UNIT 7 DETERMINING ECONOMIC VALUES

Structure

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7.0 OBJECTIVES

After going through this unit, you should be in a position to:

- explain the concept of economic values and differentiate between economic and financial prices;
- adjust financial prices to economic values;
- estimate the premium on foreign exchange; and
- value the intangible costs and benefits.

7.1 INTRODUCTION

We need economic valuation in project analysis to carry out their social cost-benefit analysis. It will enable us to determine whether project is likely to contribute significantly to the development of the economy as a whole and the contribution is large enough to justify the use of needed scarce resources. The economic analysis also helps to make the choice of projects consistent with the objectives of national planning, e.g. employment, consumption, output, savings, foreign exchange earnings, income distribution etc. Economic analysis basically allows for remuneration to labour and other inputs (factors of production) at market or shadow prices whichever approximate true opportunity costs. Economic values are based on economic prices which are associated with the values of foregone opportunities —
Economic Aspects of Project Analysis

the opportunity cost. It is required for allocation of resources to maximise their productivity.

7.2 Concept of Economic Values

We know that the theory of valuation is a major branch of economic theory and it makes a distinction between value and price. Value of a commodity is based on a theory of utility and its demand is based on its utility value. On the other hand, price for a commodity (or service) emerges with the interplay of demand and supply factors. You will realise that this can happen only if there is a market. It reflects a balance between what a consumer is ‘willing to pay’ (WTP) and a producer is ‘willing to accept’ (WTA). However, such an equilibrium may not exist – first on account of non-existence of markets e.g. water in rural setting. The people know the value of water but not its price. Second, even if market exists, the commodity may have been under administered price system (e.g. urban water supply). Then its price may not reflect the true value. Third, under imperfect market conditions consumers’ WTP and the price determined by market conditions may differ. We can, therefore see that in practice value and price of a commodity may or may not be same.

7.2.1 Theoretical Considerations

The economic theory holds that every economic commodity will be priced at its marginal value product in a perfect market – one which is highly competitive with many buyers and sellers. That is, the price of every good and service will just exactly reflect the value the last unit utilised of that item contributes to production. Whenever a unit of a good or service can produce more of some activity, its price will rise and it will be attracted there. When the economy is in ‘equilibrium’, the opportunity cost – the best use in an alternative production process – the marginal value product, and the price will all be equal. Resources will then have been allocated through price mechanism to that use where the last unit utilised of every good and service in the economy is at its most productive use; no transfer of resources could result in greater output. However, such ideal conditions do not exist and market prices do not always reflect values.

We will discuss some aspects of economic valuation to make you aware that market prices necessarily do not reflect the economic or social values of goods and services.

First, how much money a consumer is ready to offer depends on his income level. A rich person may offer a good deal of money for a trivia, while a very poor person may find it difficult to spend even very small amounts of money on essentials. The WTP in the market is, thus not a good guide to social welfare, for it includes the influence of income distribution on the prices offered. We have, therefore, quite a legitimate reason to consider distributional questions in economic valuation.

Second, there are influences that work outside the market rather through it. These are called ‘externalities’. These are relevant for economic valuation exercise. Externalities are often quite pervasive and can arise in the process of production (e.g. air and water pollution), in the process of consumption (e.g. additional private vehicles crowding the roads), and also in the process of sales and distribution (e.g. garish shop display affecting the tranquility of the community).
Third, even in the absence of externalities and consideration of income distribution, market price may still be misleading. If we look at the market value of a good or service, we get a measure of a floor to expected satisfaction. But in fact the consumer may expect more and get more. We would have to examine the excess of what consumers are willing to pay for goods and services and what they actually pay. This difference is sometimes called ‘consumer surplus’. In the figure, the line AB represents the maximum a consumer is ready to pay for each unit of a good. If market price is BC, he will buy OC units of it. The total expenditure he will make on it is the area under ODBC, which will represent the earnings of the producer from him. But the value of the satisfaction that he anticipates is more, namely the area under OABC.

The difference, the area under ADB represents the surplus that he enjoys. It is clearly a relevant consideration for economic valuation in project analysis. Consideration of income distribution, externalities and consumer surplus are among the factors that distort market prices. As the economic value for any commodity or resource reflects their opportunity cost, we use shadow prices for estimation in comparison to market prices which are used in financial analysis.

