### CHAPTER THREE ECONOMIC ANALYSIS OF PROJECTS

* 1. ***An overview of Economic Analysis***

In financial analysis, the project analyst is concerned with the profitability of the project from an individual (firm's profitability) point of view. The main objective here is to maximize the income of the firm or to analyze the budgetary impacts. In financial analysis the analysis is done by applying market prices. Given the prevailing market prices the financial analysis will tell the project analyst whether a project will be financial profitable. Thus, governments and other individuals can pursue only limited objectives when they choose projects on the basis of financial appraisal. However, the objective of any legitimate government should be the promotion of community welfare. They will be more concerned with their public work programs to promote community welfare than they merely maximize financial profits at distorted local prices. The basic question here is whether it is possible to use market prices to assess the economic worth of projects or not.

In financial analysis prices could be distorted because of:

* + - Failure of markets
    - The absence of perfect knowledge and the existence of externalities, consumer and producer surplus, government and public goods, etc. So that governments must choose projects on the basis of an economic analysis if they wish to promote the community's welfare.

It is useful to have a full understanding of the areas where government intervention and market failure result in serious distortion in market prices.

The major conditions under which it is impossible to use market prices to assess the economic worth of projects can be grouped under the following headings:

1. Government intervention in and/or failures of goods market; including the markets for internationally traded goods.
2. Government intervention in and/or failure of factor markets including the market for labor, capital, and foreign exchange.
3. The existence of externalities, public goods, and consumer and producers surplus.

### Government Interventions and /or failure of goods market.

* 1. ***Failure of domestic goods market***

The true economic value of a good produced by a project, which can be called its marginal social benefit, or how much it will add to community welfare, is in general measured by what people are willing to pay for that good. Traditionally this is reflected by the market prices of the commodity. But the market price of that commodity will not measure what people are willing to pay for it unless the following conditions are met:

1. If there is no price controls in the market for the good. That is the quantity of the good that is demanded by consumers must equal the quantity supplied by producers, and the price of the good must be its competitive demand price.
2. If there is no consumer's surplus from the consumption of the good. If people are willing to pay more than they actually have to pay for a project output, then these market prices do not reflect the true value of the good produced by the project.
3. If there is no monopsony buyer who is large enough to force the project to sell its output below the price that the monopsonist is really willing to pay.

Unless these conditions are met the good's market price will not reflect people's true willingness to pay for the good and will not be a good measure of the income in welfare that people will obtain from consuming the project's output.

If any of these market imperfections exist, it will be necessary to use corrective measures (shadow prices).

#### Figure : Goods market distortions, price fixing

Price

Sg

Pd = Pc = Pe

(Equilibriun Price)

PMF

Fixed price

Ds

Qs Qd

Excess demand

Quantity good

In the figure the price of controlled commodity is set at Pmf, below the market-clearing price (equilibrium price) Pe. This results in excess demand for the commodity (Qd - Qs), so the existence of controlled price will result in rationing of the commodity.

#### Trade protection and Intervention in the Markets for internationally traded goods

Governments frequently intervene in import markets by imposing quotas & tariffs to protect infant industries that are internationally competitive.

Tariffs and quotas will cause a divergence between local market prices and the world prices of internationally traded goods.

#### Fig - Traded goods market distortions - Import quota.

Price

D

Sg-domestic supply curve

Pnd

PM World supply curve

S

Qs Import Quota

Ds-domestic demand curve

Import Quantity

An import quota will push the domestic market cost of the input to Pmd, well above the foreign exchange cost to the economy of importing the input, which is the world price Pw . So, such import quota over value the social cost of the traded input used by the project.

### Failures of /or Interventions in factor Market

The true economic cost to an economy of a project's input, its marginal social cost, will be measured by its economic opportunity cost to suppliers.

The market price of an input will equal to its opportunity cost of production if the following conditions are met:

* 1. There are no rationing, price controls or taxes in factor markets
  2. There is no producer's surplus in the market price of the input
  3. There is no monopsony buyer who is in a position to force the factor's market price below their marginal revenue product and hence the price they would be willing to pay for it.

### Intervention in the labor market

Labor markets are frequently regulated with fixed minimum wage rates or centrally fixed wage rates for formal sector jobs. If these wages rates are set above the Market clear levels, there is likely do open unemployment or disguised unemployment. This is particularly true for unskilled labour. In the case of skilled labour, fixed wage rates may actually be set below market clearing levels causing an artificial shortage of skilled labour.

#### Figure: Labour market distortions - fixed wage rates

Wage

D SL

Wn Fised

Gov’t fixed wage

Wd = Wc = We

(Equilibriun wage

= Sℎadow Price)

S DL

Workers D Workers S Unemployment

Qs Workers D

Quantity Labour

The government fixed wage ***Wm*** fixed above the market equilibrium wage ***We***. This will result in unemployment of labour (unskilled) with the number of such workers offering themselves for the formal sector jobs, Workers S exceeding demand, Workers D. The existence of open unemployment or underemployment will indicate to the project analyst that market wage for the

categories of labour concerned is greater than its marginal social cost. The project analyst will need to adjust these wage rates downwards until they reflect the true social cost of labour in the country, the shadow wage rate.

### Intervention in / or failure of capital market

Another important factor market in which governments often intervene by fixing prices is the capital market. In order to encourage investment interest rates are often kept low.

##### Figure -: Capital market distortions, fixed interest rate

Interest rate

I

S - Saving

re

Equilibriun Interest

rate)

IMF

Fixed interest rate

S I - Investment

Supply savings

Demand for investible funds

Quantity investible funds

Excess demand for credit

The interest rate paid for investible funds is held down to Imf well below the equilibrium interest rate. As more people wish to borrow than to save at this low interest rate there will be an excess demand for capital funds. It will then be necessary to ration the available credit to preferred borrowers. In addition government routinely tax both borrowers and lenders introducing further distortions into the capital market. For these reasons market interest rates should not be used to

discount future income streams in an economic analysis. The government will have to estimate the social discount rate that better reflects the opportunity cost of using investible funds in a project.

1. **Intervention in foreign exchange Markets**

Many countries often peg or manage their foreign exchange arte. Often the exchange rate is set significantly above its free market level in terms of say a US dollar per unit of local currency. Overvaluation of local currency is a common practice in developing countries.

Currency over valuation creates an apparent shortage of foreign exchange. This happens because at the overvalued exchange rate imports appear cheap relative to locally produced goods unless tariffs are imposed, demand for imports will rise.

On other hand currency over valuation makes exporting as compared with supplying the local market, financially unattractive to producers.

