
5 Economic Analysis

5.1 INTRODUCTION

Modern concept of an enterprise calls for a balance of interest of the participants such as the employees, project sponsors, customers, suppliers, the state and the public at large. This concept ensures that the business activities are beneficial to the entire society (economy). The governments, in both free and controlled economies, protect this concept by enacting appropriate regulatory laws to ensure that all the sectors of the society – public, private, small or big – work for the overall benefit of the society. It is therefore logical that the pluralistic nature of the interests can be achieved if the economic analysis is done from a national point of view, rather than restricted to a regional issue or to a particular wing of the administration. In other words, consequences to all persons or groups of persons in the country should be considered in the analysis.

The method is generally used prior to commencement of project activity, early enough to be able to focus on the desired objectives of the project. However, it is a practice to use it during the project duration and also after the project is completed in order to ascertain the degree of its success during implementation and on completion. The technique is normally applied for the analysis of public investments. However, this is used for private enterprises also, where national socioeconomic considerations nowadays play an important role in investment decisions within the framework of broad strategic options at the macro-level.

5.2 FUNDAMENTAL CONCEPTS OF ECONOMIC ANALYSIS

5.2.1 PROLOGUE

It is a common practice that the costs of development projects and their maintenance are borne by the state, whereas the benefits arising out of these are enjoyed by the general public. Consequently, it is logical that economic analysis of such projects should be carried out from a national point of view rather than a regional or sectorial government department. This implies that the analysis should be done keeping in view the interests of every citizen of the community.

Financial and economic appraisals are somewhat similar to each other, because both assess profitability of investment. However, the undergoing concept of financial profit is not the same as economic profit. While financial profitability indicates commercial and monetary viability of a project, economic profitability measures the real worth of a project from the point of view of the society.

In effect, financial appraisal is a technique for estimating the rate of return of the investment in monetary terms. Economic appraisal, on the other hand, estimates the return on investment on all the segments of the society as distinct from a project

entity. The basic difference between financial and economic appraisal is that the former assesses profitability based on market prices, while the latter measures the net impact of the investment on the national economy.

5.2.2 DIFFERENCE BETWEEN FINANCIAL ANALYSIS AND ECONOMIC ANALYSIS

Financial analysis deals primarily with the means of financing a project (by levying toll or floating bonds etc.), and its monetary profitability. Financial analysis is thus concerned with the source of financing, availability and allocation of funds. For example, in a toll road bridge, the costs and expected toll collection will decide whether the project will be viable from financial considerations and management has to take a decision to construct it or not depending on whether the toll collection seems attractive enough. This analysis is financial in nature. Economic analysis, on the other hand, concerns with the consequences of such decisions to all sections of the community, and this will be necessary for establishing the economic viability of the project. In this connection, it needs to be clearly understood that even if the economic viability is established, the authorities may still decide not to take up the project due to financial constraints, such as lack of funds or unattractive returns.

5.2.3 STUDY OF THE FUTURE

Economic analysis is not concerned with the past events or investments. It is essentially a study of what would happen in the future. Consequently, economic analysis should estimate future results of any development project.

5.2.4 ALTERNATIVE SOLUTIONS TO BE CONSIDERED

It is mandatory that a number of possible alternatives are evaluated and the most attractive option is selected (including 'do nothing' option).

5.2.5 QUANTITATIVE AND QUALITATIVE APPROACHES

Some consequences can be quantified into monetary terms, and some cannot. In economic analysis, effects that can be quantified monetarily should be included in the analysis. Non-quantifiable consequences are to be specified and presented to the decision maker for his consideration. For example, the impact of a project on the safety aspect of the public is an extremely important consideration. Since this cannot be quantified in monetary terms before it happens, the concerned engineer should highlight in qualitative terms, the effects of such future safety aspect.

5.2.6 ANALYSIS PERIOD

For minor private projects, it is common to have a short analysis period (say 2–5 years). For major public sector projects, the analysis period may extend to 15–20 years or even more beyond the completion of such projects.

5.2.7 COMMON TIME DATUM

It is customary to have all future costs and benefits to a common time datum since these occur at different points of time. For this purpose, discounted cash flow (DCF) procedure is followed. This method is discussed in a separate chapter dealing with financial aspect of project.