### 7.2.2 Shadow Prices

These can be defined as those prices which would prevail in the economy if it were in perfect equilibrium under conditions of perfect competition. Conceptually, the shadow prices are based on the benefits of alternate opportunities which are sacrificed for the selected course of action to achieve the given objective. You can realise that the appropriate concept of opportunity cost or shadow price is that of the maximum alternative benefits foregone. For example, if we require 10,000 tonnes of steel for an irrigation project. Now, this steel will have number of alternative uses in other sectors of economy e.g. export, manufacture of consumer goods or producer goods etc. We have to identify the relevant cost as the maximum benefits that are lost by using up this amount of steel in an irrigation project. Similar considerations are used in other resources.

In the identification of costs as maximum benefits sacrificed, we must be careful to define alternative opportunities realistically. We should bear in mind the real feasibility and not merely technical possibilities. The maximum benefit that has to be identified with cost will be from the list of real feasible alternatives. The technical opportunities that cannot be made use of, given social and political constraints, are not real opportunities. To identify feasible opportunities (as opposed to technical possibilities) requires a considerable depth of understanding of political and social structure, which is beyond pure economics. In particular, the shadow prices depend on the extent to which Government wield its instruments of policy (taxes, tariffs, public investment, regulatory mechanism etc.). But the extent to
which these instruments are and can be controlled is constrained by a variety of social and political considerations. Therefore, considerable judgment is required to estimate the economic values. This judgment depends on a clear identification of political and social constraints that limit economic opportunities.

Check Your Progress 1

Note: (i) Use the space below for writing your answers.
(ii) Compare your answers with those given at the end of unit.

1) Differentiate between financial prices and economic values.

2) Define shadow prices.

7.3 ESTIMATING ECONOMIC VALUES

We know that the prices reflect values or can be adjusted to do so. Although, the markets are imperfect but the first approximation of a ‘true value’ of a good or a service which is traded is its market price. We can put it in other words – if we can find a market price for an item that is normally the best price to use in economic valuation. The criterion used is to determine the consumers’ willingness to pay. The first measure for WTP that is suggested is market price itself, for when a consumer pays a given price for a good; the satisfaction he drives from that good must be at least as great as the sacrifice he makes in cash. In other words, his willingness to pay must be at least as great as the market price of the good, or else he would not engage in the transaction. The conditions which guarantee that consumer WTP is not greater than the market price will be discussed.

7.3.1 Adjusting Financial Prices to Economic Values

The conditions which guarantee that consumer WTP for goods and services does not exceed their market price are three fold:

1) The goods and services are freely available to any potential customer willing to pay the market price, i.e. the absence of rationing and other restrictions;

2) No consumer is big enough to exercise ‘monopoly’ power i.e. monopoly buying power to influence through his own purchases the market price level; and

3) The addition to the supply of goods and services brought about by the project is not large enough to change the market price.
Conditions (1) and (2) are the conditions of the competitive buying. Wherever, the buying is competitive we should expect that the price paid by each consumer for his last unit of goods reflects precisely his expectation of satisfaction from that unit, and therefore, also his WTP for it. For if his WTP exceeded the market price, he would, buy more goods at that price – that he is free to do so – and that his own purchases would not push up the price. This argument holds good irrespective of whether the sellers – as distinct from the buyers – are in a position to influence market price level through their actions (thereby exercising ‘monopoly’ power). All that is required is that the conditions of purchase be competitive.

Condition (3) is also required to ensure that the anticipated market price of the goods manufactured by project reflects the willingness to pay for all the additional units of goods supplied by the project. If the WTP for an extra unit – as reflected by market price – is same both before and after the project takes effect, we can be sure that no consumer of additional output was willing to pay any more than the market price for it.

If one of the three conditions is not satisfied, we can no longer say that consumer WTP is limited to market price. If the output of the project is not freely available to consumer at a given market price, or if it is large enough to result in a change in the corresponding price, the measurement of consumer WTP has to depart from the value of the consumers’ actual payment, which it will exceed. An estimation of the WTP will then require investigation into the shape of demand curve for the product. There are fairly well developed techniques for this purpose.