##### Figure: Foreign exchange Markets distortions

Exchange rate

D Sfe

SER

(Equilibriun

Excℎange rate)

OERM

Fixed exchange rate

S Dfe

Qfec Qfed

Quantity of foreign exchange

Excess demand for foreign exchange

The official exchange rate is fixed at OER. This will result in excess demand for foreign exchange Qfed – Qfes In these circumstances the official exchange rate will understate the true value of foreign exchange to the country concerned. This is given by the shadow exchange rate, SER, the amount residents are willing to pay for the fixed quantity of foreign exchange available Qfes. Use of the OER in project appraisal will have the effect of undervaluing projects that produce exportable outputs and overvaluing those that use imported inputs. The overvaluation of the exchange rate must be corrected in an economic analysis. One method of doing this is to employ a shadow exchange rate to convert foreign prices into local currency.

1. ***Externalities and public goods***

Another reason why the perfect world of neoclassical theory fails to represent the real world is the existence of public goods and externalities. A financial analysis of a project that uses or produces public goods and externalities, therefore, will fail to capture the full impact of a project on the community’s welfare.

### The existence of externalities

Externalities are created in the process of producing, distributing and consuming many goods and services. There are positive or negative attributes or effects of a good or service, or its production, that are not directly felt by the people who buy it and hence may not be reflected in the price they are willing to pay for it.

Some costs and benefits do not appear among its inputs and outputs when it is analyzed from the enterprises or individual’s viewpoint and thus do not enter into the financial NPV and IRR. These items are considered as external to the enterprise but are internal when they are considered from the economy’s angle. Somebody pays for the external costs and someone receives these external benefits even if this is not the enterprise.

#### Example:

* + The costs incurred in providing the project area with infrastructure inputs, e.g. access roads, energy lines, sewerage services, etc. Although these inputs are required by the project their cost is often met by the government rather than the enterprise, because often they serve other purposes too.
  + Flood control measures (benefits) resulting from a hydroelectric dam are real benefits to downstream farmers and the economy but external to the power authority.
  + Pollution created in the production of a commodity may be a cost to the society but external to the project.

### The existence of public goods

Public goods are usually provided free by governments and in financial analysis would therefore, be priced at zero. However, they do have a beneficial impact on the welfare of those receiving them, most of whom will be willing to pay for such goods through taxation. But it costs the society significant sum of money to produce many of the public goods.

This is a case where the market price of a good or service will not reflect its true cost or benefit to the society. If the project uses public goods as inputs or produces them as out puts it would be wrong to value them at their market price of zero in many economic analysis of the project. They will have to be valued at the amount that it is estimated people will be willing to pay for them. In short public goods and services can be described as: Goods and services whose use by one person does not reduce their availability to others. Non-exclusion goods.

# Major Questions That Economic Analysis Should Answer

A large part of project analysis serves to establish a project's technical and institutional feasibility, its fit with the government's strategy for the country and the sector, and the appropriateness of the economic context for the project. Economic analysis takes for granted that the project is technically sound and that its institutional arrangements will be effective during implementation. It is, therefore, only one part of the overall analysis of the project, but a very important part, as its main objective is to ascertain that the value of project benefits will exceed project costs. Good economic analysis should leave no doubts about the project's contribution to the country's welfare.

This section provides a general overview of the questions that good economic analysis should answer and can serve as a checklist and a map for finding tools that could help answer those questions.

#### What Is the Objective of the Project?

The first step in the economic analysis of a project is to define clearly its objective(s). A clear definition is essential for reducing the number of alternatives to consider and for selecting the tools of analysis and the performance indicators.

If the project tries to achieve a narrow objective, such as improving the delivery of vaccines to a target population, then the analyst will only look at alternative ways of delivering vaccinations to a target population and will judge the success of the project terms of the vaccination coverage obtained. If the project tries to achieve a broader objective, such as improving health status, then analysts will look not only at alternative ways of delivering vaccinations, but at alternative ways of reducing morbidity and prolonging the lives of the target population. The success of the project then will be judged in terms of its impact on health status.

The appropriate tool of analysis also depends on the breadth of the objective. For example, if the objective is to reduce the cost of vaccination, cost-benefit ratios might be adequate ways to compare and select among interventions. If the objective is to improve health status, then the interventions need to be compared in terms of their impact on health status. If the objective is even broader--say, to increase a country's welfare—then the comparisons need to be done in terms of a common unit of measurement, usually a monetary measure.

#### What Will Happen if the Project Proceeds or Not?

One of the most fundamental questions concerns a counterfactual: What would the world look like without the project? What would it look like with the project? What will be the impact of the project on various groups in society? In particular, what will be the impact of the project on the provision of goods and services in the private sector? Will the project add to the provision of goods and services, or will it substitute for or displace goods and services that would have been provided anyway? These differences between the situation with and without the project are the basis for assessing the incremental costs and benefits of the project.

Both the financial and economic analysis of the project are predicated on the incremental net gains of the project, not on the before and after gains.

#### Is the Project the Best Alternative?

Another important question concerns the examination of alternatives. Are there any plausible or mutually exclusive alternatives to the project? Alternatives could involve, for example, different technical specifications, policy or institutional reforms, location, beneficiaries, financial arrangements, or differences in the scale or timing of the project. How would the costs and benefits of alternatives compare with those of the project? Comparison of alternatives helps planners choose the best way to accomplish their objectives.

#### Does the Project Have Separable Components?

Is the project one integrated package, or does it have separable components that could be undertaken and justified by themselves? If the project contains separable components, then each and every separable component must be justified as if it were an independent project. Omitting a component that cannot be justified always increases the project's net benefits. Separable, unsatisfactory components should always be deleted from the project.

#### Winners and Losers: Who Enjoys the Music and Who Pays the Piper?

A good project contributes to the country's economic output; hence, it has the potential to make everyone better-off. Nevertheless, usually not everyone benefits from a project, and some may lose. Moreover, groups that benefit from a project are not necessarily those who incur the costs of the project. Identifying those who will gain, those who will pay, and those who will lose gives the analyst insight into the incentives that various stakeholders have to implement the project as designed, and to support it or oppose it. Identifying the benefits accruing to and the costs borne by the poor or very poor is especially important.

#### What Is the Project's Fiscal Impact?

Given the importance of fiscal policy for overall macroeconomic stability, the fiscal impact of the project should always be analyzed. How and to what extent will the costs of the project be recovered from its beneficiaries? What changes in public expenditures and revenues will be attributable to the project? What will be the net effect for the central government and for local governments? Will the cost recovery arrangements affect the quantities demanded of the services provided by the project? Are these effects being properly taken into account in designing the

project? What will be the effect of cost recovery on the distribution of benefits? Will the cost recovery arrangements contribute to the efficient use of the output from the project and of resources generally? Is the non-recovered portion factored into the analysis of fiscal impact?

#### Is the Project Financially Sustainable?

The financing of a project is often critical for its sustainability. Even projects with high benefits undergo lean periods when external funds must sustain them. The cash flow profile is often as important as the overall benefits. For these reasons, knowing how the project will be financed, and who will provide the funds and on what terms, is important. Is adequate financing available for the project? How will the financing arrangements affect the distribution of the project's benefits and costs? Is concessional foreign financing available only for the project and not otherwise?

