CHAPTER IX

SEARCH FOR A MORE RATIONAL TAX STRUCTURE
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9.1 So far, this study covered all important aspects of excise duties such as structural complexities, tax incidence, tax effects on revenue, prices and production. Having derived certain tentative conclusions and approximate estimates on the various characteristics, behaviour and impact of the existing tax structure, the key task now is to consolidate the findings for obtaining an overall view of its performance over time. This approach is meant for evaluating the efficiency and adequacy of the existing tax structure in terms of various tax objectives so as to facilitate the formulation of a more rational and simpler one if the present system is found inadequate for the current and future fiscal and extra-fiscal requirements of the country. In this context, the recent literature on optimal tax theory is proposed to be reviewed and extended to the Indian tax conditions in order to explore the possibilities of providing a sound theoretical foundation to the excise duty structure while recasting it in a systematic and scientific manner. The revised tax structure will be simulated over a period of time to examine the possible yield of revenue and it will also be evaluated in terms of the efficiency to subserve distributional and other extra-revenue considerations. The assumption is that the proposed tax structure will be more efficient and responsive to the fiscal needs of the government and it will also safeguard the interests of the manufacturing industries and consumers.
Salient features of Optimal tax theory:

9.2 In tax literature, optimal taxation is generally considered to be the one which minimises the aggregate deadweight loss for any given tax revenue or expenditure. According to the classical theory, a good tax system presumably possesses several other attributes such as administrative convenience, fairness in tax treatment, certainty, flexibility, etc. Although the latest contributions to the optimal tax theory attempts to incorporate distributional considerations also, the main focus still continues to be on economic efficiency aspects. As individuals differ in their endowments and tastes, there are several observable and unobservable characteristics which can be considered as determinants for choosing a suitable tax base. The simplest form of optimal tax is a lump-sum tax on all individuals with the quantum of tax fixed on the basis of the differences in some observable characteristics. Such a tax would be an ideal one from the efficiency point of view, but it cannot be expected to mobilise all the revenue required by a government. Hence it becomes necessary to look for other taxes that may be distortionary and at the same time reasonably satisfy the optimality requirements. The research literature on optimal taxation mostly consists of propositions for the "second best alternatives" whether it is for designing a brand new tax system or for introducing piecemeal tax reforms in an existing tax structure.

9.2.1 The relationship between a tax and economic efficiency is generally analysed on a partial equilibrium model of a
simple market structure as follows:

\[ \text{Diagram 9.1} \]

The tax at rate 't' pushes up the supply curve SS to S'S'. The revenue yield is AP' CB and the excess loss of consumer surplus is PP'F and of producer surplus is PCF. For small taxes, the total deadweight loss for a given revenue \( R \) is

\[
\frac{R^2}{2\alpha \frac{1}{\epsilon_d} + \frac{1}{\epsilon_s}}
\]

where \( \epsilon_d \) and \( \epsilon_s \) denote the elasticities of demand and supply and \( \alpha \) stands for expenditure on the taxed commodity.

On the basis of the conventional analysis (Hicks^1, Bishop^2) it is indicated that to minimise distortion, the tax should be levied on goods which have low price elasticity of demand and supply. The taxed goods should also be necessities which form an integral part of the purchase schedule.


9.2.2 Ramsey’s article on the theory of taxation was the first comprehensive treatment of the problem of optimal taxation. Later on, Pigou gave a simplified analysis of the problem in his work on public finance. Although the Ramsey-Pigou formulation did not receive much attention during their time, in the early seventies considerable interest was evidenced in the theoretical approach proposed by them. Several public finance theorists analysed the implications of optimal tax theory in practical tax situations in terms of economic efficiency and distributional requirements. The survey in the following part mainly concerns with the developments in optimal tax theory in the seventies with particular emphasis on indirect taxes like excise duties. The major analytical works in this area have been initiated by Diamond and Mirrlees who extended and explored the Ramsey formulation. Other notable publications on this subject are by Baumol and Bradford, Dixit, Lerner and Atkinson and Stiglitz. In general terms, the Ramsey

formulation states that in the case of a one person or many identical persons’ economy, the optimal taxes induce approximately equal percentage reduction in compensated demands. This approximation is presumably valid only for small amounts of tax revenue.

9.2.3 According to Atkinson and Stiglitz*(1972), while the conventional analysis centered around the question of choosing the commodity or group of commodities on which the tax should be levied, Ramsey theorem considers the relative optimal tax rates for different commodities. The appropriate taxable commodities are to be chosen on the criteria of the lowest deadweight loss for a given revenue. This principle implies that commodities having low price elasticity of demand and forming an important necessity for the purchaser are the ideal ones for levy of duties. The Ramsey theorem formulates that in order to minimise the total deadweight loss on all taxable goods, the marginal deadweight loss associated with each commodity for raising a marginal quantum of tax revenue should be the same. For small taxes this requires, (if supply is assumed to be perfectly elastic)

\[
\frac{\partial t_i}{\partial q} = \text{constant for all commodities} \quad i = 1, ..., n
\]

It means that the tax rates for ad-valorem taxes should be inversely proportional to the elasticity of demand in each industry.

As against the partial equilibrium analysis which

is too restrictive for its assumptions on income effects and demand functions, the Ramsey formulation concludes in a general way that the optimal tax structure requires reduction of the compensated demand for each good by the same proportion.

A model tax structure having base derived from the partial equilibrium analysis and rates conforming to Ramsey formulation has been suggested by Atkinson & Stiglitz. The optimal tax formula is derived on the basis of certain simplifying assumptions. On the production side, only demand factors are taken into account. In order to avoid consideration of supply elasticities, constant return to scale is also assumed. It is also assumed that producer prices of all commodities and labour are fixed. If $q_i$ is the consumer price for good $i$, and $p_i$ its producer price:

$$q_i = p_i + t_i$$

On the consumption side, it is assumed that the consumer maximises the function $U(x, L)$ subject to the budget constraint

$$\sum_{i=1}^{n} q_i \cdot x_i = L \quad \text{(1)}$$

where $L$ is the labour supplied and $x_i$ is the purchase of the consumption good. If $\alpha_i$ is the marginal utility of income, the first order conditions are

$$\beta q_i = \alpha_i q_i \quad i = 1 \quad \text{.........(2)}$$

$$M_L = \alpha \quad \text{.........(3)}$$

The assumption in respect of social welfare function is that the government seeks to maximise a social welfare function which

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$^{14'}$ Atkinson and Stiglitz, op.cit. pp 55-75.
is individualistic and impersonal.

\[ W = \sum u^1 + u^2 + u^3 + \ldots \] 

where \( u^k \) is the utility of the \( k \)th man. Assuming that all consumers are identical, the representative welfare function is

\[ \Lambda (x, L) \]

The purpose of taxation is to raise a certain revenue \( R \) (which will purchase a fixed quantity of the goods at producer prices)

\[ R = \sum_{i=1}^{n} t_i x_i = \sum_{i=1}^{n} (q_i - p_i) x_i = \sum_{i=1}^{n} p_i x_i \]

The formulation of optimal tax structure is in the choice of \( t_i \) (\( i = 1, \ldots, n \)) in such a way that the function \( \Lambda (x, L) \) can be maximised subject to the government's budget constraint (4) and conditions for individual utility maximisation (1 and 2). The Ramsey theorem treats the \( t_i \) and \( \lambda \) as functions of \( x_i \) and \( L. \) The problem when written in terms of \( x_i \) and \( L \) and maximising the Lagrangian

\[ \Lambda (x, L) + \sum_{i=1}^{n} \lambda_i x_i = \sum_{i=1}^{n} p_i x_i + \sum_{i=1}^{n} \lambda_i \]

Rewriting the Lagrangian in vector notation (defining \( \Lambda \) as good 0)

\[ \Lambda + \frac{\Delta}{\xi} \Lambda x = \lambda (R + Fx) \] 

where \( \Lambda \) denotes the vector \( \Lambda = (1 = 0, \ldots, n) \) and \( q_0 \) has been eliminated. The first order conditions are

\[ \left( I + \frac{\Delta}{\xi} \right) \Lambda + \frac{\Delta}{\xi} \Lambda^\prime \xi = \lambda \]

\[ \Lambda = \lambda \]

where \( \Lambda \) denotes the matrix \( \Lambda_{ij} (ij = 0, \ldots, n) \)

If the sum of the elasticities of the marginal utilities
of $k_i$ is $H_k$

$$H_k = \sum_{i=0}^{n} \frac{(-1)^i k_i x_i}{uk}$$

The first order condition can be written as

$$\frac{\partial L}{\partial x_i} = \lambda P_k x_i = 0, \ldots, n \quad \cdots (6)$$

from normalisation of $t_0 = 0$.

$$\lambda = \frac{1 - \alpha}{1 - H^0}$$

So that the optimal tax rates $t_k^*$ as a percentage of consumer prices are characterised by

$$\frac{t_k^*}{P_k + t_k^*} = \frac{\lambda - 1}{\lambda} \frac{H_k - H^0}{1 - H^0} \quad \cdots (7)$$

$H_k$ is inversely proportional to the elasticity of demand.

