OECD METHOD OF PROJECT EVALUATION
(SOCIAL COST-BENEFIT ANALYSIS)

This method is the subject of two books. The first, Volume II of the OECD Manual for Industrial Project Appraisal, was for Industrial Projects only. The second, Project Appraisal and Planning for Developing Countries, extends the application of the method particularly to agricultural projects. This note is based on the method as outlined in the second book. The original book was designed for application to industrial projects only, but the second book applies to projects of many different kinds.

1. THE BASIC UNIT OF VALUE (NUMERAIRE)

The basic reference of value to which all other values are related is uncommitted social income measured in terms of convertible foreign exchange. A large portion of the "uncommitted social income" created by a project will accrue to government, so an alternative way of expressing the numeraire is government income measured at world prices. It is assumed that marginal sums available to the government could be used for investment, so the numeraire is thus expressed in terms of savings rather than consumption.
A basic feature of valuation is that all goods and services used up or produced by a project should be valued in relation to their potential or equivalent effect on increasing or decreasing the available amounts of foreign exchange. Thus, wherever possible, all values should be based on the Border Prices of the item concerned, i.e. the price paid by or to foreigners when goods or services cross the border. These values will be expressed in terms of the currency of the country in which the project is located. Thus, it can be taken, it normally involves foreign exchange conversion at the existing official exchange rate.

2. THE BASIS OF PROCEDURE: TRADABLES AND NON-TRADABLES

The method aims to measure the effects (measured in value units as valuable as a change of one unit in the availability of government-held foreign exchange) anywhere in the economy as a whole arising from the use of any input in a project and from the supply of any product or beneficial effect that would result from a project.

From this viewpoint, inputs into a project and products from it can be divided into four main classes:-

a) Direct payments by a project agency to domestic factors of production (primary
resources) - wages, salaries, rents, normal profits and things of this kind.

b) Goods and services that are directly obtained from or are sold to agencies in other countries, i.e. imports or exports. Such inputs or products are said to be "traded".

c) Goods and services that are not obtained from or sold to agencies in other countries, but which would be if artificial barriers did not prevent their importation or export. Usually only potential imports are likely to occur in this category.

d) Goods and services which could not (or, given rational policies, would not) be either imported or exported. Goods of this kind - which are called Non-tradables - are not traded for one of two possible reasons; either because their nature requires that they must be used in and obtained from the country where the project is located (e.g. transport, construction) or because their price in domestic supply would be somewhere between the import or export prices of the commodity in question. This would be the case with bulky commodities of low value in relation to
transport costs, like water, some staple foods and often electricity.

With regard to the latter three categories listed, Little and Mirrless proposed treating differently inputs and outputs that are Tradable and those that are Non-Tradable. They felt that both categories (b) and (c) should be regarded as Tradables. That is, all goods that both are and could be traded across borders should be valued as though they would be traded, their Accounting Prices being used on the relevant Border (i.e. world market) Prices.

It is worth pointing out that the practice of valuing tradables on the basis of border prices is not a unique feature of the approach associated with Little and Mirrless. This practice is (sensibly) the approach used in all shadow pricing methods.

3. THE TREATMENT OF TRADABLES

The project price of tradables will reflect the border price of the items, plus the port-to-project (or project-to-port) costs incurred in moving and handling them. The price of each tradable should thus be broken down into three different types of element - the border price, the different non-tradable port-to-project costs that
arise (each identified separately), and any taxes, subsidies or other non-resource-cost elements that exist in the project price.

4. THE TREATMENT OF NON-TRADABLES

To obtain a price analysis analogous to that for traded goods, one needs to value non-traded resources also in terms of the contribution they make to increasing the amount of available foreign exchange. This is done by repeatedly analysing the production and supply cost of non-traded goods into

i) domestic factor payments

ii) traded goods

iii) taxes, subsidies, etc. and

iv) other non-traded inputs

5. THE ULTIMATE ANALYSIS OF TRADABLE AND NON-TRADABLE GOODS

By successive iterations in the analysis of non-tradable goods (which will appear as elements in the price of both tradable or non-tradable goods), all prices can be reduced to a small group of inputs beyond which analysis cannot be made. This group consists of what are called primary resource inputs. (If sufficient data is available, this process of reducing costs into only primary resource inputs can be quickly achieved (with a computer) through the simultaneous-equation solving
process known as the semi-input-output process).