#### What Is the Project's Environmental Impact?

An important difference between society's point of view and the private point of view concerns costs or benefits attributable to the project that are not reflected in its cash flows. When these costs and benefits can be measured in monetary terms, they should be integrated into the economic analysis. In particular, the effects of the project on the environment, both negative (costs) and positive (benefits), should be taken into account and, if possible, quantified and valued in monetary terms. The impact of these external costs and benefits on specific groups within society—especially the poor--should be borne in mind.

#### Techniques for Assessment: Is the Project Worthwhile?

After taking into account all the costs and benefits of the project, the analyst must decide whether the project is worth undertaking. Costs and benefits should be quantified whenever reasonable estimates can be made, but given the present state of the art, quantifying all the benefits and costs is not always possible. Various proxies or intermediate output may have to suffice. The net present value is the appropriate yardstick for judging the acceptability of projects whose benefits are measured in monetary terms. To be acceptable on economic grounds, a project must meet two conditions:

* + The expected net present value of the project must not be negative.
  + The expected net present value of the project must be higher than or qual to the expected net present value of mutually acceptable project alternatives.

For other projects, physical indicators of achievement in relation to costs, or cost-effectiveness, are appropriate. In some other cases, a qualitative account of the expected net development impact might have to suffice. In all cases, however, the economic analysis should give a persuasive rationale for why the benefits of the project are expected to outweigh its costs, that is, economic analysis should give the reasons for expecting the net development impact of the project to be positive. When analysts carry out quantitative analysis, they should apply economic prices, not market prices.

#### Is This a Risky Project?

Economic analysis of projects is necessarily based on uncertain future events and involves implicit or explicit probability judgments. The basic elements in the costs and benefits streams are seldom represented by a single value. More often they are represented by a range of values with different likelihood of occurring. Therefore, analysts should take into consideration the range of possible variations in the values of the basic elements and reflect clearly the extent of the uncertainties attached to the outcomes.

At the very least, economic and risk analysis should identify the factors that could create the greatest risks for the project. In other words, it should identify the critical variables that determine the outcome of the project, in particular, the values of those variables that increase or decrease the likelihood that the project will have the expected positive net development impact. The analysis should also assess if such deviations are likely to exist, singly and in combination. If risk analysis is based on switching values, it should identify the range of values that critical variables and plausible combinations of critical values can take before the net present value of the project turns negative. To the extent possible, the analysis should also identify and reflect the likelihood that these variables may deviate significantly from their expected value and show the major factors affecting these deviations. Finally, analysts should be explicit about actions taken to reduce these risks.

# Identification of Costs & Benefits of Economic Analysis

Identifying costs and benefits is the first and most important step in economic analysis. Often project costs and benefits are difficult to identify and measure, especially if the project generates side effects that are not reflected in the financial analysis, such as air or water pollution. A second important step is to quantify them. The final step is to value them in monetary terms.

The major steps in economic analysis can be summarized as:

1. Identification of cost and benefit items that need to be incorporated in economic analysis; this involves the inclusion of some variables and exclusion of others from the economic accounts.
2. Quantify both the cost and benefit items;
3. Revalue the cost and benefit items; i.e. what prices to use?

The projected financial revenues and costs are often a good starting point for identifying economic benefits and costs, but two types of adjustments are necessary. First, we need to include or exclude some costs and benefits. Second, we need to revalue inputs and outputs at their economic opportunity costs. Financial analysis looks at the project from the perspective of the implementing agency. It identifies the project's net money flows to the implementing entity and assesses the entity's ability to meet its financial obligations and to finance future investments. Economic analysis, by contrast, looks at a project from the perspective of the entire country, or society, and measures the effects of the project on the economy as a whole. These different points of view require that analysts take different items into consideration when looking at the costs of a project, use different valuations for the items considered, and in some cases, even use different rates to discount the streams of costs and benefits.

Financial analysis assesses items that entail monetary outlays. Economic analysis assesses the opportunity costs for the country. Just because the project entity does not pay for the use of a resource, does not mean that the resource is a free good. If a project diverts resources from other activities that produce goods or services, the value of what is given up represents an opportunity cost of the project to society. Many projects involve economic costs that do not necessarily involve a corresponding money flow from the project's financial account. For example, an adverse environmental effect not reflected in the project accounts may represent major economic

costs. Likewise, a money payment made by the project entity--say the payment of a tax--is a financial but not an economic cost. It does not involve the use of resources, only a transfer from the project entity to the government. Finally, some inputs—say the services of volunteer workers--may be donated, entailing no money flows from the project entity. Analysts must also consider such inputs in estimating the economic cost of projects.

Another important difference between financial and economic analysis concerns the prices the project entity uses to value the inputs and outputs. Financial analysis is based on the actual prices that the project entity pays for inputs and receives for outputs. The prices used for economic analysis are based on the opportunity costs to the country. The economic values of both inputs and outputs differ from their financial values because of market distortions created either by the government or by the private sector. Tariffs, export taxes, and subsidies; excise and sales taxes; production subsidies; and quantitative restrictions are common distortions created by governments. Monopolies are a market phenomenon that can either be created by government or the private sector. Some market distortions are created by the public nature of the good or service. The values to society of common public services, such as clean water, transportation, road services, and electricity, are often significantly greater than the financial prices people are required to pay for them. Such factors create divergence between the financial and the economic prices of a project.

Economic and financial costs are always closely intertwined, but they rarely coincide. The divergence between financial and economic prices and flows shows the extent to which someone in society, other than the project entity, enjoys a benefit or pays a cost of the project. Sometimes such payments are in the form of explicit taxes and subsidies, as in a sales tax; sometimes they are implicit, as in price controls. The magnitudes and incidence of transfers are important pieces of information that shed light on the project's fiscal impact, on the distribution of its costs and benefits, and, hence, on its likely opponents and supporters. By identifying the groups benefiting from the project and the groups paying for its costs, the analyst can extract valuable information about incentives for these groups to implement the project as designed, or to support it or oppose it.

A thorough evaluation should summarize all the relevant information about the project. To look at the project from society's and the implementing agency's viewpoint, to identify gainers and

losers, and ultimately to decide whether the project can be implemented and sustained, it is necessary to integrate the financial, fiscal, and economic analyses and identify the sources of the differences.

## Sunk Costs

For both financial and economic analysis, the past is the past. What matters are future costs and future benefits. Costs incurred in the past are sunk costs that cannot be avoided. When analyzing a proposed project, sunk costs are ignored. Economic and financial analyses consider only future returns to future costs.