Atkinson and Stiglitz's equation (7) can also be obtained from the formula of Samuelson, Diamond and Mirrlees by inverting their formula

$$\sum_{i=1}^{n} \frac{x_i}{C_2} \frac{x_i}{C_3} = \frac{1}{H_k}$$

i.e. the compensated demand for each goods should be reduced by the same proportion (for infinitesimal taxes).

9.2.4 Optimality of uniform versus differential taxation

The choice between uniform taxation and differential taxation for maximising economic efficiency can be analysed in terms of equation 7. For this purpose, it is assumed that all indifference maps are identical in shape. This can be

1st. R.A. Samuelson, Memorandum for U.S. Treasury (unpublished)
2nd. See Diamond and Mirrlees, op.cit., pp 8-27.
illustrated diagrammatically for two taxed goods. The indifference map is homothetic and the fall in demand consequent upon tax levy is along line 00 of equal proportionate reduction.

This indicates that uniform taxation is optimal if there is no change of relative prices within the group of taxed goods. It is also possible to assume that if the group of taxable commodities also include labour, the uniform taxation will be optimal. But this does not hold good since such a tax structure would yield zero tax revenue. As subsidising labour supply at the same rate is implied in maintaining constant all relative prices when tax is levied on consumer goods, the subsidies and taxes have to cancel out each other.

Another situation that can imply uniform rates for optimal taxation is when it is assumed that labour is completely inelastic in supply. If labour is chosen as the only commodity for tax levy, there will be no change in the
relative prices among the consumer goods themselves. In such cases, uniform tax rate on all consumer goods would be optimal if labour is not taxed.

From diagram 9.2, it can be seen that the indifference curve is homothetic which means that income elasticities of both taxed goods are the same. But in actual practice the supply will change with the change in price. It is to be made clear that only under the assumption of utility separability between consumption and labour can it be held that the uniform taxation is optimal.

This shows that optimality of uniform taxation is a theoretical possibility but generally it is not considered as practical. The optimal tax rates depend upon the characteristics of the different commodities on which tax is levied.

If it is assumed that there is constant marginal disutility of labour. Then $H^C = 0$ and the optimal tax formula is

$$\frac{t_k}{P_k + t_k} = \frac{1 - \alpha}{\alpha} H^k \quad \ldots \ldots \ldots (9)$$

If it is also assumed that $\prod_{ij} = 0 (i \neq J)$, $H^k$ becomes inversely proportional to the price elasticity of demand. If $i = -h^C$ tend to infinity i.e. the supply of labour is completely inelastic, then the uniform rate of tax on all goods become optimal.

It is therefore, possible to conclude that the real optimal tax system is somewhere between the uniform tax and taxes proportional to $H^k$. It can also be seen that the
consumer goods that merits highest tax rate is the one having lowest compensated cross elasticity with labour. The rationale is that since leisure cannot be taxed we can indirectly tax commodities which are complementary with leisure.

The optimal tax formula also suggests direct additivity of the utility function.

This shows that $u_{ij} = 0$ for $i \neq j$, 

$$
K^j = \left( \frac{-u_{kk} x_k}{u_k} \right) 
$$

By differentiating with equation 2 it is seen that it is inversely proportional to the income elasticity of demand for good $k$.

The result is that if the utility function is directly additive, the optimal tax rate depends inversely on the income elasticity of demand.

The practical utility of the formulation is that it enables one to design the optimal tax structure of indirect taxes from empirically estimated demand functions. Since elasticity of supply of labour is not available with respect to commodity demand function, we have to use assumed values for the elasticity of the supply of labour. Such as $H^0 = 0$ where supply of labour is completely elastic.

In the case of direct adilog utility function, the optimal tax rates can be calculated directly as the terms $H^k$ are constant. Atkinson and Stiglitz calculated the optimal tax structure of Sweden, Canada, and EEC based on estimates.

1/ See Atkinson and Stiglitz, op.cit. pp 55-75
given in direct additive demand functions. It is seen that the articles that are taxed heavily are necessities like food and rent and that durable goods with high income elasticity are taxed lightly. In the case where $H^0 = 0$, is independent of the tax rate and equation 7 reduces to the quadratic

$$\left( \frac{k}{p_k} \right)^2 \left( \frac{p_k c_k}{\beta} \right) (\lambda - \infty) - \frac{\alpha_k}{p_k} \lambda = 0 \quad \ldots \quad (11)$$

The optimal ad valorem tax rate $t_k^x = 1 - (p_k/q_k)$ for different levels of revenue ($\lambda / \infty$). The use of alternative specification of the demand equations would provide vastly varying results.

The substance of the analysis do not favour uniform rates for optimal tax structure and on efficiency consideration optimal taxation is one which taxes heavily on goods having low income elasticity of demand. This formulation is however consistent with partial equilibrium analysis which can be obtained if the supply of labour is completely elastic.

9.2.5 Distributional aspects of Optimal tax structure

The foregoing analysis of economic efficiency and optimal tax structure proceeded either on the assumption of a one consumer economy or on the assumption that the society can be represented by social indifference curves. But the assumption of a social indifference curve is possible in practical situations only if all individuals have homothetic and identical indifference maps or there is some lump-sum transfer mechanism in the society to maintain an optimal income distribution on the basis of some individualistic
utility function. If the former case exists, the consideration of any optimal commodity taxation will be superfluous.

The inverse elasticity rule developed from Ramsey formulation by Atkinson and Stiglitz (1972) and the tax rate calculations derived from the formula clearly brings out the conflict between distributional objectives and efficiency considerations. The efficiency criterion prescribes higher rates of duties for necessities which obviously have price elasticities much lower than that of luxuries. Consequently, luxuries which are generally consumed by the high income groups get lightly taxed whereas common men's necessities like food items are highly taxed. This runs counter to the distributional policies based on equity considerations.

The distributional aspects of optimal tax structure have been discussed in detail by Diamond and Mirrlees (1971). They have extended the Ramsey formula and the results were further reviewed by Atkinson and Stiglitz (1976) with allowances for individual differences in tastes and abilities, imposition of other taxes and non levy of duty on all commodities. The results were on the assumption of constant return to scale in production of hundred per cent profit taxes. It was further assumed that individual differences were only with respect to abilities (wage rates) and that tastes are identical and that effort was not a variable. Assuming the continuum of individuals and deriving the formulae by

1\textsuperscript{st}. See Atkinson and Stiglitz, \textit{op. cit.} pp. 97-119
2\textsuperscript{nd}. See Diamond and Mirrlees, \textit{op. cit.} pp. 8-27
3\textsuperscript{rd}. See Atkinson and Stiglitz, \textit{op. cit.} pp 55-75
integrals they got

\[
\frac{t_i}{1 + t_i} = \frac{1 - b_i}{\bar{E}_i} = \frac{(1 - b) - b \bar{E}_i}{\bar{E}_i}
\]

Where \( \bar{E}_i \) was the weighted average compensated price elasticity. The consumption of different individuals formed the basis of the weight.

If every one is identical the formula gives the general result that tax rates should be inversely proportional to the demand elasticities. This formula when modified for introducing distributional objectives the value of \( \bar{E}_i \) depends on the social marginal value of income received by different household and on the proportion of total consumption. When \( \beta \) is constant which indicates society's indifference to distributional aspects the familiar Ramsey formula can be derived from the equation.

9.2.6) Certain optimal tax formulas have been evolved to take care of both equity and efficiency aspects of the tax policies. Notable contributions in this area are by Diamond and Mirrless \(^1\) (1971), Diamond \(^2\) (1975) and Atkinson and Stiglitz (1976) \(^3\). In the case of a one consumer model optimal tax rates have been calculated by Atkinson and Stiglitz (1972) \(^4\) on the basis of empirically derived relationships. An alternative approach which simplified the

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\(^1\) See Diamond and Mirrless pp. cit. pp 8-27
\(^2\) See Diamond, op. cit pp 335-342
\(^3\) See Atkinson and Stiglitz op. cit pp 55-75
\(^4\) See Atkinson and Stiglitz op. cit pp 97-119
rigorous mathematical formulations in the earlier research was presented by Deaton (1977). In this approach, the original formula has been simplified by using strategic aggregation assumptions and the computation does not require extensive data base involving the welfare weights for each consumer. The formula is stated in terms of the behaviour of two consumers i.e. an average and a socially representative one. The position taken by the socially representative consumer in the income distribution depends on the degree of egalitarianism built into the social welfare function. The assumption of exogenous supply of labour do not yield a uniform optimal tax rate as in the case of a single consumer and Deaton (1977) has illustrated that even a mildly egalitarian social welfare function can produce significant departures for uniform tax rates.

9.2.7 Ramsey formulation which applies to an economy comprising of identical consumers who are only subjected to commodity taxation has limited practical utility as no economy in reality can conform to such simplistic assumptions. The problems of an optimal tax structure arise from the fact that the consumers have different abilities and tastes. Mirrlees (1975) extended Ramsey theorem to a simple economy consisting of two types of consumers. The two class economy can be roughly representative of the dichotomies of any

2/. Ibid pp 299-312
economy comprising of the rich and poor, capitalists and labourers, urban versus rural population etc. The analysis derives the equation,

\[ m(x-y) = (m \times q + ny^*) t \]

where \( m \) and \( n \) are the number of members of the first and second class. \( x \) and \( y \) are the net demand vectors of individuals of the two classes and are functions of the consumer prices denoted by vector \( q \), and a uniform lump-sum subsidy or of negative tax \( k \). \( t \) represents the commodity taxes (i.e., the difference between \( q \) and the producer price \( p \)) are optimally chosen to maximise a welfare function subject to production feasibility constraints.

