CHAPTER IV

CONCEPTUAL AND METHODOLOGICAL ISSUES

Taxes affect the households and the fortunes of business. Therefore, incidence of taxation forms the basis for intense debate and discussion among economists and academicians. The incidence of taxation has been defined as the final resting place of money burden of taxes. For every unit of revenue raised by the government by means of taxation there is a corresponding reduction in the income of some one or the other. Therefore, a study on the incidence of taxation is to trace whose incomes are reduced as a result of the imposition of the tax.

Apart from transferring resources from private use, taxes often distort the choices of consumers and distort expenditure patterns. It also leads to less efficient use of factor inputs and affect total output, rate of savings, investment and rate of growth. All these combined effects impose extra burden. As a result, the reduction in income available for private use, by means of a tax is greater than the amount of revenue raised through a tax.

Normally, an analysis on these effects of taxations is often excluded from the study of incidence of taxation, as they pose a lot of conceptual and methodological problems. Tackling these conceptual and methodological issues is also beyond the means of an individual researcher. Therefore, a study on the direct money burden of taxation form the subject matter of most of the studies and the present study is no exception to this.
The perception that taxes are responsible for the reduction in real income available for private use has undergone changes recently. One such view in that, it is the public expenditure which absorbs the resources transferred through taxation. Tax rates may go up or come down, but the level of expenditure remains unaltered. Therefore, it is inferred that taxes are responsible for the changes in real income available for private use. Hence, incidence of taxation must be defined as a catalyst responsible for the changes in the distribution of real income available for private use.

The extent and nature of changes in real income can be studied by comparing two situations. One is the state of distribution before the imposition of tax and the other is the state of distribution after the imposition of tax. The problem is, when a tax is imposed, something else, either the public expenditure or the budget balance will also change. In either case, the changes in the distribution of real income will be due to the combined effects of tax and public expenditure or the budget balance and not the tax alone.

If one is interested in estimating the combined effect of taxation and public expenditure, then budget incidence would be more appropriate (Musgrave), because the distribution of income among the households is not only affected by taxation but also by public expenditure. When taxes are imposed, the income of the households is getting reduced. Similarly, when transfer payments are made through public expenditure, the income of the households increase.
If the effect of a given tax on the distribution is to be isolated, then other things must be held constant. This can be done by replacing one tax by another tax of equal yield. The distributional impact of substituting one tax for another tax of equal yield is termed as differential incidence. The concept of differential incidence relates to a change in the tax system. It cannot measure the incidence of an existing tax system specifically.

Despite the theoretical arguments in favour of a particular tax system, the general public are interested in knowing whether the existing system of taxation distributes the burden in an equitable manner or not? None of the concepts in the literature of taxation provides a satisfactory answer to this. Keeping this in view, the present exercise attempts to measure the incidence of the tax system in Tamil Nadu in general and sales tax in particular on the basis of the assumption that the magnitude and pattern of government expenditure is given and that the tax revenue is spent.

Another important aspect of study of tax burden is to distinguish between ‘incidence of tax’ and ‘burden of tax’. To some writers, both the terms mean the same, whereas to some others, there are differences between the two. To Pechman and Okner, both the terms mean the same. Therefore they can be used as synonyms. But, according to John F. Due, the term burden refers to reduction in real income and the term incidence of tax refers to the distributional aspects of tax.
Douglas Dosser explained incidence of taxes in two forms. One is static incidence and the other is dynamic incidence.\footnote{1} When the effects of taxes are considered at a particular point of time, it is static incidence; whereas under dynamic incidence the effects of taxes are considered over a period of time. The formula used by Dosser to measure static incidence is

\[ \Delta R = f(w_i, w_j, p_{ij}, q_{ij}), \quad i = 1, 2 \text{ and } j = 1, 2, 3, 4, \ldots, n \]

Where,

\( \Delta R = \) change in individual income.

\( w_i = \) Change in prices of factor before and after tax.

\( w_j = \) Change in hours work or capital offered.

\( p_{ij} = \) Change in price of \( j^{th} \) good before and after tax.

\( q_{ij} = \) Change in quantity of \( j^{th} \) good before and after tax.

When this is differentiated with respect to time it is dynamic incidence.

\[ \frac{d\Delta R}{dt} = g\left( \frac{dw_i}{dt}, \frac{dw_j}{dt}, \frac{dp_{ij}}{dt}, \frac{dq_{ij}}{dt} \right) \]

A.R. Prest\footnote{2} offers a different interpretation of tax incidence. According to him, “if one classifies income recipients by size of income groups, then one can estimate the sum received in the two years by each group after deduction of taxes directly assessed on income. Subsequently one
can deflate this change in net income received by each group by a retail price index appropriate to that group”.