The price of any resource or commodity involved in a project can be broken down through the procedures into four main classes of primary resource inputs.

a) The border price of tradable goods, expressed in domestic currency, to which foreign currencies are converted at the official exchange rate.

b) Payments to the owners of domestic factors other than unskilled labour, (i.e. skilled labour, rent, profits, etc.). For these it is assumed either that the price they are paid is equal at market prices to their alternative net value product, and that therefore they receive no significant increase in income because of the project (e.g. skilled labour, management) or, if their income is increased (e.g. receivers of increased land rent incomes or abnormal profits), that the social value of their increased income is very small, or negligible, so that all income received by them because of the project is to be taken as a cost.
c) Payments to Unskilled Labour. Generally workers of this kind are paid more in the formal sector (where industrial, infrastructure, and human resources projects will generally occur) than the value of their net value product in their alternative employment, which is often taken to be wage employment in the informal rural sector. Increased consumption by such people is usually taken to have a clear social value. (The 'formal' sector refers to those areas of employment where the wage is set institutionally (e.g. by law, trade union agreement, etc.), and so does not vary much, while the 'informal' sector refers to those areas where the wage is set by market forces, and so may fluctuate.

d) A Residual category, which includes taxes; subsidies; the part of differences between existing and expected prices that is due to non-marginal changes and that accrues to government; and other elements of this kind. When each item's price has been broken down by accounts analysis into this detail, valuation in social terms becomes a matter of determining the value of each of these primary resource inputs in terms of the numeraire.
6. THE VALUATION OF PRIMARY RESOURCE INPUTS

The numeraire is based on government income valued in terms of the world prices of tradable goods. For each commodity or primary input used or produced in a project, the Little Mirrless method aims to produce an Accounting Ratio. This will reflect the ratio between the Accounting Price (i.e. the value in terms of the numeraire) of each item, and its domestic market price.

The Accounting Price of a commodity is derived by applying the Accounting Ratio of primary resource inputs to the market value of each of the primary inputs into which the price has been analysed.

The social value of primary inputs can now be considered.

a) Tradable inputs, whose value is their Border Price, are given an Accounting Ratio of 1.0. Their actual market value at the 'border' is the basis of the numeraire, so they require no adjustment.

b) The Residual group, which relates to that part of price that does not reflect the cost of resources used, is given an Accounting Ratio of 0.0. Although a money cost to someone, it does not reflect a social cost.
c) Skilled labour costs are adjusted to allow for the opportunity cost of employing the people concerned for a particular project and so preventing them from helping increase net output somewhere else. This net output foregone, we assume, will have a market value that is approximately equal to the workers' money cost. However, what the actual commodities are that they would have produced cannot be specified for the application of an Accounting Ratio. Consequently it is taken that their opportunity product was "domestically produced things in general". In this case, the Accounting Ratio to be applied is a Standard Conversion Factor, which reflects the general (i.e. average) relationship between market and social prices, and is discussed in more detail later in this note. The SCF may be given the value of the modal Accounting Ratio. These factors will give an Accounting Price for Skilled Labour that is normally a little less than 1.0, and may be somewhere between, say, 0.75 and 0.95.
7. THE SHADOW WAGE

This is the Accounting Price of Unskilled Labour. It has three elements:-

a) The opportunity cost of a worker, which is taken to be the value of his net marginal product in another occupation, typically in the formal sector of agriculture.

b) The cost of his increased consumption. Typically this cost will be significant because (i) creating employment will mean moving people from rural areas, where the cost of consumption goods is low, to the towns, where costs are higher; and (ii) because through the effects of collective bargaining and minimum wage legislation, wages in the formal urban sector generally allow a higher level of real consumption than would be possible if workers were paid only the equivalent of their opportunity cost, which would make them no better off.

c) Extra consumption by unskilled workers, who are typically low-paid, has a social value. A main purpose of development is to allow higher levels of consumption. When this objective is achieved it should not all be counted as a cost. The shadow wage— which measures a
social cost - must be reduced to allow for the social value of increased consumption.

Increased present consumption occurs at the expense of investible funds (savings) which, through investment, could have given rise to higher levels of consumption in the future. So long as the marginal rate of return on investment is higher than the consumption rate of discount, present consumption is of less value than savings. Thus, we may reduce the (benefit) value of extra consumption of workers by applying a factor - s - to allow for this. Apart from this adjustment, the basic Little-Mirrless method assumes that extra consumption by workers is to be counted entirely as a benefit (i.e. it has an income distribution weighting of 1.0).

\[
    w^* = m + \frac{c^* - m}{s}
\]

Where

- \( m \): opportunity cost; the marginal value product in other uses,
- \( c \): consumption out of wages, and other benefits actually received,
- \( s \): a factor reflecting the savings/consumption value ratio, which is based
on \( r \), the rate of return on marginal investment and \( i \), the consumption discount rate.

\( (c^* \) may be higher than \( c \) due to the occurrence of external costs that arise when the formal sector of free or subsidised services in urban areas).