The equation indicates that the differences in demands of the two classes should be proportional to terms that are approximately equal to the changes in aggregate compensated demands resulting from the commodity taxation. A specific criterion that can be derived for optimal taxation in a dual economy is that if all tax rates are slightly changed in the same proportion, the effect on the aggregate net demands (compensated) would be proportional to the differences in net demands between typical members of the two classes. The advantage of this equation is that it does not refer to the relative social marginal utilities of the two classes. The analysis indicates that the taxes should be levied upon commodities demanded by the less deserving class. This result is also linked to Ramsey theorem to the extent that it relates to demand effects rather than to tax levels. It also proves that when Ramsey formulation of applying
highest rate of tax on goods having inelastic demand is adopted for a two class economy, it can conform with the equity requirements of heavier taxation on less deserving sections of the society.

Diamond (1975) has further extended the Ramsey formulation to a many person economy with excise taxes and a poll tax. The result indicates that with optimal excise and poll taxes, there is a negative covariance between social marginal utility of income and excise taxes paid.

For analytical convenience, it is assumed that individual tastes are identical and that consumers differ only in respect of income.

Assuming that \( m \) is the income and \( u(m, z) \) is the indirect utility function, \( z \) is the vector of prices and \( f(m) \) is the p.d.f. of the income distribution. The parameter \( \alpha \) is minimum income and the function \( h(\cdot) \) is a normalisation function representing the government's attitude to inequality.

The revenue constraint is given by

\[
\int_{C} q_{k}(m, z) dm = p\bar{m} - 2 \quad \ldots \quad (13)
\]

\( p \) is the \% of average income going in tax vector \( t \) is a vector of taxes; \( z \) is the vector of producer prices.

Assuming constant returns, the first order condition derived through Roy's theorem and the Slutsky equations is

\[
\int_{C} f(m) \lambda(m, z) q_{t}(m, z) dm = \beta \int_{C} f(m) \int_{C} q_{t}(m, z) (1 - \beta \theta) + \sum_{k} \delta_{k} q_{k}(m, z) dm + \delta_{k} q_{k}(m, z)
\]

Where \( \lambda \) is a Lagrange multiplier, \( (m,s) = \frac{\partial \phi}{\partial \mu} \)

is the marginal social utility of income \( S \) is the Slutsky substitution matrix, \( \phi \) is the vector of tax rates

\( (\phi x t_k/s_k) \) and \( \beta \) is the vector of marginal propensities

to spend \( (\beta, \frac{\partial q_i}{\partial m}) \)

9.2.8 Equation 14 from Deaton's model generally confirms
the models derived by Diamond and Mirrlees \(^1\) (1971) and
Atkinson and Stiglitz (1976) \(^2\). This equation presumably
introduces the much needed balancing effect between
efficiency and equity requirements. The right hand side
indicates marginal tax yield allowing for distortionary
substitution and the left hand side shows the quantities
weighted by marginal social utilities.

If it is assumed that consumers have linear
Engel curves, thus \( u(m,s) \) takes the common form

\[ u(m,s) = \sum a(s) / b(s) \]

where \( a(s) \) and \( b(s) \) are homogenous of degree one
in the prices \( z \). It is also assumed that \( i = a(s) \) for
all consumers and for relevant tax rates \( t \).

It also follows from 15 that \( q_i(m,z) = a_i(s) +

\[ b_i(s) \sum_a(s) / b(s) \]

\[ \int a(s) q_i(m,z) dm = q_i(\bar{m}) \]

\( \bar{m} \) is the average income and \( a_i \) and \( b_i \) denote the ith
partial derivatives of \( a(s) \) and \( b(s) \). If \( v \) is the vector of

\(^1\) See Diamond and Mirrlees, op. cit. pp 8-27
\(^2\) See Atkinson and Stiglitz, op. cit. pp 55-75
value shares $v_i = a_i q_i (m)$ we can get from equation 16

\[ v_i(m) = \frac{a_i}{a} \left( \frac{a}{m} \right) + \frac{b_i}{b} \left( 1 - \frac{a}{m} \right) \] ...16

This shows that the vector of value shares is a weighted sum of $a_i a_i / a$ the expenditure pattern of the very poor ($m=a$) and $b_i a_i / b$ the expenditure pattern of the very rich ($m=\alpha$).

Defining $h(v)$ by

\[ h(v) = v^{1-\xi} (1-\xi) \] ...19

$\xi$ represents a measure of the government's aversion to inequality. If $\xi$ is 0, the government is not interested in any distribution.

When $\xi$ tends to infinity social welfare becomes sensitive only to the real incomes of the poorest.

Substituting 15 and 19 in 14 we get

\[ b^{-1} \left\{ \sum_{a} f(m) \left( \frac{a}{h} \right)^{\xi} q_i(m,\xi) \int_{a}^{\infty} \frac{f(m)}{f(m)(m-a)^{1-\xi} da} \right\} \] ...20

Where $S$ is measured at average income $\xi$ can be rewritten as

\[ q_i(\xi,\mu) = \xi \left[ q_i(\mu,\xi) \left( 1 - \frac{\mu}{\xi} \right) + \sum_{k} s_k k \right] \] ...21

where

\[ \mu = a(m) + \int_{a}^{\infty} \frac{f(m)}{f(m)(m-a)^{\xi} da} \] ...22

and $\mu = \int_{a}^{\infty} b(1-S) I^{\xi}$, where $I$ is the integral on the denominator of the right hand side of 22 from 0.

When $\xi$ is zero, $\mu = \bar{m}$.

It can also be shown that as $\xi$ increases, with
given \( z \), \( m \) declines monotonically, tending to subsistence income \( a \) as \( \theta \) tends to infinity. Hence, \( m \) is always less than \( \bar{m} \), the difference will depend on the extent of the governments inequality aversion \( \hat{\theta} \).

\( m \) is referred to as socially representative income
and can be found by \( s^* q(m_o, z) = m_o \int q(\bar{m}, z) = \bar{m} \) and \( z^* \theta = 0 \), hence

\[ m_o = \bar{m} (1 - \theta) \]

and equation 19 becomes

\[ \sum_{k=1}^{\infty} \frac{b_{ik}}{q_i(\bar{m})} = (1 - \theta) \left( \frac{w_i(m_o)}{w_i(\bar{m})} - 1 \right), \quad \ldots \ldots 23 \]

or defining \( c_i = z - z_i \), \( s \), \( \bar{m} \),

or in matrix form

\[ C \beta = (1 - \theta) \left[ w(\bar{m}) - w(m_o) \right] \]

\[ \ldots \ldots 24 \]

9.2.9 The basic tax rules developed by Deaton\(^6\) are given in equation 23 and 24. In 23 the rule is given in terms of quantities. The left hand side is the compensated proportionate reduction in demand for good \( i \) as a result of the imposition of taxes. As socially representative income is below average this is negative for luxuries and positive for necessities. Depending upon the degree of egalitarianism of the social welfare function, taxes might encourage substitution of necessities for luxuries.

Equation 24 states the rule for tax rates (\( \theta \)). If changes of substitution are ruled out the 'C' matrix will be close to the diagonal and the tax rate will be determined by equity part of the rule. Since luxury goods are highly elastic

\[ \text{See, A. Deaton, op. cit. pp 299-312} \]
and have large elements of 'C' associated with them, such goods will have low tax rates. The optimal tax structure therefore, will have to strike a balance between equity and efficiency consideration that pull in opposite directions according to the optimal tax formula.

It is further illustrated that if preferences are directly additive, the 'C' matrix takes the form

\[ C = \hat{\beta} (\beta - \beta ') \]

for \( \beta > 0 \), so that

\[ \beta_{i} \frac{1}{\beta} \neq \beta ' \text{ if } w_{i}(\beta) > \frac{1}{\beta} d(m_{0}) \]

Compared to the weighted average of tax rates, \( \beta \beta ' \), the tax rates on luxuries will be more than that on necessities. But in the absence of additive preferences, the rule of inverse elasticity (eq.24) will be operative.

It is interesting to note that eq.23, & 24 can yield uniform tax rates if right hand side of 24 is zero. This can arise in a situation where the government is indifferent to equity if \( s_{0} = \bar{s} \) when \( S = 0 \). Similarly, a uniform tax rate is implied when the preferences are homothetic. But both these cases involve a single consumer case and are not practically relevant.