Ignoring sunk costs sometimes leads to seemingly paradoxical, but correct, results. If a considerable amount has already been spent on a project, the future returns to the costs of completing the project may be extremely high, even if the project should never have been undertaken. As a ridiculous extreme, consider a bridge that needs only one dollar to be completed in order to realize any benefits. The returns to the last dollar may be extremely high, and the bridge should be completed even if the expected traffic is too low to justify the investment and the bridge should never have been built in the first place. However, arguing that a project must be completed just because much has already been spent on it is not valid. To save resources, it is preferable to stop a project midway whenever the expected future costs exceed the expected future benefits.

On the other hand, although stopping a partially completed project may be more economical than finishing it, **closing a project is often costly**. For example, one may have to cancel partially completed contracts, and lenders may levy a penalty. Such costs have to be taken into account in deciding whether or not to close the project. Similarly, the cash flow of a project should show some liquidation value at the end of the project. This liquidation value should be counted as a benefit. Sometimes, to focus attention on the years for which the information is more reliable, we use the estimated liquidation value of a project as of a certain year.

#### Transfer Payments ( -) (but + when assessing losers & gainers of a project)

Some payments that appear in the cost streams of financial analysis do not represent economic costs, but merely a transfer of the control over resources from one group in society to another.

Transfer payments involve the transfer of claims over real resources from one person or entity in society to another, rather than payments made for the use of or received from the sale of any good or service. Thus transfer payments are payments made among different persons/economic agents/ but they are not related to any particular resources cost. So they do not reflect changes in the national economy.

The term direct transfer payment notifies payments that show up directly in the project accounts but do not affect National income. Direct transfer payments redistribute national income and generally affect the government treasury, positively or negatively. When looking at the project from the project entity's point of view, taxes and subsidies affect the benefits and costs of the project. When looking at the project from society's viewpoint, however, a tax for the project entity is an income for the government, and a subsidy for the entity is a cost to the government; the flows net out. Hence transfer payments have to be excluded from all estimates of economic costs and benefits during the economic analysis of a project.

It is to be noted that transfer payments affect the distribution of income though they don’t affect the overall level of resources available to the economy/society/. Taxes and subsidies should not be disregarded altogether. Transfer payments affect the distribution of project costs and benefits and, hence, are important to assess gainers and losers. If taxes and subsidies render a project unfeasible from the project entity's viewpoint, they are important in assessing project sustainability. A complete profile of the project should identify not only the amounts involved in taxes and subsidies but also the groups that enjoy the benefits and bear the costs. Usually, the government collects the taxes and pays the subsidies. In these cases, the difference between the financial and economic analysis accounts for a major portion of the fiscal impact of the project.

## Taxes versus User Charges ( -T and + Charges)

Some care must be exercised in identifying taxes. Not all charges levied by governments are transfer payments. Some are user charges levied in exchange for goods sold or services rendered. Water charges paid to a government agency, for example, are a payment by farmers to the irrigation authority in exchange for the use of water. Whether a government levy is a payment for goods and services or a tax depends on whether the levy is directly associated with the purchase of a good or a service. Also, it must accurately reflect the real resource flows associated

with its use. For example, irrigation charges frequently do not cover the true cost of supplying the service. While they indicate a real resource flow as opposed to a pure transfer payment, the real economic cost would be better measured by estimating the long-run marginal cost of supplying the water and showing the difference as a subsidy to water users.

## Subsidies ( -)

Subsidies are taxes in reverse. They shift control over resources from the giver to the recipient and do not constitute a cost to society. As with taxes, analysts must keep track of the recipient's benefit and the giver's cost to present a complete picture of project flows. Because the flows net out, they are not a cost to society. Nevertheless, because subsidies often flow from the government to the project entity, they are part of the project's fiscal impact, and analysts must take care to show them explicitly.

## Donations and Contributions in Kind (+)

In some cases, the project entity receives goods and services free of charge. For example, hospitals may receive costly medical equipment as gifts from the private sector or nongovernmental organizations. When evaluating projects from society's viewpoint, it is important to include these items. It is customary to impute a value to the goods and services so rendered by valuing them at their market price as a first approximation to their economic cost. The next chapter will deal with the valuation problems in more detail.

## Interest Payments and Repayment of Prin cipal ( -)

Financial costs are an important component of a firm's income statement. Debt service-the payment of interest and the payment of principal—entails cash out lays, but is never the less omitted from economic and financial analysis. In both cases assessing the quality of the project independently of its financing mode is what matters most. Another reason for excluding debt service from economic analysis is that debt service does not entail a use of resources, but only a transfer of resources from the payer to the payee. Gittinger (1982) states the rationale clearly:

From the standpoint of the farmer [who receives a loan], receipt of a loan increases the production resources he has available; payment of interest and repayment of principal reduce them. But from the standpoint of the economy, things look different. Does the loan reduce the

national income available? No, it merely transfers the control over resources from the lender to the borrower... A loan represents the transfer of a claim to real resources from the lender to the borrower. When the borrower pays interest or repays the principal, he is transferring the claim to the real resources back to the lender—but neither the loan nor the repayment represents, in itself, use of the resources (Gittinger, 1982).

## Interest during construction ( -)

Sometimes lending institutions capitalize the interest during construction; that is, they add the value of interest during construction to the principal of the loan and do not require any interest payments until the project begins to generate income. Whether the bank capitalizes the interest or not, we treat the interest the same for purposes of economic analysis. Interest during construction is still a transfer, and we omit it from the economic accounts.

## Externalities (±)

A project may have a negative or positive impact on specific groups in society without the project entity incurring a corresponding monetary cost or enjoying a monetary benefit. For example, an irrigation project may lead to a reduced fish catch. The reduction in fish catch would represent a cost to society that fishermen would bear, yet the monetary flows of the project entity would not necessarily reflect this cost. Analysts should consider these external effects, known as externalities, when adjusting financial flows to reflect economic costs. If the cost were measurable in monetary terms, we would gain an important insight into the incentives that fishermen would have to oppose the project.

## Consumer Surplus (+)

In some cases, a project may not only increase output of a good or service but also reduce its price to consumers. When a project lowers the price of its output, more consumers have access to the same product, and the old consumers pay a lower price for the same product. Valuing the benefits at the new, lower price understates the project's contribution to society's welfare. If the benefits of the project are equated with the new quantity valued at the new price, the estimate of benefits ignores consumer surplus-the difference between the maximum amount consumers would be willing to pay for a product and what they actually pay. In principle, this increase in

consumer surplus should be treated as part of the benefits of the project. There may also be a gain in consumer surplus without any decline in price. If supply is rationed at a price below what consumers would be willing to pay, an increase in supply at the same controlled price involves a gain in consumer surplus over and above what consumers actually pay for the increase. This may be particularly significant for public utility projects.

# Determining Economic Values

### Valuation of the Impact of a Project: Pareto Optimality Vs. the Hicks - Kaldor Compensation Principle

This section is meant to lay the theoretical basis for evaluating the worth of a project. Different economists are concerned with the valuation of alternative economic situations (state, configurations) from the point of society’s well-being.