Ursula Hicks classified incidence into two categories namely, formal incidence and effective incidence. Formal incidence is nothing but the money burden of taxes. Effective incidence deals with the tax payer’s responsiveness to a change of tax and its consequence. Thus, effective incidence covers two set of situations. One is before the imposition of tax and the other is after the imposition of tax.

According to Dalton, there are two concepts of burden of taxation. One is money burden and the other is real burden. Incidence of a tax means the direct money burden borne by those who pay the tax. Real burden is the loss of economic welfare in terms of the sacrifice undergone by the tax payer.

Out of the various types of incidence, we intend to measure the formal incidence. The real burden and the effective incidence explained by Dalton and Ursula Hicks respectively involve economic welfare. Measure of incidence involving economic welfare warrants the usage of sophisticated econometric tools despite their subjectivity. Measure of incidence with such constraints, requires data suitable for such ventures. Availability of such data is bleak in India.

Similarly, the measuring of differential incidence requires the substitution of one tax regime in the place of other, while keeping the public expenditure constant. This will illustrate the distributional effects of a tax
policy. However, the estimation of differential incidence poses a lot of computational difficulties. Therefore we have not measured differential incidence.

**STATISTICAL PROBLEMS**

Statistical problems connected with the task of estimating tax burdens are multi-dimensional in character. Earlier studies on tax burden were done by Taxation Enquiry Commissions set up by the governments at different point of time to estimate the burden on the basis of NSS consumption expenditure data. In earlier occasions, the NSS data on consumer expenditure did not contain commodity-wise quantum or value of consumption. Even though NSSO publishes data on household consumption of different commodities, assimilating such voluminous data are humanly not possible and so the corresponding estimation of tax burden is also not possible. Most of the earlier studies including Taxation Enquiry Commission studies which attempted to measure tax burden on the basis of NSS consumption expenditure data were not free from this drawback. (Non-availability of quantum or value-wise consumption by size distribution of expenditure classes)

To overcome such constraints, Divakara Rao (1984) attempted to estimate the incidence of direct and indirect taxes in India, with respect to household income for the years 1964-65, 1968-69 and 1975-76 by assuming that
consumer expenditure follows a log normal distribution and Pareto law applies to the higher groups of income tax data.

On the basis of NSS data, the first and second moments were calculated by using the following formula.

\[
M_1 = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}, \quad M_2 = \frac{\sum_{i=1}^{n} f_i x_i^2}{\sum_{i=1}^{n} f_i}
\]

Having calculated \( M_1 \) and \( M_2 \), the parameters \( \mu \) and \( \lambda \) have been worked out to fit a distribution of consumer expenditure. The cumulated number of persons is plotted against the upper limits of the NSS expenditure classes on a double logarithmic graph. Thus, obtain a curve which is concave to the origin. This curve represents the log normal distribution of the consumer expenditure.

In the same way, on the basis of income tax data, parameters of Pareto equation are estimated. \((\log Y' = \log A - \alpha \log X')\). The cumulated number of persons against the upper income per capita (based on Pareto equation) was plotted on a graph which yields a straight line (Pareto line). The Pareto line and the log normal curve are plotted on the same graph, and the Pareto line is extrapolated backward so as to have tangency with the log normal curve. At the point of tangency, the per capita expenditure level equals the per capita income level. The persons falling below the point of tangency are assumed to be the lower income groups while those falling beyond the
point of tangency are assumed to be upper income groups. This is how; the size distributions of personal income along with its corresponding consumer expenditure were obtained.

This method is specifically useful to allocate the burden relating to indirect taxes imposed on various goods and services, which are consumed by various income brackets.

Among the several methods adopted in estimating tax burden, the method followed by Divakara Rao is unique and pioneer as it combined the NSS consumption expenditure data with the size distribution of income as furnished by All India Income Tax Statistics, by Ministry of Finance, Government of India. Earlier studies on the estimation of tax burden in India or on Indian States relied on consumption expenditure data only. Non-availability of size distribution of income\(^5\) was the major reason for relying on consumption expenditure data for the estimation of tax burden as furnished by the NSSO through their various rounds of survey. The methodology followed by Divakara Rao was pioneer because of the combination of consumption expenditure and income distribution and the corresponding estimation of tax burden on the basis of income.

