of an individual tax to its base and the resonance of the latter to State income may provide a clear picture of the tax structure.

Symbolically, if \( T_i = \) revenue from the \( i \)-th tax, \( B_i = \) base of \( i \)-th tax and \( Y = \) State income, then the response of the \( i \)-th tax to its base is

\[
ET_i B_i = \text{rate response} = \frac{\Delta T_i}{\Delta B_i} \quad \text{and the response of } \text{i-th tax base to}
\]

State income is \( E_Y B_i = \text{base response} = \frac{\Delta S_i}{\Delta Y} \).
The response of the i-th tax to State income is

\[ \frac{\Delta T_i}{\Delta Y} \cdot \frac{T_i}{Y} \]

which is equal to the product of elasticity to base and elasticity of base to State income.

Decomposition of elasticity helps in indentifying the sources of rapid tax revenue growth or conversely, the causes of relatively sluggish revenue growth. It enables the analyst to discover whether the State can improve its tax revenue by initiating measures to improve collection or by checking evasion through under reporting of the base itself. The tax-to-base component of elasticity may be enhanced by a State by improving its collection machinery while slow growth of the base may result from evasion or from peculiarities in structure of the economy.

Generally, for calculating the elasticity and buoyancy coefficients of a tax or of a tax system as a whole, hypothetical revenue series is worked out by the ‘Proportional Adjustment Method’ or by the ‘Constant Rate Base Method’. But due to data constraints, none of these methods could be used on municipal taxes. As legal bases of taxes are not easily available, proxy bases have been used in the present study for which data are available. Moreover, we have calculated the elasticity coefficients of tax on trade, profession and callings, property tax, octroi and total tax revenue, as data on proxy tax bases could be obtained only for these categories of taxes. As a matter of fact, these taxes are the major components of the total municipal revenue, constituting about 80 per cent of the total municipal revenue in
2005-06. However, buoyancy coefficients have been calculated for all categories of taxes as well as for total tax revenue. The elasticity and buoyancy coefficients have been calculated at two points of time, one pertaining to Period-I (1970-71 to 1990-91) and the other pertaining to Period-II (1991-92 to 2005-06). The data in Period-I was taken at constant prices with 1981-82 as base whereas for Period-II 1993-94 was taken as base. Data were mainly taken from various issues of Statistical Abstract of Punjab. Table 6.1 provides estimates of elasticity for Period-I and Period -II.

Table 6.1: Estimates of Elasticity of Total Municipal Taxes and Individual Taxes in Punjab

<table>
<thead>
<tr>
<th>Tax</th>
<th>Period I</th>
<th>Period II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elasticity Coefficient</td>
<td>R²</td>
</tr>
<tr>
<td>Total Municipal Tax</td>
<td>0.691 (9.536)</td>
<td>0.818</td>
</tr>
<tr>
<td>Property Tax</td>
<td>1.029 (7.036)</td>
<td>0.708</td>
</tr>
<tr>
<td>Octroi</td>
<td>1.126 (13.427)</td>
<td>0.900</td>
</tr>
<tr>
<td>Tax on Trade, Profession &amp; Callings</td>
<td>0.340 (5.996)</td>
<td>0.636</td>
</tr>
</tbody>
</table>

Figures in parenthesis show t-values.


Elasticity of Property Tax

Property tax is the main tax which falls in the category of direct tax. In computing the elasticity coefficients, the annual rental value, as taken for assessment purposes by valuation department has been taken as proxy base. Although property tax, besides house tax, includes other service taxes, but there is some homogeneity in the base. Most of the service taxes are charged on flat rates and return from these taxes mostly depends upon the number of houses. Table 6.1 shows elasticity coefficient of 1.029 in Period-I for property tax. This means that with one per cent increase in rental value of the assessed units, income from the tax increased by 1.029 per cent. However, in Period-II, the elasticity coefficient declined to 0.916 per cent, which implies that the property tax is no longer an elastic source of revenue for the ULBs in Punjab. Although the rental values of properties have increased manifold, yet the rates of the taxes are still very low. In Punjab, private property owners enjoy large-scale exemptions. Most exemptions have been given to categories of property owners, e.g., owners of half Kanal houses (250 sq. yds) and self-occupied houses. This has led to property tax becoming an insignificant source of revenue for ULBs. Moreover, Rent Control Act has frozen the revenue from this source.