To evaluate alternative economic situations, we need to have criteria for evaluating social well- being or welfare (social welfare function). Measurement of welfare requires some ethical standard and interpersonal comparisons, both of which involve subjective value judgments.

Welfare economics is concerned with the evaluation of alternative economic situations from the point of the society’s well-being. Welfare analysis is a systematic method of evaluating economic implications of alternative allocations. Welfare analysis gives answers to the following questions:

* + - 1. Is a given resource allocation efficient?
      2. Who gains and who loses under various resource allocations? By how much?

Related to the above two questions, the two major tasks of welfare economics (WE) are:

1. To show/measure present day welfare (W) and show whether or not the present welfare is less than the optimal welfare (W\*), i.e. W<W\*
2. Suggest ways to rise W to W\*.

Welfare economics is a methodological approach to assess resource allocations and establish criteria for government intervention.

Once a project’s financial cost and benefits have been identified, valued in market prices and entered in the cash flow, the remaining task is to use this information to determine whether or not the project will be profitable and should be selected for implementation. The basic selection criterion, which is applicable in both financial and economic analyses, is that a project should not be undertaken unless its benefits outweigh its costs. The theoretical justification for this rule is the Hicks - Kaldor selection criterion.

The standard measure employed in welfare economics to determine whether a change in resource allocation will result in people being better off is the **Pareto welfare improvement criterion**. A Pareto improvement in welfare is said to occur if at least one person is made better off and no one is made worse off by a given change in economic conditions. When using this criterion it is unnecessary to make any comparison between the utility (welfare) enjoyed by different people as a result of any change in their income, since everyone must either be unaffected or made better off by the change for it to be considered a Pareto welfare improvement.

However, if projects could only be implemented when they were expected to result in an actual Pareto welfare improvement, it is obvious that very few, if any, would be approved. This is because there will always be someone who is made worse off by the improvement of project, such as a tax payer who does not receive any benefit.

To overcome the restrictive nature of Pareto unanimity rule, the concept of a potential Pareto improvement or the compensation principle, was developed by Hicks (1939) and Kaldor (1939). This criterion states that a given change in the allocation of resources will potentially improve welfare if those who gain could compensate those who lose, and still be better off themselves. The Hicks-Kaldor compensation principle is central to the theoretical justification for cost benefit analysis in welfare economics. This criterion provides the rationale for choosing projects whose benefits outweigh their costs, even if the people who gain from a project are not the same as those who pay for it. The excess of benefits over costs is called the project’s net benefit.

A crucial element of this criterion is that it is not necessary for the gainers from a project to actually compensate the losers, only for them to be able to do so if they wished and still remain better off than if the project had not been implemented. Hence a project that meets the Hicks -

Kaldor hypothetical compensation criterion will not necessarily result in an actual Pareto welfare improvement, only a potential improvement.

The Hicks - Kaldor criterion can be criticized because of its failure to address the distributional impacts of projects. Total welfare will not necessarily be increased even if a project meets the Hicks - Kaldor criterion, unless those who gain receive the same increase in their utility from an extra unit of income as those who lose from the project. However, it is a basic tenet of welfare economics that the poor can be expected to receive a greater increase in their utility or welfare from 1 extra unit of income than the rich. That is, the poor are expected to have higher marginal utility of income than the rich. Put simply a project that costs the poor 1 unit of income and increases the income of the rich by 1.5 units will pass the Hicks - Kaldor criterion and be selected, but will not increase total community welfare if the poor value their unit of lost income twice as highly as the rich value each additional unit of income they gain.

Nevertheless, in economic analysis these problems are largely ignored and it is implicitly assumed that everyone has the same marginal utility of income. However, the rationale for the social analysis of projects is largely based on this failure of the Hicks - Kaldor compensation criterion to deal with the distributional issues that will arise if actual compensation does not take place.

### Efficiency/ Economic/ Shadow prices

As it is discussed, market prices are inappropriate in project selection, the question arises how the necessary accounting prices should be estimated. Thus the economic analysis of projects requires that inputs and outputs be valued at their contribution to the national economy, through efficiency or Shadow prices. From the national economic point of view it is the alternative production foregone or the cost of alternative supplies that should be used to value project inputs and outputs. An economic or shadow price reflects the increase in welfare resulting from one more unit of an output or input being available.

#### Definition of shadow (accounting) prices

Accounting or shadow prices are simply a set of prices that are believed to better reflect the opportunity cost i.e. the cost in their best use of goods and services. It is the value of Used in

economic analysis for a cost or benefit in a project when the market price is left to be a poor estimate of economic value.

Efficiency shadow prices are border prices determined by international trade. The basic assumption here is that international market is less distorted than the domestic market and thus taking international price is more realistic to value the true cost of goods and services.

Shadow price estimates can be made at two levels:

* Economic analysis
* Social analysis

In economic analysis resource efficiency is considered. In social analysis growth and income distribution objectives are pursued.

### Traded and Non-Traded commodities

As we have discussed market prices are inappropriate in project selection and the question that arises would be how the necessary accounting (shadow) prices should be estimated. The valuation of goods and services depends on whether the good can be traded in international market or whether it is consumed locally such as in a closed economy.

### Non-Traded Goods

The non-tradable goods are goods that do **not enter into the international trade** because of their:

* Nature or physical characteristics: Perishable and/or bulky goods, goods for which there is only endogenous taste/demand/ (Like Teff in Ethiopia);
* Economics of trading: cost and/or quality performance of products;
* Policy barriers that affect international trade.

So the non-traded inputs and outputs of a project cannot be valued directly at border or world prices. When goods do not enter in to trade by their very nature decomposing is a pre requisite to their valuation in terms of would prices. For some non-traded goods no reference border prices are available. **Example**: Teff. For other commodities the local supply price is below the CIF

(Cost, insurance and Freight) price of potential imports but above the FOB (Free on board price) of potential exports.

In both cases the non-traded inputs and outputs of the project cannot be valued directly at border or world prices. The economic value of non-traded goods depends on whether their production is assumed to be fixed or variable. If production is assumed to be variable it is assumed that the use of one more unit of a non-traded item will cause the output to increase by a similar amount. The cost to the economy is then the long run marginal cost of producing the extra item.

In some cases it is possible that the supply of a non-traded good is fixed. In such cases the economic value would be estimated by consumer ‘willingness to pay’ (WTP) on the assumption that the use of the item deprives the alternative user of a value represented by their WTP.

However, t**echnological developments** are turning a number of non-tradable into tradable goods. Following containerization in the shipping industry bulky products like cement have become tradable goods. For instance, while in Ethiopia cement is non-tradable good till the present (at least before 2006), it is tradable good in the Sudan. The Sudan has been heavily dependent upon imported cement for the last two or so decades because of the fact there has been domestic supply shortfall in the Sudanese cement market. Likewise, perishable products like vegetables and flowers have become tradable goods thanks to refrigerators that extend the effective life of perishable products. Example. Ethiopia has already started flower farming meant to European Union market. A number of countries are doing well in the flower industry. There are a number of Latin American countries known as the Banana Republics, whose economy has been dependent upon the exportation of vegetables, specifically banana.

