CHAPTER - 5

Tax Efforts of Urban Local Bodies in Punjab

Introduction

By tax efforts we mean the extent to which a state or a municipal body uses its fiscal or taxable capacity to extract the resources. Thus, it may be defined as the ratio of actual tax performance to taxable capacity. In a developing economy, with an increase in national income, the potential of the economy to raise resources also increases. The mobilization of additional resources depends not only on the ability of the government to impose taxes and taxable capacity of the people but also on the efforts of the tax collecting machinery.

The study of tax efforts assumes importance at all levels of government. In a federal set-up like India, the need for comparing the tax efforts of the States was particularly felt in the context of transfer of resources from Centre to State. At the municipal level, although no resource transfers are made on the basis of tax efforts, yet a study of tax efforts assumes significance as it helps in assessing a municipal body’s efforts to raise resources. With an increase in municipal obligations and functions, particularly after the Constitutional seventy-fourth amendment, the ULBs have to raise resources. The amendment envisages mobilization of resources as the primary responsibility of the ULBs in order to bring fiscal health to municipal finance and to achieve the constitutional objective of financial...
autonomy. As the chances of enlarging local taxes are limited, the exploitation of existing taxes assumes special importance. There have been no new local taxes during the last many decades. The State governments have not been able to delegate their tax powers to ULBs. The key to the solution, therefore, lies in broadening the tax base and improving the methods of collection and assessment.

The measurement of tax efforts assumes importance as it rewards extra tax efforts and penalizes laxity in it. A number of criteria have been employed for making a comparative study; the success of tax effort criterion depends on its precise measure. In the economic literature, most of the studies in this field have measured tax efforts as the ratio of tax revenue to income. But this measure suffers from a drawback because income is not the sole determinant of taxable capacity. There are a large number of other factors which may have significant impact upon the tax potential of a State. Tax effort in any State is an aggregate result of its income, sectoral development, composition of output, size distribution of income, pattern of government output and outlays, extent of urbanization, degree of monetization, tax rate, tax base in the State and in the neighboring States.

In the present chapter, we have measured the tax efforts of ULBs in State of Punjab both in pre- and post-seventyfourth constitutional amendment periods, i.e. 1970-71 to 1990-91 and from 1991-92 to 2005-06, using regression analysis. The data on municipal tax revenue have been
taken from Statistical Abstract of Punjab. As in the previous chapters, data was taken at constant prices. Before we do that, various measures of tax effort have been explained below:

Methods of Tax Efforts

Various methods of tax efforts are as follows:

Per Capita Tax Revenue

This is the simplest measure of tax effort. It was adopted by the Fifth Finance Commission in the context of fiscal transfers to the States. However, it is not a reliable method. The major drawback of this method is that it is solely dependent upon population of a particular State. If the population within the jurisdiction of a State/ULB is small, this measure would place that State/ULB high in terms of tax efforts. But population is not in itself a determinant of tax effort of particular State/ULB. The revenue generated by a State/ULB from taxation depends upon the pattern of taxation and the efficiency and ability of the taxing authorities.

The method is considered highly unsatisfactory since it does not relate tax efforts to fiscal capacity. The measure ignores the distribution of income and inter-sectoral distribution of income which may differ from State to State and may affect the relative capacity of the States/ULBs to raise taxes.
**Tax-Income Ratio**

This measure aims at finding out whether States were collecting taxes in proportion to their respective total income. In this method, tax revenue is related to State income in absolute or per capita terms. The method indirectly assumes that State income determines the tax revenue collected i.e. the State income is the index of the fiscal potential of a State.

Frank (1959) in an empirical study of United States suggested that in order to measure the degree of sacrifice involved in each State, the percentage of taxes to personal income shall be divided by per capita personal income. Symbolically, Frank’s index is:

\[
\frac{T}{Y + \bar{Y}}
\]

Where \( T/Y \) is tax income ratio and \( \bar{Y} \) is per capita personal income. However the problem with Frank’s index is that it suffers from excessive progressivity. In his index, the numerator is the ratio in percentage value and the denominator is absolute value.