We can apply the principles discussed above for adjusting the financial prices to economic values in case of consumer goods (sugar etc.) or producer goods (steel etc.) that are freely traded in the markets i.e. have a market price. However, in some cases the output of the project is not purchased at all in the market, so that there is not even a first approximation in the form of market price. The example of such goods and services are educational or medical facilities, welfare programmes, which often carry no meaningful market price. In such cases, we can do economic valuation that is based on estimation of the importance of these free facilities to the community in comparison with consumer goods that are purchased e.g. how many times is medical facility valuable as a rupee’s worth compared to purchased commodities? A judgment is required to estimate economic values in such cases.

**Labour:** The wage of a labour would be equal to that amount of product which an extra labour hired would produce i.e. its marginal value product. Under conditions of perfect competition, the market wage rate is the approximate shadow price for labour, just as any market price is approximate shadow price for a good or service. We know that as per neoclassical theory, there is no involuntary unemployment, and the wage is equal to the productivity of the marginal worker. So the market wages are the opportunity cost of labour, the social value of the goods lost by adding another worker. However, the imperfections of the labour market are quite widespread and market wages are inappropriate for economic valuation. First, the wage rate obviously does not reflect the opportunity cost of an unemployed person; to a first approximation, the economy looses nothing apart from the disutility of work from creation of new jobs. Second, redistribution accompanies new jobs. The redistribution occurs as the immediate gainers (formerly unemployed) save less than the immediate losers (employers, employed workers). In other words, though the direct opportunity cost of employment in terms of aggregate consumption – the first approximation – may be zero, there is in general
an indirect opportunity cost whose magnitude depends on the propensities to save of the newly employed and others in the economy. However, the fact is that we can say very little a priory. Only the direct opportunity cost can generally be assumed to be smaller than the market wage.

The availability of labour in surplus-labour economy varies during the year and it is employed gainfully for some days. For rest of the period it is surplus i.e. their marginal product value is zero. Therefore, considering its value as zero for economic valuation is one of the options. The other option is to value the price of labour on an annual basis. This will be equal to the wages received for the period when they are fully employed i.e. if they are employed for 145 days in a year @ Rs. 60 per day then their wage is 8700 rupees. The last option is to value labour at the wage rate it commands. It is based on the assumption that the labourers produce output worth something near their wages. Although labour in a project area may be unemployed or under employed, this may not be the case after development takes place. We may use all three options to value labour if project duration is more than ten-years.

**Land and Natural Resources:** The appropriate measure of the value of land is the ultimate consumer willingness for the aggregate consumption benefits made possible by the use of land. As it has alternate uses, we will use the principle of net value of production foregone or its opportunity cost as the basis for estimating economic value of land. There are three alternatives:

1) We value the land at its purchase price as a onetime capital cost. This is the simplest approach with the inherent assumption that the price of land is a fairly good reflection of the present worth of the contribution that the land would make to its future use. It also implies that land markets is relatively competitive and open i.e. almost a perfect market. This is a good alternative if land is to be actually purchased instead of only land use change.

2) We value the land at its rental value on an annual basis. This would be a suitable alternative in a land market where sales are thought to be strongly influenced by non-economic factors but rental market for land is relatively competitive. The rental value then becomes a convenient and rather easily determined proxy for the net value of production foregone and can be easily used.

3) We value the land at an estimate of the net value of production foregone or opportunity cost as value on annual basis. This reduces the incremental benefit that is realised. This method of using an imputed cost of land is usually the approximate one for various scenarios of existing land use (public land, change of land use only under same ownership and changed ownership) for economic valuation. Sometimes, this is the only means to provide for the value of land.

We can realise that much the same analysis applies to all natural resources i.e. water flowing down a river. The building of a dam at one place and its use in the neighbouring areas may affect water supply farther down the stream, and the valuation of this impact is, in principle, similar to that of land. However, while private markets exist for land, they may be absent for river water, the users WTP for water may have to be guessed rather than observed in the market. In this case, as in the case of land, there is no prospect of increasing the total flow of
water. Hence, the relevant alternative is demand reduction for which cost need to be examined.