### Traded Goods

Traded goods are defined as goods and services whose use or production causes a change in the country's net import or export position. Traded goods produced or used by a project do not actually need to be imported or exported themselves, but must be capable of being imported or exported.

Traded goods are either exportable or importable goods or Services. Exportable goods are those whose domestic cost of production is below the FOB export price that local producers can earn for the good on the international market.

The opportunity cost of tradable goods is defined by their border prices. For example, if a project uses an item that could otherwise have been exported, the loss experienced by say the Ethiopian Economy is represented by the foreign exchange that could otherwise have been earned, that is the export price. Similarly, if a project produced an item that substitutes for imports, the benefit to the Ethiopian economy is the foreign exchange saved by not having to import it that is the import price of the item in question. Differences between the opportunity costs and the market prices may arise either because of trade restrictions or because of taxes and subsidies. Differences in transport costs also have to be taken into account.

There are different types of traded goods.

* Imported input;
* Locally Produced Import Substitute;
* Exported Output;
* Diverted Export as an Input.
* Simultaneously a good can be both import and export good

Some traded goods may be regarded as both imports and exports. This occurs quite frequently in relatively open economies where the same category of good might be both exported and imported. It is particularly likely to be the case for manufactured goods where each category might cover a large number of different products. In such cases, valuation according to opportunity cost principles would be based on a weighted average of the different situations. Such cases are relatively unimportant in Ethiopia because of the small size of the industrial sector, but it is possible that they could become more important in future.

#### Figure: Domestically produced good is an exportable

Quantity

Qs Workers D

S

Qd

Qs

Dd

Pd

DW

PM

D

Sd

D

Price

Exports

The domestic equilibrium for the commodity is Pd, is below the world price, put that is determined by the world demand curve DDW. This makes it profitable for domestic exporters (producers) to export and receive higher world price. Domestic producers will produce Qs of which Qd will be sold locally and Qs minus Qd will be exported. Importable are goods whose landed CIF import cost is less than the domestic cost of producing these goods.

#### Figure: Domestically produced good is an importable

Price

D

Sd

S

SW

S

Dd

Pd

PM

Qc Qd

Quantity

Imports

The domestic equilibrium price Pd is above the world price PW, which is determined by the world supply curve SSW. This will make it worthwhile for domestic consumers to attempt to import the commodity at the lower world price. (Qd-Qs) would be the demand for imports.

* + 1. **Measurement of the economic value of tradable (Valuation of Tradable) commodities**

The economic benefits of producing tradable outputs and costs of using tradable inputs are measured by the border price of these inputs and outputs. An importable border price is its CIF import price - its price landed in the importing country before the effects of any tariffs or quantitative restrictions have been added to its price. The landed cost of an import on the dock or other entry point in the receiving country includes the cost of international freight and insurance and often includes the cost of unloading on to the dock. But this excludes any changes after the

import touches the dock and excludes all domestic tariffs and other taxes or fees. The CIF price represents the direct foreign exchange cost of the input up to the port or the border of entry.

Similarly an exportable good should be valued at a border price or FOB export price. The FOB price is the price that would be earned by the exporter after paying any costs to get the good to the border, but before any export subsidies or taxes were imposed. The border price (FOB price) should be netted from handling, transportation and marketing expenses to arrive at the project site place. The FOB border price is the actual foreign exchange earned from exporting the export price minus any marketing margins and transport costs to get the good from the project site to the border.

### Border parity pricing

World prices are normally measured as border prices reflecting the value of a traded good at the border or port of entry of a country. Border price is the unit price of a traded good at a country's border (FOB for exports and CIF for imports.) However, values in project financial statements will normally be at prices received by the project -ex - factory or farm gate prices or paid by the project for inputs. To move from market to shadow price analysis therefore, shadow prices must in terms of prices to the project.

This means that for traded goods domestic margins, relating to transport and distribution (including port handling) will have to be added to prices at the border to obtain values at the project level.

The decomposition of these margins is referred to as border parity pricing. A parity price or parity economic value is the price or value of a project input that is based on a border price adjusted for expenses between border and the project boundary.

To assess the full economic values of a traded good in a world price system requires both its foreign exchange worth at the border, plus the value at world price of the non-traded activities of transportation and distribution required per unit of output. Thus for goods that are traded directly by a project the border parity price for the project output is the FOB price minus the value of transport and distribution. These later costs must be deducted since real resources are required before the good can be exported.

Similarly where a project imports an input its border parity price is the CIF price plus transport and distribution costs. If the project does not actually import or export the goods concerned but produces that save imports (import substitutes) and uses domestic goods that could have been exported (exportable) or could have been imported (importable) the adjustment is less straight for word.

### National parameters and standard conversion factors

 ***Conversion factors***

As has been stated that all project inputs and out puts should be valued at the world prices, which are the border prices. World prices are used to measure the opportunity cost to the economy of goods and services, which can be bought and sold on the international market. This means the world price reflect the terms on which it can buy and sell on the world market. However, in practice there are significant numbers of commodities for which there will be no direct world price to use as a measure of economic value (Example Teff) of non-traded goods.

Thus some world price equivalent figures need to be derived for these non traded goods. To estimate the efficiency (accounting prices) for all other non-traded gods, (inputs and outputs) we use conversion factors.

A conversion factor is defined as the factor by which we multiply the actual price in the domestic market of an input or output to arrive at its accounting price when the latter cannot be observed or estimated directly. The more the inputs and out puts are traded the less will be the need to use conversion factors. The conversion factor is simply the ratio of the shadow price of the item to its market prices. A conversion factor is estimated simply by taking the ratio of border prices (world prices) to domestic market prices of the good.

### National parameters:

There are some important parameters that have general applicability in the sense that they are used in all projects. These parameters should take the same value in all projects although they can change from time to time. In other words such parameters are national in that they apply to all projects regardless of their sector, and they are economic because they reflect the shadow

price of the items concerned. A typical list of national economic parameters covers conversion factors for:

* + Unskilled and skilled labor
  + Some of the main non-traded sectors
  + Some aggregate conversion factors such as consumption conversion factor, a standard average conversion factor, the discount rate, etc.

A project analyst can apply these parameters directly to the project under analysis. They are called national parameters to distinguish them from the project specific shadow prices. They are estimated by the central planners a dare taken as given by the project analyst. How many parameters should be estimated depends upon the economic conditions of the country and the degree of sophistication desired in project analysis. However, a minimum of three or four national parameters should be estimated:

* + - The standard conversion factor
    - The shadow wage rate
    - The discount rate and
    - The shadow exchange rate

### The Standard Conversion Factor

This is an all - inclusive conversion factor used in place of commodity - or sector specific conversion factors, either because they cannot be estimated accurately, or because we believe that they cannot be estimated accurately or because they do not differ substantially from the standard conversion factor. It is a summary measure to calculate accounting prices for non-traded commodities.