9.2.10. For illustrative purposes we shall examine the equations and methodology used by Deaton for indirect taxes in the U.K. Assuming that the distribution of money

\[ \text{Ibid pp 299-312} \]
expenditure on non-durable goods is the relevant distribution of income which is lognormally distributed above the minimal level $a(z)$. Then eq. 22 becomes

$$m_o = a(z) + \frac{1}{\lambda} 1 - \epsilon / \lambda - \epsilon \quad \text{....27}$$

where $\lambda$ is the $j$th moment around zero of the distribution of $m-a(z)$. For a lognormal distribution with parameters $\mu$ and $\sigma^2$ is equal to $\exp \left\{ \int_{-\infty}^{\infty} \frac{x^j}{\sigma^2} \phi(x) dx \right\}$

That shows

$$m_o = a(z) + \left\{ \overline{m} - a(z) \right\} \exp \left\{ \frac{1}{\sigma^2} \epsilon \right\} \quad \text{....28}$$

It can be proved that $m_o$ declines from $\overline{m}$ when $\epsilon$ is zero to $a(z)$, as $\epsilon$ tends to infinity. As $\sigma^2$ and $\epsilon$ appear as a single product, the high degree of dispersion in the original distribution associated with low inequality aversion results in the identical tax structure produced by low initial dispersion coupled with high inequality aversion. Since taxes are calculated for different values of $\epsilon$ it is not necessary to have precise information on $\sigma^2$. The distribution of $m-a(z)$ also shifts as the tax rate changes $a(z)$ being a function of tax rates.

Within the framework of eq. 28 we can account for the shifting values of the parameters. Changes in $\mu$ are taken care by changes in $a(z)$ and the value of $x$ can be reinterpreted by ignoring the effect of $\theta$ on $\sigma^2$. The indices $a$ and $b$ are given by

$$a(z) = \sum_{k} \beta_k \epsilon_k \quad \text{and} \quad b(z) = \beta_0 \prod \sum_{k} \beta_k \epsilon_k \quad \text{....29}$$

In accordance with eq. 28
Since the expenditure system is linear and directly additive eq. 25 will show that luxuries are taxed at higher rates than necessities. Substitution possibilities can be prevented by a proper disaggregation of expenditures into few groups.

Equation 24 is the starting point for calculating the optimal tax rates. The major problems are the non-linear nature of the formula since C and w's are functions of ... when revenue constraint is rewritten as w(m) \( \Theta = P \), and multiplied by w(m) and added to 24 it gives

\[
\left\{ \text{c} + w(\text{m}) \right\} \Theta = (1-\beta \Theta) \ w(\text{m}) - w(\text{mc}) \ + wu(\text{m})
\]

This equation can be rewritten as

\[
\Theta = (1-\beta \Theta) \left\{ \text{c} + w(\text{m}) \right\} \frac{1}{\Theta} \left\{ w(\text{m}) - w(\text{mc}) \right\} \ + \frac{1}{\Theta}
\]

This equation can be used for solving \( \Theta \) through Gauss-siedel integrative procedure. A given value of \( \Theta \) can be used for evaluating the right hand side which will yield a new value for \( \Theta \) and so on. The estimates of \( \Theta \) can also satisfy the revenue requirement. Dolan used this equation for calculating optimal tax rates for a range of values of \( \Theta \) and \( P \). Optimal tax schedules were drawn for different revenue requirements (P) and different values of \( \Theta \) starting with 0 and ending with 0.5 which is nearest to unity. When \( \Theta \) is 0 the tax rates are almost always uniform for all commodities. But the highest value of \( \Theta \) gives fairly acceptable results.

\( \text{Ibid} \) pp. 299-312
9.2.11 The important conclusions emerging from Deaton's tables are that (1) at low values of food should be taxed at very low rates and there should be a uniform rate for other goods and (2) at higher values of $\theta$, food should be heavily subsidised and that revenue should be raised by higher taxation of housing, transport and communication. The results are not very much different for changes in the revenue requirement. The tax rates on clothing, fuel and other services increase with increases of at first but the trend gets reversed at higher values of $\theta$ probably because these groups are important in poor men's budget. The category "other goods" also gets heavily taxed at higher values of $\theta$ as they are considered to be luxuries. The fact is that there is no direct relationship between inequality aversion, tax rates and luxury/necessity distinction except for the commodities which fall into one or the other category.

9.3 Rationalisation of Indian excise system

The foregoing survey of the literature on optimal tax theory indicates that the "second best" choice for any Government is a non-linear income tax provided individual utility functions are separable between leisure and other goods. If the labour supply is exogenous, even without assuming separability, non-linear income tax is non-distortionary and hence preferable to commodity taxes which are bound to produce distortionary effects.

This "second best" option is, however, not a practical proposition for developing economies like India in view of the practical problems in the levy and collection of income tax.
Conceptually, a tax on the money income is not a popular measure in less developed economies as majority of the population earn less than subsistence income and taxes are to be confined to a tiny segment of the population deriving only professional income. In the Indian tax system also, sufficient revenue cannot be generated through direct taxes. This is evident from the fact that more than two thirds of the total tax revenue in India is being mobilised from indirect taxes like excise duties, sales taxes, import duties, etc. In these circumstances, the proposition for the replacement of the existing indirect taxes by a non-linear income tax is not a practically acceptable one even if it is theoretically more desirable. Moreover, tax reforms for achieving reasonable optimality will have to be formulated within the framework of the existing system already established in accordance with the statutory powers of taxation allocated to the Central and State Governments. In the background of the survey of optimal tax literature, certain proposals are made here to rationalize the existing excise system in India. These proposals are examined in the following part with reference to theoretical and practical problems and possibilities particularly relevant to Indian tax situation.

9.4 Theoretical issues

The basic issue in any rationalisation proposal is the maximisation of economic efficiency without sacrificing horizontal and vertical equity requirements. In addition, the
tax structure so formulated should also be easy and convenient to administer involving minimum cost of collection and with little scope for tax evasion. Efficiency requirements demand minimisation of aggregate deadweight loss for any given tax revenue and (expects a steady inflow of revenue without entailing frequent rate-revisions and base expansion. In other words, it presumes that the tax structure does not disturb the production schedules of the taxed industries by altering the demand-supply schedules in any unintended manner. The literature on optimal tax theory indicates that the tax base for maximising efficiency should comprise of only goods having low price elasticity of demand. Equity considerations, on the other hand, suggest that a tax structure should exclude common man's consumer items from the tax base so that resources are mobilised from luxury goods mainly consumed by persons having sufficient taxable capacity. Since it is not practicable to formulate a tax structure which can satisfy both revenue and equity requirements, the dichotomy will have to be reconciled only by evolving a somewhat acceptable framework.

9.4.1 Theoretically, horizontal equity advocates equal treatment of equals which in practical terms mean imposition of equal tax burdens with resultant uniform welfare loss. This presumes equal pre-tax position of individuals and equal options and equal tax treatment. What actually prevails in practical situations is unequal pre-tax position, unequal options and unequal preferences. The tax treatment in such situations cannot but be unequal but this does not rule out possibility o
having reasonable tax norms that can narrow down the gaps and fairly satisfy the requirements of horizontal equity. A consumption tax base like excise duties can also be considered as an equal option tax base if equity considerations can, somehow or other, be inducted into the system.

Assuming that utility functions are the same for the population, equal excess burden will be imposed on all individuals if the tax system is uniformly applied to all persons. But for unequal preferences, a uniform tax system will not equalise the excess burden on the entire population. This calls for a differential tax formula that can provide for individual preferences and priorities. In brief, when revenue requirements seek to impose a heavy tax burden on commodities having low or inelastic demand, equity considerations favour heavy taxation of luxury goods consumed by a comparatively smaller section of the population.

9.4.2 Further, vertical equity considerations demand that the tax system should provide unequal treatment to unequal persons. In other words, progressive or graded taxation is the one which can satisfy vertical equity whether the tax is direct or indirect. This concept, as in the case of horizontal equity, also suffers from the same problems of unmeasurable utility schedules and equal sacrifice requirements. If some measure of progression in the tax structure is designed on the presumption that it will satisfy vertical equity, efficiency requirements are to be met for ensuring revenue and
minimising distortions. If it is assumed that the conflict between equity considerations and efficiency requirements can be resolved by evolving a compromise formula based on simplifying assumptions of utility functions and demand and supply schedules, its implications on administrative convenience are to be considered carefully before implementation. Administrative convenience favours levy of duty on a few goods having price inelastic demand rather than collecting small sums of revenue from a large number of products with price elastic demand. Efficiency considerations also support collection of revenue from a few items at moderate rates. In short, efficiency and administrative considerations favour taxation of a few basic consumer items so that steady revenue is ensured at the minimum cost of collection with little scope for tax evasion.

9.4.3 In practical situations, the real conflict is between efficiency and administrative convenience on the one hand and equity considerations on the other. The conflicting tax norms claim different approaches in designing tax structure i.e., one with moderate rates and a narrow base comprising solely of goods having low price elasticity of demand and the other with a broad base and high rates for consumer durables and luxury articles and a low rate for a few essential mass consumption articles. In compromising these approaches, the tax structure that emerges will be a broad based one with moderate rates for goods having high price elasticity of demand and low rates for commodities.
having low price elasticity. Such a structure should reasonably satisfy the demands of efficiency and administrative convenience without sacrificing too much on the requirements of horizontal and vertical equity.