### 7.3.2 Premium on Foreign Exchange

The principle used to estimate the value of foreign currency is to determine the WTP in terms of Rupees for an extra foreign currency made available. As a first approximation, we may again consider the market price as a measure to WTP. The market price of any given foreign currency is nothing but the official rate of exchange between that currency and the Rupee (domestic currency). If the foreign exchange market is perfectly competitive, so that foreign currency can be bought and sold without limit at the official exchange rate, the domestic WTP is presumably accurately reflected by domestic currency equivalent at the official rate. However, these markets are regulated by governments and the official market rates understate the domestic WTP for foreign currencies. It becomes necessary to estimate by other means the true economic value, expressed in Rupees, of a unit of foreign currency. It also is important for social benefit-cost analysis.

*Calculating the Shadow Price of Foreign Exchange*

Let us suppose that foreign exchange is used to import various commodities at their c.i.f. (cost, insurance, freight) price per unit as it becomes available at the margin. Let \( f_i \) is the fraction of foreign exchange that is allocated to the \( i^{th} \) of the \( n \) commodities at the margin. Let \( P_i \) represent the domestic market clearing price that is the price reflecting the marginal willingness to pay for the \( i^{th} \) import. Finally, let \( C_i \) represent the c.i.f. price in rupees calculated at the official rate of exchange. Then \( f_i / C_i \) represent the quantity of the \( i^{th} \) import that will be purchased if an extra Rupee of foreign exchange becomes available.

Now the quantities of goods 1... \( n \) are

\[
\frac{f_1}{C_1} \ldots \frac{f_i}{C_i} \ldots \frac{f_n}{C_n}
\]

and have the respective unit values of

\[
P_1 \ldots P_i \ldots P_n
\]

in terms of aggregate consumption. The total aggregate consumption value of the imported goods is therefore

\[
P_1 \frac{f_1}{C_1} + \ldots + P_i \frac{f_i}{C_i} + \ldots + P_n \frac{f_n}{C_n}
\]

With \( f_1 + \ldots + f_i + \ldots + f_n = 1 \)

This expression defines the shadow price of the foreign exchange that we can denote as \( S_p \). Equivalently

\[
S_p = \sum_{i=1}^{n} \frac{P_i}{C_i} f_i
\]

This is to say that the shadow price of the foreign exchange is a weighted average of the ratios of market clearing to official c.i.f. prices, the weights reflecting the content of the marginal import bill.

Although, the above expression is straightforward but some important assumptions underline them are.
1) This formula for the shadow price of foreign exchange is based on actual and projected trade policies, not on optimum policies. This assumption is on the basis that the allocation of foreign exchange at the margin among various demands is a given parameter of project decisions rather than a choice variable. The trade policies are the outcome of a bargaining process among various interest groups, between foreign and domestic, and inside the government and outside. This assumption will reflect what is likely to happen and not that ought to happen.

2) Another assumption implicit in the formula is that the increments to supplies measured by the ratios $f_i/P_i$, $f_j/P_j$, ..., $f_n/P_n$ are not additive. This means that no 'reverse import substitution' takes place. In other words that marginal import in general represents net additions to the supplies of the commodities in question. However, capital goods are the exception and they are excluded from the calculations of the marginal import bill in our formula. The allocation vector $(f_1, ..., f_n)$ is limited to consumer goods and intermediates used for the production of consumer goods. It may be advisable to eliminate rationed goods from the calculations of the formula and weights $(f_1, ..., f_n)$ on remaining goods must then be adjusted so that they add up to unity.

7.3.3 Trade Policy Impact

It was mentioned earlier that the calculation of the shadow price of the foreign exchange is based on the assumptions regarding trade policies. It is based on actual and projected trade policies rather than optimal policies. The weights $(f_1, ..., f_n)$ in shadow price calculations depend on trade policies as has been already discussed. But we are not expected to make judgment on national trade policy during project analysis as it is a matter of Government decision. Hence, the weights in the calculation of shadow price of foreign exchange are provided by Government. This indicates that the trade policy has a direct bearing on project analysis.