In the case of Ethiopia the standard conversion factor is interpreted as a summary and approximate quantification of the distorted markets (domestic) as compared to the international market. It is therefore estimated as the ratio of the value of imports and exports of a country at border prices (CIF and FOB) to their value at domestic prices.

The formula for computing the standard conversion factor is given as:

SCF = M + X

(M + TM − Sm)(X + Sx − Tx)

Where: **M** and **X** are total imports and exports respectively at world prices converted at the official exchange rate.

**Tm** and **Tx** are the total trade taxes on imports and exports respectively.

**Sm** and **Sx** are total trade subsidies on imports and exports respectively.

All values should refer to the same year or to an average over the same period. The SCF is a summary measure to calculate accounting prices for non-traded goods. This is achieved by multiplying the net of taxes domestic prices of one commodity by the SCF.

Thus every effort must be made to decompose the, non-traded goods in to traded and non-traded elements and apply the SCF only to the latter. The rule for the non-traded goods should be still decomposition and the SCF should be used only when this is impossible, very difficult or is not worth the effort. The SCF is revised from time to time by the central economic authorities and adopted by planning bodies.

To summarize, although in general it is recommended that a different accounting price be estimated for different non-traded goods. It is useful to have available a standard conversion factor that can be used for non-traded goods which remain after one or two rounds of decomposition. For this purpose, the ratio of the value of border prices of all exports and imports to their value at domestic prices might be used. SCF⁄OER = 1⁄SER

# The Economic valuation of foreign Exchange

### Introduction

In the previous sections we have discussed how border prices are used to value the economic benefits and the cost of project’s tradable inputs and outputs. In project appraisal the foreign exchange earnings and costs are usually converted into local currency so that they can be included in the project’s cash flow with its non-tradable inputs and outputs. The OER would be applied on the border price of exported commodities, X (fob price) and to that of each of the

imported inputs, M (c.i.f. price) to value them domestically. But does the OER (the price of foreign exchange) reflect the economic values of foreign exchange to the economy? In the preceding section, we were implicitly assuming that the official price of foreign exchange reflects its economic benefits to the country concerned. However this is often not the case and needs to be relaxed and see its effect on the valuation of a project’s tradable inputs and outputs.

The official exchange rate, OER will be equal to the true economic value placed on foreign exchange if it is able to move freely without interventions or control by the government and if there is no rationing of foreign exchange, no tariffs or non-tariff barriers on imports and no taxes or subsidies on exports. In countries where these conditions hold the market price of foreign exchange, the OER should be a good measure of people’s willingness to pay for the foreign exchange needed to buy imported inputs and the economic benefits the local economy receives from any foreign exchange earnings made by a project.

In very few countries in the world there is little or no government intervention and few imperfections in the country’s traded goods and foreign exchange markets. There are many distortions in the market for foreign exchange and traded goods:

1. The market for foreign exchange may be strictly controlled and it may only be possible to purchase foreign exchange for permitted purposes. These controls may be imposed because the fixed official exchange rate is overvalued. This results in the demand for foreign exchange greatly exceeding supply.
2. A currency is overvalued if the official exchange rate understates the amount of domestic currency that residents of the country would be willing to pay for a unit of foreign currency if they could freely spend it on duty free goods -goods sold at their border prices. Trade distortions such as import tariffs and quotas; result in a country's currency being overvalued.

#### Figure: The shadow exchange rate and overvaluation of a currency

Exchange rate, ER

D

Official supply of FE

Sfe (Hypothetical free market supply of FE)

Shadow ER Undistorted Equilibrium

(ER=R)

OER

S

0 Qc Q0

 Dfe (Hypothetical free market demand for FE)

Demand for FE

Foreign Exchange

Qd Quantity

Excess Demand

Dfe Shows that amount of foreign exchange that local residents would demand in each exchange rate if there were no tariffs and import quotas on imports or foreign exchange rationing.

Sfe is the hypothetical supply curve for foreign exchange showing the amount of foreign exchange exporters would be willing to earn at each exchange rate if there were no subsidies or taxes on exports or tariffs on imported inputs.

The undistorted exchange rate is achieved at the intersection of these hypothetical, distortion free foreign exchange demand and supply curves. At this exchange rate the DD for and the SS of foreign exchange will be equal at Q0.

Now if the official exchange rate OER expressed in terms of units of local currency needed to buy one unit of foreign exchange is fixed below this equilibrium level it is said to be overvalued.

This means that an unrealistic high value is placed on the local currency in terms of how much foreign exchange can be bought with a unit of currency. At this overvalued exchange rate, exporters will only be willing to export goods and services worth Qs of foreign exchange rate because they will receive less in local currency for each dollar of foreign exchange earned than they would have at the equilibrium exchange rate. On the other hand imports will seem to be cheap at such a low exchange rate and importers will demand Qd of foreign exchange to purchase these inputs/ imports. At this artificially low exchange rate, OER the economy will therefore, experience excess demand for foreign exchange Qd - Qs.

Consequently to overcome the resulting balance of trade deficit the government is likely to impose import tariffs. This will shift the net of tariff demand for importable and hence for foreign exchange downwards. The tariffs imposed causes a downward shift in the demand curve for foreign exchange to DDt this will be sufficient to restore an artificial equilibrium in the foreign exchange market so that the demand for foreign exchange equals supply at the OER. In addition to this, one common misconception is that an economy’s shadow exchange rate is equivalent to its parallel market for foreign exchange. But the two are different.

### The Foreign Exchange Premium

If the official exchange rate, OER, expressed in terms of units of local currency needed to buy one unit of foreign exchange is fixed below their equilibrium level it is said to be overvalued. This means that an unrealistically high value is placed on the local currency in terms of how much foreign exchange can be bought with a unit of currency. Countries that have an overvalued exchange rate or to have a foreign exchange premium (FEP). A FEP measures the extent to which the OER under states the true amount of local currency that residents would be willing to pay for a unit of foreign exchange, or its true opportunity cost to the economy. It is defined as the proportion by which the OER overstates the real value of local currency or of non-traded goods and services relative to traded goods and services. It is used to calculate the shadow exchange rate and the standard conversion factor for economic analysis.

The FEP can be measured by the ratio of the value of total trade, imports plus exports, values in domestic prices and therefore including the effect of tariffs and other distortions, to the value of trade in border prices, minus one, as given below.