However, its application today is technically not feasible due to the following reasons.
1. The size distribution of income as furnished by All India Income Tax Statistics, Ministry of Finance, Government of India, contained 12 classes viz.

Income Classes (Rs.)

0 – 1000
1001 – 2000
2001 – 3000
3001 – 4000
4001 – 5000
5001 – 7000
7001 – 10000
10001 – 15000
15001 – 20000
20001 – 30000
Above 30000

The distribution of assesses by income tax data follows Pareto law (Pareto law explains the relation between a certain level of income and the number of persons earning that income or more). It is generally shown by the formula,

\[ N_y = \frac{A}{Y^\alpha} \]

Where A and \( \alpha \) are statistical parameters of the Pareto law. \( Y \) denotes income and \( N_y \) denotes the number of persons earning that income.
level or more. The law explains that $N_y$ decreases as we choose a higher $Y$. Pareto studied the income data of many countries and confirmed the above relationship. The relatively larger number of income classes as furnished by Income tax data made it possible to fit it into Pareto equation and the subsequent extrapolation of Pareto line to the NSS based expenditure curve and the estimation of tax burden accordingly. The size distribution of income classes by income tax department in recent times consists only very few income classes and so it does not conform to Pareto law.

<table>
<thead>
<tr>
<th>Income Class (Rs.)</th>
</tr>
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<tbody>
<tr>
<td>0 – 1,10,000</td>
</tr>
<tr>
<td>1,10,000 – 1,50,000</td>
</tr>
<tr>
<td>1,50,000 – 2,50,000</td>
</tr>
<tr>
<td>2,50,000 – 10,00,000</td>
</tr>
<tr>
<td>Above 10,00,000</td>
</tr>
</tbody>
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Thus, less number of income classes as furnished by income tax department in recent times do not confirm to Pareto law. This non-conformation of income classes to Pareto Law, hampered the application of this methodology to estimate the tax burden in Tamil Nadu.

2. This methodology worked well in estimating the tax burden at all India level. The availability of income tax data on an all India basis is the reason for this. However, data on size distribution of income at state
level is scanty and virtually nil in India. This is the second reason for the unsuitability of this methodology for estimating tax burden at state level.

So, we discarded the above method, and adopted a new method to estimate the tax burden in Tamil Nadu.

**METHOD FOLLOWED IN THIS STUDY**

The methodology followed by us involves two levels. Level one is applicable for estimating the incidence of all taxes in Tamil Nadu. Level two deals with the estimation of incidence of sales tax in Tamil Nadu.

Though, there are several methods of estimating tax incidence, the most simple method of measuring it is to divide the revenue realised from a particular tax during a given year by the estimated mid-year population in the respective year. When this method is used in estimating the incidence of different taxes, no assumption is required to be made. The following formula is used to arrive at the incidence of a tax.

\[ I = \frac{CT}{P} \]

Where, \( I \) = Tax Incidence

\( CT = \) Total revenue realised from a tax during a particular year

\( P = \) Mid-year population in the respective year.

Per capita incidence, estimated by this method gives an idea about the magnitude of burden of different taxes. But, the incidence, through this method, is influenced by two variants, one is, the increase or decrease in
revenue from a given tax and the other is the increase or decrease in population. If tax incidence increases with an increase in population, it can be inferred that some elasticity has been maintained between the increase in population and the increase in tax revenue. The only drawback in this method is that the population cannot be divided into different groups on the basis of their income slabs and the tax incidence thereon cannot be calculated.

Therefore, the possible methodology for estimating tax incidence is to take a particular year as base year and then calculate the index number of succeeding years for a comparative analysis of tax incidence during the period under study. Thus, with the help of this method, comparable data regarding per capita gross incidence and the index number of per capita incidence are made available. On the basis of this, it can be ascertained whether the per capita incidence has been increasing though population is increasing. If there is an increase in the per capita tax incidence, in spite of an increase in population, it can be inferred that there is an increase in the consumption of such goods and services which are subject to the various taxes. Further, this will serve as a benchmark for levying additional / new tax or for increasing the tax rates on these goods and services, because, the consumption of these goods offers very good scope for enhancing tax rates.