Bird (1964) has also used tax – income ratio with slight modification which he calls tax sacrifice index. The Bird’s index is:

\[
\frac{\left( \frac{\text{Taxes}}{\text{Disposable Income}} \times 100 \right) / \frac{\text{Gross Domestic Product}}{\text{Population}}} {\left[ \frac{T}{Y - T} \right] \times 100 + \left[ \frac{\bar{Y}}{\bar{P}} \right]}
\]

Symbolically :

\[
\left[ \frac{T}{Y - T} \right] \times 100 + \left[ \frac{\bar{Y}}{\bar{P}} \right]
\]
Where T stands for current government revenue and Y/P stands for per capita income. Reddy (1975) has pointed out that Bird, in his index, has used disposable income whereas Frank has used personal income in his index. But both the indices consider income alone as the capacity factor and do not incorporate the influence of other capacity factors.

**Incremental Tax –Income Ratio**

It is the ratio of changes in tax-revenue to changes in the State income. This method is an improvement over tax-income ratio as it relates to the increase in tax revenue to increase in income from urban sector. This measure is generally used in time series analysis and has the advantage of giving the information on how much of a given increase in State income resulting from planned development is scooped by additional taxation. From the point of view of dynamic fiscal policy for growth, this is very relevant and useful since the objective is to ensure that as large a proportion as possible of incremental income is siphoned to the government fisc for capital formation rather than allowing such increases to be spent on consumption. Symbolically, it may be written as \( \frac{\Delta T}{\Delta Y} \), where \( \Delta T \) is the incremental tax revenue and \( \Delta Y \) is the incremental State’s income from urban sector.
**Income Elasticity of Tax Revenue**

In this method income elasticity is defined as the ratio of percentage change in the tax revenue and percentage change in the urban income. It is measured by the formula

\[ E_i = \frac{\Delta T}{\Delta Y} \times \frac{Y}{T} \]

This method has the advantage over the other methods as it takes into account the effect of both the changes in the rate structure and base structure on the productivity of taxes. The method is useful in making a comparison of tax efforts at two points of time.

Various points of criticisms have been levelled against this approach. It assumes that the revenue buoyancy depends only upon income. But it is not so. Income elasticity depends largely upon the initial position of taxes in relation to income. A State whose tax ratio happens to be high in the base year is bound to show higher income elasticity of tax revenue in view of fact that it carries with it all the advantages it has had in the base year. Institutional factors take time to cause their impact upon the government operations.

**Regression Analysis**

The various methods of tax efforts discussed above are based on the assumption that the State tax revenue is a function of State income only. The scope of these methods is limited as they consider income to be the sole determinant of tax effort and ignore a large number of factors, both
economic and non-economic, which may exert significant influence upon the taxable capacity of a State. In addition to this, they do not take into account various factors like the distribution of income and wealth over State and the structure of income i.e., whether the bulk comes from agriculture or industry. If a large proportion of income comes from agricultural sector, the tax revenue collected may be less and the State is placed on the disadvantage position. On the other hand, if larger proportion of State income originates from industrial sector, that particular State may be considered better placed in terms of taxable capacity. Thus, the advantage of regression analysis lies in the fact that it takes into accounts all those factors which are quite important and presents a more comprehensive picture.

The different empirical studies have demonstrated that factors such as per capita income, share of non-agricultural income in State income, i.e., State income from urban sector, degree of urbanization, level of literacy, etc., have an impact on the taxable capacity and hence fiscal potential. Lotz and Morss4 (1967) in their study on tax efforts of developing countries, considered aggregate income, tax-ratio and other factors such as per capita income, size of foreign trade and gross national product. They used regression analysis to estimate a few factors that affect tax efforts. On the empirical basis, different weights were assigned to different factors so as to establish a norm for the appraisal of tax efforts. They used the following regression equation:

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\[ T/Y = \alpha + \beta Y_p + \gamma (F/Y) \]

Where \( T/Y \) is tax-income ratio, \( Y_p \) is per capita income, \( F/Y \) is the sum of exports (f.o.b.) and imports (c.i.f.) as a percentage of gross national product. \( \alpha, \beta \) and \( \gamma \) are the regression parameters.