Each element in this formula needs first to be estimated at market prices and then converted to numeraire units by the use of an appropriate Accounting Ratio. Often \( m \) can be expressed in units of actual farm products, whose ARs can then be used directly.

The consumption pattern of workers can be measured from household budget surveys. Each item of consumption should, in principle, be revalued to show its cost in terms of numeraire. Otherwise a SCF should be applied to consumption items as a whole.

\( s \) can take any value between 1.0 (when savings are as valuable as consumption, and there is no "shortage" of savings) and infinity, when present consumption is given no value at all. \( w^* \) thus has a value between \( m \) and \( c \). Typically the value of \( s \) may lie between 1.5 and 6.2 in a general value that is often used.
Note that the third element in the formula for the shadow wage (as put forward by Little and Mirrlees) contains the implicit value weight that all extra consumption by low income workers is to be counted as a benefit. The only adjustment made is to express present consumption in terms of savings. However, income distribution weights can also be used if preferred to revalue the additional benefits that different workers receive as a result of the project.

When the shadow Wage has been calculated, the Accounting Ratio for Unskilled Labour can be determined. The value is likely often to be between 0.5 and 0.8.

8. CALCULATING THE ACCOUNTING RATIO FOR INDIVIDUAL PROJECT INPUTS AND PRODUCTS

According to the procedure mentioned in Section 5, the market price of each project input and product is analysed into primary resource elements. This analysis should be expressed in percentage terms. When the Accounting Ratio for each primary resource has been determined, these ARs can be applied to the percentage to give (on summation) the Accounting Ratio for the project item concerned.
It is usually a feature of the Little-Mirrless Method in practice that an Accounting Ratio is calculated separately for each input - transport, steel, fertiliser, equipment, water, fuel etc. The procedure does not normally involve calculating and then adding together into one figure the primary resource elements of each input before applying the Accounting Ratios in application, as seems to be the practice of UNIDO System. The calculation of Accounting Ratios for individual inputs and products is preferred because, once calculated for any project, they can be used without adjustment in the appraisal of other projects. However, this is merely an operational matter. It does not reflect a basic difference in basis between the two methods.

9. THE STANDARD CONVERSION FACTOR

In principle, an Accounting Ratio might be calculated for every type of project input and product. However, this could be laborious. A short-cut way of avoiding this can be used for small items. This involves calculating a number of Accounting Ratios for specific goods and services, looking at their distribution and identifying some kind of "average" Accounting Ratio (weighted mean
or moad), and using this value (a Standard Conversion Factor or SCF) for small input items. Sectoral Accounting Ratios could also be obtained.

As a general rule, Accounting Ratios and SCF's obtained in the appraisal of other projects may be applied for inputs that are not of overwhelming importance in a particular project. However, the Accounting Ratios for the main inputs and products should normally be determined separately for each project.

10. THE EFFECTS OF SHADOW PRICING

Under the Little-Mirrless method, savings is a feature of numeraire, and is valued more highly than consumption, so resource payments that give rise to increased savings will have a social cost less than their market price. Transfer payments to government are not counted as costs. The Accounting Ratios of skilled and unskilled labour are typically less than 1.0. For all of these reasons, Accounting Prices for inputs will in general be less than Market Prices; Accounting Ratios will thus be less than 1.0. The Accounting Ratio for exported or import saving products may be 1.0 or more.
11. THE ACCOUNTING RATE OF INTEREST

The Discount rate to be used in the Little Mirrless Method is the rate of return on the best available project whose implementation will just exhaust the stock of investible resources available in any period. This rate of return, which is obviously difficult to measure, will, in principle, be calculated from projects of all of whose prices are expressed in Accounting Prices. This rate of return is thus the social opportunity cost rate. Typically it is unlikely to be below 10 and may be as high as 15%.

12. SUMMARY OF THE PROCEDURE

a) Identify all changes arising as the result of a project, and value them at market prices. Calculate the NPV at market prices.

b) Divide all payments made by or to the project for inputs and products into: tradables, non-tradables, and primary resources.

c) Value all tradables on the basis of Border Prices and project-to-border costs.

d) Analyse the structure of all tradable and non-tradable inputs and products into tradables, skilled labour, unskilled labour, other primary resources and a residual category.
e) Calculate the Accounting Ratios for labour and other primary resources.

f) Calculate the Accounting Price and Accounting Ratio for each important project input and product. Apply the SCF to all minor items.

g) Apply the AR for each item to the market price to get everything in a cash flow statement valued at Accounting Prices. Discount at the Accounting Rate of Interest. All projects with a positive NPV may be suitable for recommendation for implementation.