Elasticity of Octroi

Although regressive in character, octroi constituted the lion’s share in the tax revenue of the ULBs and is regarded as the mainstay of municipal
finance in Punjab. The value of goods and commodities passing through
different octroi posts was taken as the proxy tax base. The Table 6.1 shows
that the elasticity coefficient of octroi in Period-I is 1.126. This implies that
with one per cent increase in value of goods in commodities, the revenue
from this tax increases by 1.126 per cent. With increase in income, revenue
from this source increases automatically. In Period-II, the elasticity
coefficient declined to 0.802, implying that octroi ceased to be an elastic
source of the revenue for ULBs in Punjab. The assessment of octroi has
been a matter of criticism as being inadequate and non-scientific, resulting
in evasion, corruption and other malpractices.

Elasticity of Tax on Trade, Profession and Callings

For the purposes of finding elasticity of this tax, income from the
urban sector of the State has been chosen as a proxy tax base. The results
show that the tax is not elastic as the elasticity coefficient was found to be
0.340 in Period –I , which marginally improved to 0.457 in Period-II. There
is a limit of Rs. 2500/- per annum on this tax, as fixed by the Constitution of
India. As a result, revenue from this tax has not increased much. The Third
Punjab Finance Commission (2006) in its main report has observed that
Punjab being a State where earnings are high and the quality of life superior,
it makes eminent sense to levy professional tax in urban areas to ensure that
the civic amenities in Punjab also develop apace with economic
development of the State. The Commission has also recommended that to
be genuinely useful in augmenting local finances, this tax should be levied and collected by the Department of Excise and Taxation, thereby ensuring efficiency and economy in collection, and given directly to ULBs to be used for meeting local needs.

**Elasticity of Total Municipal Taxes**

Besides above three taxes which constitute about 80 per cent of the total municipal revenue in Punjab, total municipal taxes include tax on animals and vehicles, tax on roads and ferries and other taxes. Instead of taking different tax bases for different taxes and then aggregating it, we have taken total income of State from urban sector as the proxy tax base for total municipal taxes for finding elasticity coefficient. Total municipal taxes were not found to be elastic in both the periods. Table-6.1 shows that the elasticity coefficient of total municipal tax was 0.691 in Period-I. The coefficient further declined to 0.588 in Period-II. This indicates the ineffectiveness of discretionary measures in mobilization of resources as there is little effort on part of the ULBs to introduce new taxes or revise the rates of existing taxes.

Table 6.2 shows the result of buoyancy of municipal tax system in Punjab.
Table 6.2: Estimates of Buoyancy of Total Municipal Taxes and Individual Taxes in Punjab

<table>
<thead>
<tr>
<th>Tax</th>
<th>Buoyancy Coefficient</th>
<th>R²</th>
<th>Tax</th>
<th>Buoyancy Coefficient</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Municipal Tax</td>
<td>1.140 (11.955)</td>
<td>0.876</td>
<td>Total Municipal Tax</td>
<td>0.699 (5.931)</td>
<td>0.709</td>
</tr>
<tr>
<td>Property Tax</td>
<td>1.003 (7.446)</td>
<td>0.731</td>
<td>Property Tax</td>
<td>0.946 (7.952)</td>
<td>0.816</td>
</tr>
<tr>
<td>Octroi</td>
<td>1.146 (13.427)</td>
<td>.902</td>
<td>Octroi</td>
<td>0.819 (7.915)</td>
<td>0.815</td>
</tr>
<tr>
<td>Tax on Trade, Profession &amp; Callings</td>
<td>1.442 (3.864)</td>
<td>0.411</td>
<td>Tax on Trade, Profession &amp; Callings</td>
<td>-3.004 (-.842)</td>
<td>-0.021</td>
</tr>
<tr>
<td>Tax on Animals &amp; Vehicles</td>
<td>0.461 ()</td>
<td>0.205</td>
<td>Tax on Animals &amp; Vehicles</td>
<td>1.197 (4.203)</td>
<td>0.543</td>
</tr>
<tr>
<td>Tax on Roads &amp; Ferries</td>
<td>-1.117 (-1.878)</td>
<td>0.112</td>
<td>Tax on Roads &amp; Ferries</td>
<td>2.630 (6.992)</td>
<td>0.774</td>
</tr>
</tbody>
</table>