M(1 + t) + X(1 − d + s)

FEP = {[

M + X ] − 1 } × 100%

Where: t = are tariffs, or tariff equivalents of non-tariff barriers, imposed on imports d = are the export tax equivalent on any restrains and taxes impose on exports

s = are the export subsidy equivalent to any support given to encourage exports M = is the value of imports in border prices, c.i.f.

X = is the value of exports in border prices, fob.

The numerator measures the total amount in local currency that residents are actually paying to consume imports (including tariffs and taxes) plus the amount they are actually accepting for exports (excluding export taxes and including export subsidies). It therefore measures the true values placed on traded goods produced and consumed in the country.

The denominator shows the actual foreign exchange value of these traded goods. They are measured at their border prices, converted in local currency at the OER. The ratio of the domestic value to the border price value, therefore, shows the true value on traded goods, relative to apparent economic values at the official exchange rate. FEP is usually expressed as % (that is why we subtract 1 and multiply it by 100). The result show the extra % that consumers are willing to pay over and above the OER if we were able to buy currency freely and spent it on duty free goods.

If both traded and non-traded commodities are used or produced in a project, they need to be valued in comparable prices before they can be used together in net cash flow of a project.

### The Shadow Exchange Rate (SER)

One way to correct for an overvalued exchange rate in project appraisal is to use a shadow exchange rate, rather than the official exchange rate to value all foreign exchange earned and used by the project.

The SER is that rate of exchange which accurately reflects the consumption worth of an extra dollar (or other convertible foreign currencies) in terms of one's own currency. Thus the SER is

the shadow price of foreign exchange and reflects the foreign exchange premium. Thus one-way to adjust for the over valuation of local currency is to increase the OER by the foreign exchange premium to obtain a shadow exchange rate. In order to make it clearer, see the following example. Example: If consumers in an economy would be willing to pay 20 percent more than the OER to obtain foreign goods, then the foreign exchange premium is 20 percent and the OER would be increased by 20 percent to obtain the SER. Thus if the OER were birr 10 = 1$US, then the SER would be birr 12 = $ US1.

Thus the input which is traded across international borders and is found in the project account it would be valued not at the OER but at the SER. This will make imports more expensive and there by encourage the use of plentiful domestic resources rather than use foreign exchange. A simple definition of a country's SER involves addition of the percentage FEP to the OER, or more precisely, multiplication of the OER by one plus the FEP divided by 100.

FEP M(1 + t) + X(1 − d + s)

SER = OER ( 100 + 1) = OER [

M + X ]

Where: x, M, t, d, and S are defined as before the value of export (FOB), value of import (CIF), tariffs imposed on imports, and export subsidy.

### Estimation of the Shadow Exchange Rate

Estimation of SER is usually based on CGE models (we will not discuss that). But this procedure is expensive both in terms of data and time. There are several alternative partial equilibrium approaches that can be used under such circumstances. The most simple and widely used formula in estimation of shadow exchange rate (SER) is the one developed by UNID 1972. It attempts to measure, in local domestic prices, the increase in welfare in an economy that will be generated from one additional unit of foreign exchange.

The UNIDO SER formula is the weighted average of the ratio of the domestic prices to border prices (C.i.f or fob) of all goods traded by the country, where the weights reflect how the next dollar of foreign export (FX) would be spent.

n P h P

SER = [Σ fa ( ad ) + Σ xb ( bd )] × OER

a=1

Pacif

b=1

Pbfob

Where: †a = is the fractional increase in each of the country's ‘n’ imports as a result of a 1 local currency (birr) increases in the availability of foreign exchange

xb = is the fractional fall in each of a country's ‘h’ exports in response to a 1 birr increase in the availability of foreign exchange

Pad and Pbd = are the domestic market clearing prices of ath importable goods and the

bth exportable good, respectively.

Paci†= is the if price of ath importable good, measured in birr, converted at the official exchange rate.

Pb†ob= is the fob price of bth exportable good, measured in birr, converted at the official exchange rate.

The major problem with this approach is it doesn’t provide any guidance about how to estimate the weights of fa and xb. It could be assumed that the marginal pattern of expenditure reflects the average pattern of expenditure on traded goods. In practice this is the approach used.

# Social cost-Benefit Analysis

In essence, project analysis assesses the benefits and costs of a project and reduces them to a common denominator. If benefits exceed costs both expressed in terms of this common denominator-the project is acceptable: if not, the project should be rejected. Economic analysis of projects is similar inform to financial analysis in that both assess the profit of an investment. The concept of financial profit, however, is not the same as the social profit of economic analysis.

### The purpose of Social Cost-Benefit Analysis

When under taking financial and economic project appraisal it is implicitly assumed that income distribution issues are beyond the concern of the project analyst or that the distribution of income

in the country is considered appropriate. A financial objective is narrow one for a public agency to pursue and for public decisions. But in most countries governments are not only interested in increasing efficiency but also in promoting greater equity.

When one project is chosen rather than another the choice has consequences for employment, output, consumption, savings, foreign exchange earnings, income distribution and other things of relevance to national objectives. The purpose of social cost-benefit analysis is to see whether these consequences taken together are desirable in the light of the objectives of national planning. Therefore, a social appraisal of projects goes beyond economic and financial appraisal to determine which project will increase welfare once distributional impact is considered. The project analysts will not be only concerned to determine the level of project's benefits and costs but also receives the benefits and pays the costs. In a situation where a project is only marginal from the point of view of an economic analysis but has strong positive distributional benefits, the analyst may consider a social analysis in addition to the traditional economic analysis.

In an economic analysis of a project it is implicitly assumed that a dollar received by any individual will increase the community's welfare by the same amount as a dollar received by any other individual. But an extra dollar given to a very poor person will usually increase the person's welfare by much more than would a dollar given to a rich person. A rationale in welfare economic for the social analysis of projects is therefore, quite strong, the marginal utility of income of a person who receives a low income is expected to be greater than the marginal utility of income of the same person if he or she receives a high income. An economic analysis of projects A & B would not capture those differences and would merely indicate that both had the same positive impact on community welfare.

##### Difference between financial calculation and Social cost -benefit Analysis:

Financial profitability is measured in terms of the difference between the value of earnings and costs in a certain period. Social cost-benefit analysis must go deeper and ask what the meaning of profit is.

1. The price offered in the market is not a good guide to Social welfare for it includes the influence of income distribution on the prices offered. One of the simpler means of income redistribution may in fact be project Selection. The choice may be between

project A to be located in a poor region or project B to be located in a rich area or between project X which uses a large amount of poor, unskilled labor which might otherwise be un employed and project Y which uses factors of production supplied by rich people.

1. A project may have influences that work outside the market rather than through it. These effects are called "externalities” externalities are relevant for social choice and provide a sufficient argument for rejecting commercial profitability as a guide to public policy. Externalities may arise in the process of production, in the process of consumption, and in the process of Sales and distributions.
2. Even in the absence of externalities and consideration of income distribution commercial profitability may be misleading because of consumer's surplus.