In the view of the above advantages this method has been adopted in the present study in calculating tax incidence of various taxes of Tamil Nadu individually (includes sales tax also) and collectively.
As mentioned above the second level of estimating incidence pertains to sales tax. This is done because of the various peculiarities of sales tax. Among the various peculiarities the following are noteworthy. At first, it is the single tax which offers considerable larger volume of revenue than other taxes. Secondly, it falls on everyone irrespective of their economic capacity. Thirdly, being a major indirect tax, its impact is on sellers and incidence is on the ultimate consumers. It is not always the consumers who will bear the burden of sales tax. As a result it is difficult to find its incidence. It is difficult in the sense that it covers a larger number of commodities on the one hand. On the other hand, if the demand for a commodity is inelastic, the price can be raised and the tax will then be fully shifted to the consumer. But, if the demand is elastic, it will be partly shifted to the consumer and remain partly with the seller. Thus, the extent to which sales tax will actually be shifted will depend upon the nature of demand and supply of commodity.

Competition among the sellers is another aspect which intervenes in the shifting of sales tax burden. In such a case, shifting will be partial. Similarly, production pattern, size of the tax and the supply of untaxed commodities also intervenes in the shifting of money burden of sales tax. Different views prevail regarding burden of sales tax. One view is that, it evenly falls on all tax payers irrespective of their origin as to rural or urban. Another view is that the burden of sales tax unevenly falls on tax payers from rural and urban areas. In view of these peculiarities, the estimation of incidence of sales tax is not similar to other taxes. This warrants a special
treatment as to the estimation of burden of sales tax. In this circumstance, the estimation of burden of sales tax will be easier if statistics of income distribution and purchase pattern of various income groups are available.

“Unlike in the developed countries, data on size distribution of income in India are not available”, in spite of the several attempts made from time to time in this direction. As already stated size distribution of income groups is not suitable for our study.

Unlike other taxes, the burden of sales tax cannot be estimated straight away. For a meaningful estimation, NSSO unit level data are essential. (Without the use of NSSO unit level data, estimation of burden of sales tax is scientifically illogical). For this purpose voluminous data have to be analysed so as to extract data on consumption expenditure on different commodities. Studies attempted to estimate the burden of sales tax on the basis of NSSO unit level data in Tamil Nadu is nil in the recent past. Our study is unique and pioneer as it estimates the burden of sales tax in Tamil Nadu by making use of NSSO unit level data (61st Round Survey, 2005). NSSO 61st Round Survey not only provides data on commodity-wise cash expenditures for rural and urban households but also for the households in different regions of Tamil Nadu.

The method for estimating the burden of sales tax by using NSSO data on consumption expenditure is as follows:
Let \( E \) be the expenditure, then

\[
E = P + P.t
\]

\[
= P (1 + t)
\]

\[
P = \frac{E}{(1 + t)}
\]

\[
Pt = \frac{Et}{(1 + t)}
\]

Assume that value of consumption for a particular commodity ‘\( x \)’
(that is ‘\( x \)’ is the variable containing the value of consumption).

Also assume that tax rate on the is ‘\( t \)’.

If the price of the good is ‘\( P \)’

Then, \( x = P (1 + t) \)

We need to know \( Pt \)

We have ‘\( x \)’ and ‘\( t \)’ but no ‘\( P \)’

So, from the above,

\[
P = \frac{x}{(1 + t)}
\]

\[
Pt = \frac{xt}{(1 + t)}
\]

This value as percentage of total consumption (either group total or commodity total or entire consumption) gives the tax burden or more precisely the tax incidence.
Since, production and consumption pattern are heterogeneous among different layers of the society, sectoral tax burden is also attempted in this study. For this purpose, the economy is divided into rural and urban sectors and tax burden is computed.

In this connection, the tax paying unit needs classification to avoid ambiguity. In most of the empirical studies, households have been taken as the tax paying units as well as spending units. But, if households are taken as the tax paying units, there are certain difficulties associated with the structure and size of the households (Like age and sex composition, etc.). In a micro sense, it is not possible to determine the effects of taxation on households differing in their size and structure. To overcome this problem as Roskamp rightly observed, household have been considered as the tax paying units in a macro sense. i.e. aggregate.  

As far as this study is concerned the meaning and interpretation of household is the same as that furnished by the National Sample Survey Organisation (NSSO).
REFERENCES

3. According to log normal distribution if $z = \log x$, where $x$ is the expenditure level, $x$ is log normally distributed and correspondingly $Z$ is normally distributed.
4. According to Pareto law, as the size distribution of income increases, the number of persons earning such income declines.
6. Ibid., p.27.
7. Ibid., p.22.