9.4.4 Another important point is that while considering rationalisation of the excise duty structure, it is necessary to confine the proposal within the scope of the constitutional powers of taxation assigned to the Central Government. The Constitution of India empowers the Central Government to levy a production tax on almost all goods except alcohol, narcotics, narcotic drugs and certain medicinal preparations. The Constitution envisages a broad-based commodity tax system at the production stage although taxes on subsequent transaction points are left to the states. A broad-base covering all manufactured goods has already been established for excise duties by the year 1975 as explained in chapter XI. Keeping these severe constraints in view, the proposals for rationalisation of the tax structure are formulated using an unconventional methodology and adjusting the tax base and rates for the exigencies of the practical situations existing in different sectors and industries.

9.5 Restructuring of the tax base for excise duties.

It is seen from Chapter XI that though the excise duties began as a selective levy comprising of certain high revenue yielding commodities, in course of time, its coverage extended to all manufactured goods with few specific exceptions. The indiscriminate expansion of the tax base gave it characteristics of both selective as well as uniform. See Appendix A-1 for details of the distribution of the powers of taxation.
taxes. Presently, out of the total number of 141 commodities in the excise tariff, (1983-84), 140 are specified commodities having selective rates and one residuary entry having uniform rate covers all other unspecified commodities.

The existing tax base of excise duties has been examined in detail in terms of the revenue yield in Chapter IV. It is noticed that the revenue from 51 commodities out of 141 is only 1.60% of the aggregate excise revenue, 26 commodities yield 78% of the revenue. This shows that there has been no rational or scientific basis for developing the tax base which contains a large number of commodities yielding negligible revenue and a small set of commodities contributing more than 4th of the revenue. Assuming that the total coverage of all commodities is a distributional requirement, it is only logical that the low revenue yielding commodities are assigned to the uniform category leaving only the commodities having significant revenue potential in the selective base unless there are compelling tax objectives for imposing selective levy on articles yielding negligible revenue. A simplified administrative procedure for such an extended uniform levy will also minimize the cost of collection and scope for evasion. This view is also supported by the findings of Chapter V that the low responsiveness of aggregate revenue to income and price changes is mainly due to the presence of a large number of commodities having very low elasticity. It is also seen that the elasticity of the revenue from residuary entry is much higher compared to that of many other

1/ See Appendix A for coverage of the residuary entry (XI 66)
commodities. In order to make the tax base more responsive, it is necessary to confine the selective levy to commodities having adequate elasticity. Since the existing residuary entry exhibit better elasticity and growth rate, it is reasonable to assume that if all low revenue yielding commodities are transferred to the residuary item for uniform taxation and selective levy is confined to a few commodities having high responsiveness, the overall elasticity and growth rate of excise revenue will definitely improve to optimal levels.

9.5.1 The extended form of uniform taxation for all low revenue yielding commodities will also improve the progressivity of the tax structure. It is seen from the study of tax incidence that the regressivity of excise duties arises mainly from the taxation of essential consumer articles. If these articles are brought under uniform levy at a comparatively lower rate, the requirements of equity can be met without compromising too much on revenue. Further, since tax structure complexities and tax evasion are mostly attributable to the differential tariff applicable to consumer articles, a simplified uniform levy will facilitate smooth collection of taxes and minimize the scope for evasion. There will be less change for the migration of factors with uniform taxation and the overall economic efficiency of the tax system will also improve considerably.

9.5.2 From the optimal tax theory point of view, the tax base should be confined to commodities having price
inelastic demand. However, in the existing set up of excise duties, it is not possible to achieve this level of optimality particularly in view of distributional considerations and the need for mobilising massive resources for developmental purposes.

In view of these constraints and considerations, the excise duties in the Indian context will have to be a combination of selective base of high revenue yielding commodities and uniform one comprising of all other commodities intended to be included in the excise system in terms of distributional objectives on the Constitution. On the basis of this approach, a rational and simpler tax base can be constructed for excise duties utilising the results of the studies in previous chapters. Particularly, relevant parameters for formulating the rationalised system are (1) revenue yield, (2) elasticity and compounded growth rate, (3) administrative conveyance and (4) equity considerations. The commodities not satisfying the minimum requirements of these criteria can be shifted to the residual entry for uniform levy and a smaller number of high revenue yielding commodities can be retained for selective levy at higher differential rates.

9.5.3 The rationalised base for excise duties chosen on the basis of the above criteria is presented in Table 9.1. This table consists of 23 commodities and all other specified and unspecified excisable commodities are assigned to the extended uniform tax base. The advantages of
this simplified and rational tax base are evaluated in terms of the important parameters in the following part:

(1) Revenue:

A rough approximation of the probable revenue yield from the proposed selective tax base and the extended residuary entry shows that the revenue will be much more than that accrues from the existing tax structure. This projection is made on the basis of the analysis of commodity-wise revenue in chapter IV. If the rate of duty for uniform levy is enhanced from the existing level (10% ad valorem) the revenue yield is likely to be more and in case additional revenue is required for meeting some financial crisis, the uniform rate can be increased without altering the rates of the selective base. The details of the probable yield from the rationalised tax base are worked out separately after formulating the optimal tax rates.

(2) Growth potential:

The average compounded growth rate of the revenue from the proposed tax base is 19.30. Since presently the compounded growth rate of the total excise revenue is only 15.86, the new tax base will have higher growth potential than the existing one. As the growth rate indicated above does not include that of the residuary entry, the extended form of uniform taxation is likely to impart better automatic growth to the tax structure than what is mentioned here.

(3) Elasticity:

The average elasticity coefficient of the proposed tax base is 0.90. Although this is still below unity, compared to the elasticity of the aggregate revenue (0.96) for
28 years and aggregate elasticity of high revenue yielding commodities \((0.59)\) for a period of 11 years, the proposed tax base shows better responsiveness to income changes. Comparison of this coefficient with the aggregate of high revenue yielding commodities having \textit{ad valorem} rates for the 11 years period \((0.73)\) which is a better index for evaluation, also indicates that the proposed tax base will be more income elastic. The conversion of 9 commodities presently having specific rates into \textit{ad valorem} rates in the rationalised rate structure will, in all probability, improve the elasticity further so that frequent rate changes may not be required for raising additional resources.

(4) **Tax objectives**

The proposed tax base accommodates the requirements of efficiency, equity and administrative convenience in a balanced manner. The tax structure will have more progressive in view of the exclusion of some of the essential consumer items from the selective tax base. Commodities like refrigerators, air conditioners, man-made fabrics, man-made fibre, motor vehicles etc. are retained for selective levy on distributional considerations. Common mans’ consumer articles like cotton fabrics, matches, coffee and food items are excluded from the purview of selective taxation for reducing the tax burden on persons having less taxable capacity. The requirements of improving public health are considered while including cigarettes and biris in the selective base
so that with a heavy duty burden the consumption can be discouraged. The objective of constraining the consumption of scarce materials like motor spirit, kerosene, diesel and non-ferrous metals has also been taken into account while choosing the base for selective levy. The administration of the proposed tax structure will be simpler and more convenient as the regular rigorous procedures can be confined to 23 major commodities and a highly simplified account based control can be designed for the extended uniform levy. The simplification of the procedure will also release substantial administrative resources that can be utilised for securing full tax compliance in respect of really significant commodities. It will also minimise the scope for tax evasion and it will provide considerable relief to the assesses by reducing the procedural requirements. The overall advantage of the proposed tax base will be that it will achieve all the main tax objectives without sacrificing too much on any particular one. Depending upon the tax rate to be prescribed for the extended uniform levy, additional revenue can be mobilised as and when required, so that the need for tampering with the rate structure of the selective levy can be minimised. The cascading effect of excise duty can also be reduced by making provision for giving tax relief to the extent of the use of duty paid inputs in the manufacture of dutiable finished products.
### Table 9.1

Rationalized tax base for excise duties

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of No. commodity</th>
<th>Elasticity coefficient</th>
<th>Present revenue yield</th>
<th>Compound growth rate</th>
<th>Tax objectives underlying the choice of commodity</th>
<th>Selective levy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td></td>
<td>(6)</td>
</tr>
<tr>
<td>1.</td>
<td>Cigarette</td>
<td>0.621</td>
<td>7.00</td>
<td>19.87</td>
<td>Revenue, Public health</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Biris</td>
<td>N.A.</td>
<td>1.28</td>
<td>30.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Motor spirit</td>
<td>0.62</td>
<td>7.78</td>
<td>15.15</td>
<td>Revenue, consumption constraint</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Kerosene</td>
<td>0.041</td>
<td>2.24</td>
<td>20.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Diesel oil</td>
<td>0.230</td>
<td>5.39</td>
<td>10.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Other petroleum products</td>
<td>1.697</td>
<td>2.73</td>
<td>41.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Man made fibre and yarn</td>
<td>1.202</td>
<td>8.27</td>
<td>23.62</td>
<td>Revenue, equity</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Man made fabrics</td>
<td>1.360</td>
<td>2.20</td>
<td>23.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Cellulosic spun yarn</td>
<td>1.864</td>
<td>1.25</td>
<td>20.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Cotton yarn</td>
<td>0.515</td>
<td>1.65</td>
<td>12.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Tyres &amp; tubes</td>
<td>1.262</td>
<td>4.39</td>
<td>16.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Motor vehicles</td>
<td>1.292</td>
<td>4.46</td>
<td>15.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Refrigerators &amp; Air conditioners</td>
<td>0.037</td>
<td>0.90</td>
<td>21.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Iron &amp; Steel products</td>
<td>0.673</td>
<td>4.20</td>
<td>13.54</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Aluminium</td>
<td>1.146</td>
<td>1.70</td>
<td>29.32</td>
<td>Revenue &amp; consumption constraint</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Electric wires &amp; cables</td>
<td>1.312</td>
<td>1.55</td>
<td>18.90</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Cement</td>
<td>0.923</td>
<td>2.08</td>
<td>14.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. Duty on cotton fabrics to be transferred totally to yarn stage.