The estimated regression coefficients gave an average tax ratio. On comparing the actual and estimated tax ratios, tax efforts were calculated. The country, whose actual tax ratio exceeded the estimated one by the largest percentage, was given the highest tax effort ranking, while the country, whose actual tax ratios was less than the estimated tax ratio by the largest percentages, was given the lowest ranking. The estimates of Lotz and Morss could not bring out clear distinction between tax ratio and tax effort approach.

Bahl\(^5\) (1971) in his study pointed out that the tax ratio itself was not a measure of tax efforts, rather it was a function of both fiscal capacity and tax efforts. The study differentiated between tax ratio and tax efforts. Bahl assumed tax-ratio to be a function of two factors, namely taxable capacity \( (T/Y) \) and tax efforts \( (E) \). Symbolically, \( T/Y = f (\bar{T}/Y, E) \). From it, tax effort ratio in any country may derived as:

\[ E = (T/Y)/(\bar{T}/Y) \]

Or \( E_i = T_i/\bar{T}_i \), where \( i = 1, 2, \ldots, n \)
In this approach, we have to make an estimation of taxable capacity and tax efforts. The tax effort for the i-th country is the ratio of actual tax yield to the expected tax yield.

Another study is by Bawa and Gill (1988). They studied relationship between tax and other independent variables with the help of a regression model for two time periods, i.e., 1967-68 and 1981-82. The independent variables included per capita income, share of non-agricultural sector in the State income, percentage of urban population to total population, literates as a percentage of total population and per capita development expenditure (on public works). The study concluded that main determinants of tax efforts were the percentage of urban population to total population and literates as percentage of total population. The share of non-agricultural income was also an important factor. Per capita income was less significant because it was itself dependent on other variables.

We have adopted the regression equation approach of Bawa and Gill in our study for assessing the tax efforts of ULBs in Punjab for both pre-constitutional amendment period and post-constitutional amendment period, i.e., 1970-71 to 1990-91 and 1991-92 to 2005-06. For the estimation of relationship between tax-income ratio and other capacity factors, the following regression equation was used:

\[ \frac{T}{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + U \]
Where T/Y represent the ratio of municipal tax revenue to urban income in the State, X₁ is per capita urban income, X₂ is the share of municipal income in urban income, X₃ is the percentage of urban population to total population, X₄ is literates as percentage of total population, X₅ is per capita development expenditure (public works) by ULBs and U is the error term. X₁ and X₂ represent the level of income and the structure of the economy while X₄ and X₅ represent the level of tax base and level of tax compliance.

Before attempting two-variable regression and multiple regression of the above model, it was considered worthwhile to examine the correlations among the variables of the model for both the periods under study. In order to do this, a correlation matrix was prepared for each period. The results are presented in Tables 5.1 and 5.2. The results of the correlation matrices for both the periods show that only X₁ and X₂, among the set of independent variables, were found to be significantly correlated with the dependent variable T/Y. While the variable X₁ was significant at 1 per cent level, the variable X₂ was significant at 5 per cent level.

### Table 5.1: Correlation Matrix for Period I: (1970-71 to 1990-91)

<table>
<thead>
<tr>
<th></th>
<th>T/Y</th>
<th>X₁</th>
<th>X₂</th>
<th>X₃</th>
<th>X₄</th>
<th>X₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/Y</td>
<td>1</td>
<td>-.021</td>
<td>.620</td>
<td>.928</td>
<td>.733</td>
<td>.218</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.928</td>
<td>.000</td>
<td>.195</td>
<td>.409</td>
<td>.036</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>X₁</td>
<td>-.021</td>
<td>1</td>
<td>.079</td>
<td>.713</td>
<td>.624</td>
<td>.723</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.928</td>
<td>.000</td>
<td>.007</td>
<td>.003</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>X₂</td>
<td>.620</td>
<td>.079</td>
<td>1</td>
<td>.383</td>
<td>.205</td>
<td>.383</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.003</td>
<td>.733</td>
<td>.087</td>
<td>.373</td>
<td>.087</td>
<td></td>
</tr>
</tbody>
</table>