7.4 VALUATION OF INTANGIBLE COSTS AND BENEFITS

The indirect benefits that a project may yield are those that are reflected by immediate willingness to pay. The projects often yield a net gain to society that is not fully captured by those that acquire the project output. In such case, the 'additional' benefits ought to be ideally added to the overall contribution of the project. Such a situation is typically occurs when an ancillary good or service produced in connection with the project contributes to the satisfaction of consumers other than those who receive the project output e.g. the roads constructed for a project work also provides benefit of communication to entire area. This represents externalities that result in lower production costs for other producers owing to their ability to use a project by-product free of charge. Somewhat similar indirect benefits are provided by a project that involves the training of its labour force. The new skills acquired by the workers contribute to the output of the project, but if the workers eventually move on to other jobs, they bring with them opportunities for greater production than they could have without their acquired skill. These skills then result in a contribution to aggregate consumption made possible by the project, but not accounted for. However, the question is whether
such evaluations are always worth doing. The probability of error in such estimates is quite high. Due to various difficulties in their estimations and high chances of errors in the estimates, such benefits are called intangible. In any case, their amount is likely to be very low compared to direct benefits which are estimated quite precisely. Therefore, these intangible benefits are not included in most of the project analysis specially related to agricultural sector.

Indirect Costs: The basic principle in evaluating costs with respect to any objective is that costs are simply equivalent to maximum benefits foregone. Therefore, we wish to assess the external effects that result in net loss to society. A typical example is the pollution of air and/or water by industrial plants. The polluting discharge is a by-product of the industrial process which results in net dis-benefits to surrounding population, although the people affected are not generally compensated for their discomfort by those responsible for the plant. In such cases, there is a consumption cost to the society that ought to be included in the assessment of project. At our present state of knowledge it appears impossible to prove decisively that one project is inferior to another in terms of its contribution to indirect dis-benefits. Therefore, these are also known as intangible costs.

It can be concluded that it appears practically impossible to quantify many externalities. However, we should recognise it as one of the limitation of social cost – benefit analysis. We do acknowledge that external effects may well be important even though we may not be able to quantify them. A qualitative description of these effects may be included that could be useful in making choice of a project. At any event, such broad descriptions may facilitate decisions by putting the quantified net benefits of a project into proper perspective.

Check Your Progress 2

Note: (i) Use the space below for writing your answer.
(ii) Compare your answer with those given at the end of unit.

1) Explain Economic Valuation of labour.

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7.5 LET US SUM UP

In this unit, we have learnt that the prices do not always do a good job of reflecting economic values. In a perfect market – one which is highly competitive with many buyers and sellers – will wind up with every economic commodity priced at its marginal value product. That is, the price of every good and service will exactly reflect the value, the last unit utilised of that item contributes to production. However, perfect markets do not exist, and, hence, prices do not always reflect values. We have also learnt how to adjust the prices for economic valuation of goods and services. The concept of shadow prices and premium on foreign exchange are also analysed. Intangible benefits and trade policy impact are discussed.
7.6 KEY WORDS

Economic Analysis: The analysis of a Productive Activity in which we estimate the total return to the society or economy as whole of all the resources committed to it regardless of who in the society contributes them and who in the society receives the benefits.

Foreign Exchange: The value of Foreign Currencies in Domestic currency (Rupee).

Prices: These are the prices prevailing in the market due to the interplay of the forces of Demand and Supply.

Shadow Prices: These are based on the benefits of alternate opportunities which are sacrificed for the selected course of action to achieve the given objective. We can also say that it is the maximum alternative benefits foregone.

Values: Value of a commodity is based on the theory of utility and its demand is based on its utility value.

7.7 SOME USEFUL BOOKS/REFERENCES


7.8 ANSWERS/HINTS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Economic value is based on a theory of utility. On the other hand, financial prices emerges with the interplay of demand and supply factors.

2) Those prices which prevail in the economy if it were in perfect equilibrium under conditions of perfect competition.

Check Your Progress 2

1) There are many option.
   i) Value of Labour as Zero
   ii) Value the price of labour on an annual basis
   iii) Value labour at wage rate it commands.

For details go through section 7.3.1