Continued...Col. (18)
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Sugar</td>
<td>0.333</td>
<td>3.78</td>
<td>10.48</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>19. Tea</td>
<td>0.566</td>
<td>0.96</td>
<td>13.17</td>
<td>Revenue &amp; Export promotion.</td>
<td></td>
</tr>
<tr>
<td>20. Plastics</td>
<td>1.274</td>
<td>2.06</td>
<td>26.00</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>21. Medicine</td>
<td>1.328</td>
<td>1.28</td>
<td>17.43</td>
<td>-do-</td>
<td></td>
</tr>
<tr>
<td>22. Jute manufactures</td>
<td>0.736</td>
<td>0.86</td>
<td>14.22</td>
<td>Revenue &amp; Export promotion</td>
<td></td>
</tr>
<tr>
<td>23. Paper</td>
<td>0.891</td>
<td>2.66</td>
<td>14.64</td>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>24. All other articles</td>
<td>N.A.</td>
<td>6.37</td>
<td>N.A.</td>
<td>-do-</td>
<td></td>
</tr>
</tbody>
</table>

Av. 0.90  
Av. 19.30

9.6 **Optimal tax rates for excise duties**

Having restructured the tax base for maximising revenue without compromising too much on equity, efficiency and administrative convenience, the major task is to rationalise the existing tax rates so as to make them optimal to the proposed base. The existing rate structure has been presented in detail in Appendix A-5. From this differential and distortionary structure a rational structure that will be optimal with reference to the demand and supply elasticities of the products and market conditions, will have to be formulated having regard to the requirements of efficiency, equity and administrative convenience. For the selective base there can be different rates but the uniform levy will have single rate without exceptions.
9.6.1

The crucial part of the optimisation exercise is the derivation of optimal tax rates for the 23 commodities chosen for the selective levy. The equation used in the calculation of optimal tax rates is the one derived by Atkinson and Stiglitz \( I^p \) with its simplifying assumptions and limitations already discussed in detail in the foregoing part. Briefly stated, the main focus of the formula is on the demand functions assuming constant returns to scale on supply side, fixed producer price is another important assumption although it is seen from Chapter VII that such assumptions are not very realistic particularly when tax rates are high and the demand is price elastic. It is also assumed that the price of labour is fixed.

9.6.2 As it is impossible to ascertain the demand elasticities of excisable commodities separately in view of the tariff descriptions, the groupwise elasticity estimates of the Planning Commission are assigned to the excisable commodity. The equation used is as follows:

\[
\frac{t^*_k}{p_k + t^*_k} = \frac{\lambda - \lambda^*}{\lambda} \cdot \frac{H^k}{1 - H^k} \quad \text{(Atkinson & Stiglitz formula)}
\]

This equation can be rewritten as

\[
\frac{t^*_k}{1 + t^*_k} = (1 - \frac{\lambda}{\lambda})H^k
\]

Since $n^k$ is the sum of own and cross-price elasticities, assuming all the cross-price elasticities to be zero, we have

\[ \frac{t^*_k}{1 + t^*_k} = \frac{\lambda - \alpha}{\left(\text{E}_k\right)} \quad \ldots \quad (3) \]

Using the elasticity of demand of each taxable commodity and the existing actual effective tax rate the implicit ratio of the individual utility function to the government's utility function is determined for the commodities in the manner prescribed below. Firstly, the utility function indirectly accepted by the government while prescribing the rate structure of excise duties and which are already implicit in the existing tax structure, is ascertained using commodity-wise price elasticities of demand. The mean implicit ratio presumably indicates the government's acceptance of a particular utility function which is likely to be optimal for the economy. Optimal tax rate for each commodity is derived by using the demand function and the implicit utility function. The details of the method employed in the calculation of the optimal tax rates are given step-wise as under:

**Step - 1**

9.6.3 The first step in the formulation of optimal rates is to determine the effective *ad valorem* rates of excise duties on various taxable commodities. This step involves the conversion of specific rates of duty into *ad valorem* incidence on the basis of a sample set of ex-factory prices for commodities in the selective tax base. After ascertain-
The ad valorem incidence, on the basis of the ex-factory prices, the effective rates are worked out with reference to the revenue yield from different rates of duty if more than one rate is applicable to a commodity. The weighted average of the different rates is taken as the actual effective rate for that commodity. These rates are worked out for the 23 commodities that constitute the proposed tax base.

**Step - II**

9.6.4 Step - II involves the estimation of the price elasticity of demand for the 23 selected commodities. The basic data used for this purpose is the C.S.O. estimates of demand functions for the period 1961-78 which are further refined in some cases. In the case of clothing, the demand model estimates of Sukumari Murthy has been utilised for determining the price elasticities of man-made fibre and yarn, man-made fabrics, non-cellulosic spun yarn, cotton fabrics and cotton yarn. Since specific estimations of elasticity are available only for some of the excisable commodities as per the description in the excise tariff, elasticity for other commodities are assumed to be iden-

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1/ See Table 9.2 for the ad valorem incidence of 23 taxable commodities.

2/ The ad valorem incidence and actual effective rates are given in Table 9.2.

3/ See Table 9.2 for the demand estimation used in the calculation of optimal tax rates.

tical to the ones allotted to broad commodity groups. Elasticity of "other goods" has been allocated to com-
mmodities which cannot be classified under any of the
specific groups. Although this methodology cannot claim
any high degree of precision, the available data on the
subject cannot provide any better means for ascertaining
optimal tax rates.

Step - III

9.6.5 After calculating the actual effective tax
rates for the 23 commodities and estimating their price
elasticity of demand \( e_{kk} \), from Step-II, the optimal tax
rates are worked out as under:

\[
t_k = \left( \frac{\lambda}{e_{kk}} - 1 \right) \times 100
\]

Where \( e_{kk} \) is the own price
elasticity of \( k \)th commodity.

If existing tax rate is \( x_i \),

\[
\Theta = (\tau_i \times e_{kk}) = \left( \frac{\lambda}{x_i} - 1 \right)
\]

On ascertaining the \( \Theta \) from the existing tax
rates for each commodity, it is assumed that the implicit \( \tilde{\Theta} \) will be the utility function underlying the prescription
of a particular tax rate for a given commodity.

In order to arrive at the optimal tax rates,
the \( \tilde{\Theta} \) of the 23 commodities are worked out. \( \tilde{\Theta} \) The mean
has been used to calculate the optimal tax rates by