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The results of the regression analysis are presented in Tables 5.1 and 5.2.
Table 5.3: Regression Analysis for Period I: (1970-71 to 1990-91)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Intercept</th>
<th>Regression coefficient</th>
<th>t-value</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X_1</td>
<td>0.013</td>
<td>-2.37E-008</td>
<td>-0.091</td>
<td>0.052</td>
</tr>
<tr>
<td>X_2</td>
<td>0.004</td>
<td>0.405</td>
<td>3.448</td>
<td>0.352</td>
</tr>
<tr>
<td>X_3</td>
<td>0.005</td>
<td>0.000</td>
<td>1.344</td>
<td>0.087</td>
</tr>
<tr>
<td>X_4</td>
<td>0.001</td>
<td>0.000</td>
<td>0.845</td>
<td>0.036</td>
</tr>
<tr>
<td>X_5</td>
<td>0.010</td>
<td>9.29E-005</td>
<td>2.258</td>
<td>0.212</td>
</tr>
</tbody>
</table>

Multiple Regression Equation for Period I

\[
T/Y = -0.019 - 8.29E-007 X_1 + 0.312* X_2 - 0.001 X_3 + 0.001 X_4 + 0.001* X_5
\]

\[
\text{(-2.747)} \quad (2.500) \quad (-1.393) \quad (1.447)
\]

R^2 = 0.64

Note: Figures in parenthesis are t-values. * shows significant at 1 per cent level.

In this table we first present the results of two-variable regression, i.e., each independent variable was regressed on the dependent variable separately and then multiple regression was attempted taking all the independent variables together. The results of the regression analysis bring out some important facts. In both the periods, two independent variables, viz., share of municipal income in urban income and per capita development expenditure were found to be determining the tax effort. These were found to have a significant impact at 1 percent level in both the periods. The remaining independent variables, viz., per capita urban income, percentage of urban population to total population and literates as a percentage of total

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population, were not found to be significant in both the periods. However, if we take into consideration the five factors in multiple regression model, the results show that in Period I they explained 64 percent of the variation in tax income ratio, while in Period II their explanatory power increased to 81 percent. In Period I, share of municipal income in urban income and per capita development expenditure were found to be significant whereas in Period II, only one independent variable, viz., per capita development expenditure was significant.

Table 5.4: Regression Analysis for Period II: (1991-92 to 2005-06)

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Intercept</th>
<th>Regression coefficient</th>
<th>t-value</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( X_1 )</td>
<td>0.015</td>
<td>-7.54</td>
<td>-0.0958</td>
<td>0.066</td>
</tr>
<tr>
<td>( X_2 )</td>
<td>0.005</td>
<td>0.455*</td>
<td>3.283</td>
<td>0.453</td>
</tr>
<tr>
<td>( X_3 )</td>
<td>0.023</td>
<td>0.000</td>
<td>-1.676</td>
<td>0.178</td>
</tr>
<tr>
<td>( X_4 )</td>
<td>0.023</td>
<td>0.000</td>
<td>-1.676</td>
<td>0.178</td>
</tr>
<tr>
<td>( X_5 )</td>
<td>0.009</td>
<td>2.66E-005</td>
<td>2.767</td>
<td>0.371</td>
</tr>
</tbody>
</table>

Multiple Regression Equation for Period II

\[
\frac{T}{Y} = -0.016 - 9.40 \times 10^{-008} X_1 + 0.121 X_2 + 0.000 X_4 + 3.55 \times 10^{-005} X_5 \\
\text{(-1.090) (0.759) (-0.970) (4.081)}
\]

\( R^2 = 0.81 \)

Note: Figures in parenthesis are t-values. * shows significant at 1 per cent level.

The conclusion derived from regression analysis is that the main determinants of tax efforts of ULBs in Punjab are the share of municipal income in urban income and per capita development expenditure. This
means that larger the municipal income that comes from urban income of
the State, the more is the tax-income ratio or tax efforts of the ULBs.
Similarly, the higher the per capita development expenditure of the ULBs on
public works, namely roads, buildings, establishments, stores etc., the more
will be the income generated from these components and hence larger will
be the tax efforts of the ULBs.
Notes and References