Buoyancy of Property Tax

In case of property tax, the buoyancy coefficient of 1.003 in Period-I shows that with one per cent increase in State’s income from urban sector, revenue from this tax increased by almost the same per cent. This implies that the tax is marginally buoyant. With urbanization, a large number of housing colonies have come up in the cities and towns all over the State, resulting in the increase in revenue from this source. However, in Period-II the buoyancy coefficient declined marginally to 0.946. To make full utilization of this near-buoyant source of revenue the ULBs must have efficient tax administration machinery.
**Buoyancy of Octroi**

With a buoyancy coefficient of 1.146 in Period-I, octroi has emerged as a buoyant source of tax revenue, which is in line with the finding of the First Punjab Finance Commission (1995). This means that with one per cent increase in State’s income from urban sector, revenue from this source increased by 1.14 per cent. In this case, the automatic increase in tax revenue is more than the increase caused by discretionary changes. Since increase in income results in increase in octroi revenue, there has not been much discretionary changes in the tax. In Period-II, the buoyancy coefficient of octroi declined to 0.819. This implies that octroi is no longer a buoyant source of revenue. This may be due to corrupt and inefficient administrative staff although the Punjab government did revise the octroi schedule in 1975.

**Buoyancy of Tax on Trade, Profession and Callings**

Tax on trade, profession and callings at local level is akin to the income tax at the national level. This tax was found to be the most buoyant tax among all the individual taxes in Period-I with a coefficient of 1.442. This shows that with one per cent increase in urban income of the State, the revenue from the tax increased by more than one per cent. In Punjab, the taxes levied by the ULBs on the income as the main criterion (except in case of listed professions mostly carried out by Harijans and scheduled castes, where a low flat rate is adopted). The receipts from the tax have not increased commensurate with the increase in State’s urban income. In fact,
under the existing conditions, the limit of Rs. 2500/- per annum is extremely low. To increase the revenue receipts from the tax, this limit needs to be raised to a suitable level at the earliest.

**Buoyancy of Tax on Animals and Vehicles**

Tax on animals and vehicles was not found to be buoyant in Period-I. In fact, its coefficient was found to be negative ( - 0.461). However, in Period-II, the tax was found to be buoyant with a coefficient of 1.197. It means that with one per cent increase in State’s urban income, the revenue from this tax increased by 1.197 per cent. Since the tax is levied on vehicles other than mechanically propelled, and the number of such vehicles has declined over time in the cities, the revenue from this source has not increased much.

**Buoyancy of Tax on Roads and Ferries**

Tax on roads and ferries with a negative coefficient of - 1.117, was also not found to be buoyant in Period-I. But, in Period –II, this tax emerged as the most buoyant tax among all individual taxes of ULBs with a coefficient of 2.630. This means with one per cent increase in State’s urban income, the revenue from this source increased by 2.63 per cent.

**Buoyancy of Total Municipal Taxes**

The total municipal taxes were, however, found to be buoyant in Period-I with a buoyancy coefficient of 1.140 and $R^2$ of 0.876. This means that as State’s urban income increased by one per cent, the tax income of
ULBs increased by more than one per cent. In Period –II, the total municipal taxes were not buoyant as the buoyancy coefficient fell to 0.699 with R² of 0.709.

Thus, from the results of elasticity and buoyancy coefficients of taxes of ULBs in Punjab for the two periods under consideration, it may be inferred that the taxes are by and large more elastic and buoyant in Period-I than in period-II. The discretionary measures had little revenue effect. In fact, municipal tax structure in Punjab has not changed much in term of introduction of new taxes as well as revising the rates of existing taxes. The small difference between elasticity and buoyancy coefficient show hesitation on the part of the ULBs to take any bold measures for mobilization of tax sources.
Note and References