\( \tilde{\Theta} \). For details, see Table 9.2
<table>
<thead>
<tr>
<th>Description of commodity</th>
<th>Ad valorem incidence of excise duty on ex-factory prices (in %) lowest highest</th>
<th>Price elasticity of demand</th>
<th>Implicit optimal tax rates</th>
<th>Optimal adjusted tax rates</th>
<th>Differential between existing rates and optimal rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2) (3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>124</td>
<td>370</td>
<td>-0.751</td>
<td>150</td>
<td>1.126</td>
</tr>
<tr>
<td>Motor spirit</td>
<td>228</td>
<td>272</td>
<td>-0.480</td>
<td>270</td>
<td>1.296</td>
</tr>
<tr>
<td>Man-made fibres and yarn</td>
<td>1.3</td>
<td>89.2</td>
<td>-2.007</td>
<td>50</td>
<td>1.003</td>
</tr>
<tr>
<td>Tyres &amp; tubes</td>
<td>25</td>
<td>55</td>
<td>-0.501</td>
<td>40</td>
<td>0.200</td>
</tr>
<tr>
<td>Diesel oil</td>
<td>25.6</td>
<td>86.6</td>
<td>-0.480</td>
<td>70</td>
<td>0.336</td>
</tr>
<tr>
<td>Iron or steel products</td>
<td>26.6</td>
<td>55</td>
<td>-0.777</td>
<td>30</td>
<td>0.233</td>
</tr>
<tr>
<td>Sugar</td>
<td>12.7</td>
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<td>Jute manufactures</td>
<td>15</td>
<td>19</td>
<td>-1.174</td>
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<td>62</td>
<td>- 0.480</td>
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<td>0.192</td>
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<td>- 0.777</td>
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<td>0.233</td>
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<td>1.5</td>
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<td>- 0.766</td>
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<td>38.5</td>
<td>- 1.174</td>
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<td>0.410</td>
<td>29.24</td>
<td>25</td>
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<td>40</td>
<td>69</td>
<td>- 0.480</td>
<td>88</td>
<td>0.422</td>
<td>71.52</td>
<td>65</td>
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<tr>
<td>Plastics</td>
<td>17</td>
<td>70</td>
<td>- 1.174</td>
<td>45</td>
<td>0.528</td>
<td>29.24</td>
<td>25</td>
</tr>
<tr>
<td>Biris</td>
<td>9</td>
<td>9</td>
<td>- 0.751</td>
<td>9</td>
<td>0.067</td>
<td>45.71</td>
<td>45</td>
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<tr>
<td>Man-made</td>
<td>0.5</td>
<td>5.5</td>
<td>- 2.007</td>
<td>5</td>
<td>0.100</td>
<td>17.105</td>
<td>15</td>
</tr>
<tr>
<td>fabrics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>40</td>
<td>77</td>
<td>- 1.174</td>
<td>65</td>
<td>0.7631</td>
<td>09.24</td>
<td>25</td>
</tr>
<tr>
<td>Cotton yarn</td>
<td>1</td>
<td>6</td>
<td>- 0.746</td>
<td>4</td>
<td>0.029</td>
<td>46.00</td>
<td>40</td>
</tr>
<tr>
<td>Electric wires</td>
<td>5</td>
<td>5</td>
<td>- 1.174</td>
<td>5</td>
<td>0.058</td>
<td>29.24</td>
<td>25</td>
</tr>
<tr>
<td>&amp; cables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>2.5</td>
<td>7.5</td>
<td>- 0.955</td>
<td>6</td>
<td>0.057</td>
<td>35.94</td>
<td>30</td>
</tr>
<tr>
<td>Non-cellulosic</td>
<td>10</td>
<td>15</td>
<td>- 2.007</td>
<td>14</td>
<td>0.280</td>
<td>17.10</td>
<td>15</td>
</tr>
<tr>
<td>spun yarn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tea</td>
<td>1.7</td>
<td>22</td>
<td>- 0.616</td>
<td>10</td>
<td>0.061</td>
<td>55.73</td>
<td>50</td>
</tr>
<tr>
<td>Refrigerators</td>
<td>40</td>
<td>100</td>
<td>- 1.774</td>
<td>70</td>
<td>0.621</td>
<td>29.24</td>
<td>25</td>
</tr>
<tr>
<td>&amp; airconditioners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other goods</td>
<td>10</td>
<td>10</td>
<td>- 1.174</td>
<td>10</td>
<td>0.117</td>
<td>29.24</td>
<td>25</td>
</tr>
</tbody>
</table>
multiplying it with the demand elasticities assigned to each group of excisable commodity. The optimal tax rates are then adjusted to make marginal allowances for other commodity taxes like sales tax, octroi, etc.

**Step IV**

9.6.6 Further adjustments are made in the optimal tax rates for reconciling the requirements of equity, administrative convenience and other socio-economic tax objectives. The method of adjustment is the addition or subtraction of a part of the differential between the actual effective rate and optimal rates to bring the optimal rate closer to the existing effective rate. Although this differential is arbitrarily fixed, it follows the trends and patterns of prescribing the rates of duty in the existing tariff. Consequently, duty on common-man's consumer items like sugar, tea and cotton yarn are brought down and a higher rate is stipulated for luxury consumption articles like refrigerators, airconditioners etc. The duty rates for cigarettes have been raised on public health grounds but being used by poor people, the duty has been maintained at a low level. In the case of medicines, the duty rates are kept at the minimum possible level on public health consideration. The details of the various adjustments made in view of the various requirements are given in Table 9.3.

14. For details, see Table 9.3
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Commodity</th>
<th>Existing Optimal Rate</th>
<th>Optimal Rate</th>
<th>Adjusted Optimal Rate</th>
<th>Rationale for Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cigarette</td>
<td>150</td>
<td>40</td>
<td>140</td>
<td>To curb consumption 100% penal rate added to optimal rate.</td>
</tr>
<tr>
<td>2</td>
<td>Briss</td>
<td>9</td>
<td>40</td>
<td>40</td>
<td>Being common-man's item the penalty for consumption removed on equity consideration.</td>
</tr>
<tr>
<td>3</td>
<td>Motor spirit</td>
<td>270</td>
<td>65</td>
<td>100</td>
<td>A penal rate for curbing consumption being a scarce item.</td>
</tr>
<tr>
<td>4</td>
<td>Kerosene</td>
<td>88</td>
<td>65</td>
<td>65</td>
<td>Optimal rate maintained as this item is being largely consumed by common man on equity consideration.</td>
</tr>
<tr>
<td>5</td>
<td>Diesel oil</td>
<td>70</td>
<td>65</td>
<td>65</td>
<td>Optimal tax rate maintained</td>
</tr>
<tr>
<td>6</td>
<td>Other petroleum products</td>
<td>40</td>
<td>65</td>
<td>65</td>
<td>Optimal rates maintained</td>
</tr>
<tr>
<td>7</td>
<td>Man-made fibre &amp; yarn</td>
<td>50</td>
<td>15</td>
<td>15</td>
<td>-do-</td>
</tr>
<tr>
<td>8</td>
<td>Man-made fabrics</td>
<td>5</td>
<td>15</td>
<td>15</td>
<td>Optimal rates maintained. Set-off of fibre/yarn stage duty to be given.</td>
</tr>
<tr>
<td>9</td>
<td>Non-cellulosic spun yarn</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>Optimal rates maintained.</td>
</tr>
<tr>
<td>10</td>
<td>Cotton yarn</td>
<td>4</td>
<td>40</td>
<td>15</td>
<td>Yarn stage duty necessary due to abolition of duty on cotton fabrics.</td>
</tr>
<tr>
<td>11</td>
<td>Tyres &amp; tubes</td>
<td>40</td>
<td>65</td>
<td>65</td>
<td>Optimal rates maintained.</td>
</tr>
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</table>

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<table>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Refrigerators &amp; airconditioners</td>
<td>70</td>
<td>25</td>
<td>40</td>
<td>A higher rate is prescribed to curb luxury consumption.</td>
</tr>
<tr>
<td>15.</td>
<td>Aluminium</td>
<td>65</td>
<td>25</td>
<td>25</td>
<td>-do-</td>
</tr>
<tr>
<td>18.</td>
<td>Sugar</td>
<td>30</td>
<td>145</td>
<td>30</td>
<td>Existing rate maintained on equity consideration.</td>
</tr>
<tr>
<td>19.</td>
<td>Tea</td>
<td>10</td>
<td>50</td>
<td>15</td>
<td>-do-</td>
</tr>
<tr>
<td>21.</td>
<td>Medicine</td>
<td>6</td>
<td>30</td>
<td>15</td>
<td>Existing rate maintained on equity consideration</td>
</tr>
<tr>
<td>23.</td>
<td>Paper</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>-do-</td>
</tr>
<tr>
<td>24.</td>
<td>All other goods</td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>-do-</td>
</tr>
</tbody>
</table>
9.6.7 The rate for uniform taxation is fixed on the basis of the price elasticity of demand assigned to "other commodities" and taking into account the existing rate for the residuary entry (10%). However, certain other commodities in the selective base are also assigned the same lower rate keeping in view the need for giving flexibility for mobilising additional revenue. They can either be assigned the uniform rate or any higher rates as deemed appropriate by the authorities keeping in view the requirements of the industries concerned. The adjusted rates are then simulated for estimating the probable revenue yield of the restructured tariff for a seven-year period. The revenue yield shows that the tax structure is more than adequate as it can provide steady revenue and also have potential for automatic growth. The rationalised tax structure will have only seven ad valorem rates as against the innumerable rates in the existing tariff. The entire rate structure has been converted to ad valorem rates for improving the responsiveness and progressivity of excise duties.

9.6.8 Evaluation of the advantages of the rationalised rate structure.

(i) Responsiveness: Since the main thrust of the rationalisation exercise is on increasing the responsiveness of excise duties, a separate analysis has been made

Details of the revenue yield from the proposed rates are given in Table 9.4.
Table 2.4

Simulated revenue yield from the proposed tax structure

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Adjusted optimal tax rate (%)</th>
<th>'75-'76</th>
<th>'76-'77</th>
<th>'77-'78</th>
<th>'78-'79</th>
<th>'79-'80</th>
<th>'80-'81</th>
<th>'81-'82</th>
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<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>1. Cigarette</td>
<td>140</td>
<td>307.14</td>
<td>347.04</td>
<td>375.02</td>
<td>406.17</td>
<td>544.47</td>
<td>572.40</td>
<td>607.31</td>
</tr>
<tr>
<td>2. Beer</td>
<td>40</td>
<td>131.95</td>
<td>140.13</td>
<td>252.53</td>
<td>322.62</td>
<td>516.66</td>
<td>522.57</td>
<td>531.55</td>
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<tr>
<td>3. Motor spirit</td>
<td>100</td>
<td>149.66</td>
<td>157.64</td>
<td>164.13</td>
<td>183.56</td>
<td>206.76</td>
<td>182.25</td>
<td>192.40</td>
</tr>
<tr>
<td>4. Kerosene</td>
<td>65</td>
<td>118.03</td>
<td>125.84</td>
<td>219.44</td>
<td>117.16</td>
<td>122.05</td>
<td>91.42</td>
<td>114.85</td>
</tr>
<tr>
<td>5. Diesel oil</td>
<td>65</td>
<td>277.06</td>
<td>301.51</td>
<td>310.99</td>
<td>336.37</td>
<td>359.40</td>
<td>258.67</td>
<td>306.42</td>
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<tr>
<td>6. Other petroleum products</td>
<td>65</td>
<td>74.32</td>
<td>84.30</td>
<td>133.21</td>
<td>224.16</td>
<td>329.43</td>
<td>284.61</td>
<td>365.54</td>
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<td>7. Man-made fibre</td>
<td>15</td>
<td>72.39</td>
<td>80.51</td>
<td>84.67</td>
<td>102.77</td>
<td>118.95</td>
<td>139.49</td>
<td>149.26</td>
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<td>8. Man-made fabrics</td>
<td>15</td>
<td>114.06</td>
<td>155.67</td>
<td>198.96</td>
<td>223.83</td>
<td>269.98</td>
<td>337.35</td>
<td>327.81</td>
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<td>9. Non-cellulosic</td>
<td>15</td>
<td>51.80</td>
<td>57.54</td>
<td>80.85</td>
<td>85.48</td>
<td>81.86</td>
<td>82.73</td>
<td>94.08</td>
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<tr>
<td>10. Cotton yarn</td>
<td>15</td>
<td>275.02</td>
<td>255.60</td>
<td>262.31</td>
<td>343.72</td>
<td>365.7</td>
<td>388.46</td>
<td>413.92</td>
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<tr>
<td>11. Tyres and tubes</td>
<td>65</td>
<td>218.70</td>
<td>207.36</td>
<td>206.7</td>
<td>287.83</td>
<td>337.38</td>
<td>433.09</td>
<td>491.62</td>
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<td>12. Motor vehicles</td>
<td>65</td>
<td>307.66</td>
<td>323.83</td>
<td>339.51</td>
<td>480.13</td>
<td>693.94</td>
<td>986.13</td>
<td>947.00</td>
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<tr>
<td>13. Refrigerators &amp;</td>
<td>40</td>
<td>10.18</td>
<td>13.73</td>
<td>16.84</td>
<td>21.22</td>
<td>23.56</td>
<td>33.86</td>
<td>35.92</td>
</tr>
<tr>
<td>14. Iron or steel</td>
<td>40</td>
<td>304.34</td>
<td>311.52</td>
<td>314.94</td>
<td>354.00</td>
<td>361.64</td>
<td>367.49</td>
<td>423.38</td>
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<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
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<td>15. Aluminium</td>
<td>25</td>
<td>34.24</td>
<td>44.11</td>
<td>38.14</td>
<td>45.4</td>
<td>40.51</td>
<td>42.93</td>
<td>52.70</td>
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<td>16. Electric wires &amp; cables</td>
<td>25</td>
<td>90.4</td>
<td>120.00</td>
<td>114.05</td>
<td>177.10</td>
<td>327.40</td>
<td>510.05</td>
<td>607.95</td>
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<td>17. Cement</td>
<td>25</td>
<td>99.63</td>
<td>101.57</td>
<td>87.07</td>
<td>92.40</td>
<td>88.42</td>
<td>97.67</td>
<td>111.77</td>
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<tr>
<td>18. Sugar</td>
<td>30</td>
<td>241.70</td>
<td>241.12</td>
<td>214.10</td>
<td>188.69</td>
<td>240.19</td>
<td>246.50</td>
<td>301.10</td>
</tr>
<tr>
<td>19. Tea</td>
<td>15</td>
<td>89.20</td>
<td>93.00</td>
<td>95.7</td>
<td>102.90</td>
<td>88.50</td>
<td>104.4</td>
<td>109.60</td>
</tr>
<tr>
<td>20. Plastics</td>
<td>25</td>
<td>47.30</td>
<td>41.36</td>
<td>41.08</td>
<td>57.31</td>
<td>68.51</td>
<td>77.18</td>
<td>84.30</td>
</tr>
<tr>
<td>22. Jute manufactures</td>
<td>125</td>
<td>73.28</td>
<td>69.35</td>
<td>59.98</td>
<td>67.18</td>
<td>82.38</td>
<td>95.31</td>
<td>100.36</td>
</tr>
<tr>
<td>23. Paper</td>
<td>40</td>
<td>82.26</td>
<td>115.05</td>
<td>120.34</td>
<td>145.8</td>
<td>199.90</td>
<td>232.69</td>
<td>260.28</td>
</tr>
<tr>
<td>24. All other goods</td>
<td>15</td>
<td>1452.15</td>
<td>1667.25</td>
<td>1504.2</td>
<td>2385.9</td>
<td>2817.3</td>
<td>3230.1</td>
<td>3723.15</td>
</tr>
<tr>
<td>Total revenue from the model</td>
<td></td>
<td>4772.67</td>
<td>5189.06</td>
<td>5388.66</td>
<td>6916.84</td>
<td>8499.05</td>
<td>9527.92</td>
<td>10580.99</td>
</tr>
<tr>
<td>Total excise revenue (actuals)</td>
<td></td>
<td>3844.78</td>
<td>4221.45</td>
<td>4359.20</td>
<td>5281.27</td>
<td>6114.01</td>
<td>6447.21</td>
<td>7460.49</td>
</tr>
<tr>
<td>Revenue from the optimal model as % of actual revenue</td>
<td></td>
<td>124</td>
<td>123</td>
<td>123</td>
<td>131</td>
<td>139</td>
<td>147</td>
<td>142</td>
</tr>
</tbody>
</table>
to estimate the elasticity coefficient of the revenue from the proposed rates. The elasticity coefficient for a period of 11 years has been estimated to be 1.16. This estimate clearly points out the high responsiveness of the revenue from the rationalised rates which is not only more than that of the aggregate excise revenue (0.86). It is also much higher than the elasticity of the 26 high revenue yielding commodities (0.59) which is almost identical to the selective tax base of the rationalised tax structure. Partial elasticity estimates with national income from manufacturing sector and wholesale price index also indicates that the revenue from the proposed rates is more responsive to income and price changes as compared to the estimates for the high revenue yielding commodities. The overall responsiveness of excise revenue will considerably improve if the existing tariff is replaced by the rational tax structure.

(ii) **Minimisation of differential rates**

The most important improvement in the rationalised rate structure is the reduction in the total number of tax rates and the differential rates applicable to the same commodity. With the extension of the uniform levy to all articles other than the 23 commodities in the selective tax base, the total number of rates are reduced to only seven. The differential rates which are allegedly causing distortions in the taxed industries are also minimised in the proposed structure as only a few commodities like cigarettes may need such approach.
(iii) 

Equity

The requirements of equity are well taken care of in the proposed tariff. For example, while the rate for cigarettes is 140%, the same for biris is only 40%. Similarly, food products, clothes and medicine attract comparatively lower rates. The incidence of excise duty on consumer articles is also much less in the proposed tariff. The adjustments made in the optimal rates for achieving equity objective are given in detail in Table 9.3.

(iv) 

Revenue

Revenue is the main consideration that discourages any attempt to restructure the tariff in a rational manner. Keeping such reservations in view, the rationalised tariff has been simulated for a period of 7 years to study the revenue yield if a complete switch over to the proposed tax structure is attempted. The details of the revenue yield are given in Table 9. It is seen that the revenue yield from the rationalised tariff is 24% to 42% more than that from the existing tariff. Not only that the rationalised tax structure also gives a steadily increasing revenue over time due to the better elasticity of the tax structure.

It is, therefore, evident that the existing excise tariff can be confidently substituted by the rationalised optimal rates proposed in this study. The proposed tariff will not only improve the revenue but will also
subserve the tax objectives more effectively and without causing distortions in the taxed industries. The rationalisation exercises carried out in this chapter can be repeated incorporating further refinements and more recent data for getting better results. Such exercises can also be introduced for restructuring other commodity taxes like sales tax, customs duty etc.

Conclusions:

9.7 In this chapter, a rationalisation exercise for recasting the excise duties has been carried out utilising the findings of the preceding chapters and optimal tax theory. It is seen that the rationalised tax structure has several advantages over the existing tariff with reference to the efficiency, equity and administrative convenience. It has also been conclusively proved that the elasticity of the probable revenue from the proposed tariff will be above unity and that the revenue yield will also be higher and steadily increasing. The tax structure complexities are likely to be minimised in view of the lesser number of rates and the extended uniform levy which will make tax evasion difficult and uneconomical. The existing procedure for tax relief on inputs can be extended to the selective as well as uniform tax base for reducing the cascading effect of the excise duties.
A few important implications of the probable behaviour of the proposed tariff have been indicated in the above paragraphs. However, it will also be possible to further improve the proposed tariff by evolving more acceptable administrative procedures and organisational changes which are beyond the scope of this study.

Similarly, all the existing exemption schemes are not examined fully in terms of the desirability of their continuation in the rationalised tariff. This question of continuing tax-relief through exemption notifications can be considered separately by the administrative department with reference to the tax policies underlying the prevailing tax structure. However, the provision for excluding the small and tiny sectors from the purview of excise duties can continue with more specific exemption criteria for enforcing tax compliance.