5.3 PURPOSES OF ECONOMIC ANALYSIS

The main purposes of economic analysis of a project are as follows:

- a. Ensuring efficient allocation of the resources towards the economy of the community at the national, regional and local level within the overall development plan. Consequently, the efficiency with which the resources are used can have an impact on the performance of the economy and prosperity of the country;
- b. Ranking of different options considering scarce resources in order of priority;
- c. Assisting in phasing the development program over a period of time considering availability of resources;
- d. Comparing the different options and selecting the most attractive one;
- e. Determining whether the option is worth the investment at all;
- f. Evaluating alternative strategies in respect of specifications, design standards and other parameters.

5.4 DISTINCTIVE FEATURES OF ECONOMIC STRATEGIES FOR PUBLIC SECTOR AND PRIVATELY OWNED PROJECTS

Public sector projects are approved, named and operated by the government or its agencies (public utilities), unlike privately owned projects where investment decisions are taken primarily by the private stakeholders.

Some distinctive features of economic strategies in public sector and privately owned projects are discussed below:

- a. In a public sector project, goods, services, jobs, etc. are provided at a 'no-profit-basis'. This is generally not the case for a privately owned project;
- b. The source of capital in a public sector project is primarily taxation, while in private sector, it is generally private investors, or promoters. In case of public sector projects, occasionally financing is done by self-liquidating bonds issued to the public or by subsidies or loans from financial institutions;
- c. It is common to have multipurpose projects in the public sector, such as flood control, irrigation and power generation. This is seldom the case in a private project;
- d. Life span of private projects is generally shorter (say 5–10 years), while a public sector project may run for longer period (20–50 years);
- e. Political pressure in public projects may be much more than that in a privately owned project.

In view of the foregoing, economic analysis of projects in the public sector may not always be possible to be done exactly in the same manner as is done in the case of privately owned projects. This creates problems for the public in general, as well as for the decision makers and managers in the public works.

5.5 SOCIAL AND FINANCIAL COSTS AND BENEFITS

Appraisal technique in private sector is primarily concerned with maximization of profit and consequently private wealth. Thus, only private costs and returns of investment which occur directly to the investor are taken into account. However, private monetary costs and benefits of a project do not necessarily reflect its true social costs and benefits. For example, while undertaking appraisal of an industrial project, the investment required to construct the plant, the costs of equipment, raw materials, labor, overheads, etc. and the revenues arising out of the operation are generally considered. However, broader social and environmental consequences of constructing such a plant are not considered. These include both beneficial and detrimental effects. Examples of beneficial effects are increased employment potential and effect on balance of trade position (if the product is exported). On the other hand, environmental pollution, effect on local property prices, etc. contribute to the detrimental effects. Social costs and benefits are quite often inclined to differ from financial costs and benefits. Some of the major sources of differences are discussed below.

5.5.1 IMPERFECTIONS IN MARKET PRICES

Market prices which form the basis of monetary costs and benefits are not always under perfect competition. Under the circumstances, they do not always reflect the actual social values. Some common examples of imperfections are as follows:

- *Rationing system*: the price paid by the consumer for consumables purchased in this system is often less than the competitive market rate, i.e., the items are subsidized.
- *Minimum wages rate system*: in this case also, the prescribed minimum wages paid to labor are more than those which would have been prescribed in a free labor market.

5.5.2 EXTERNALITIES

Projects may have beneficial external effects. These are considered as social benefits, while from monetary point of view, they may be ignored because they do not contribute anything to the sponsors. A new road bridge connecting two towns is considered a social benefit for both the towns, but may be ignored from the monetary benefit point of view to the sponsors, unless, of course, a toll system is introduced. Similarly, the same bridge may give rise to vehicle congestion, and thereby have a harmful external effect like environmental pollution. This effect is relevant from social point of view, but may not adversely affect the sponsors from monetary point of view. Needless to add such externalities are very relevant for economic analysis of

projects, since consequences of such economic activities affect other parties without this being reflected in market prices.

5.5.3 TAXES AND SUBSIDIES

Though taxes and subsidies are costs and benefits in monetary terms from the private point of view, these are considered as transfer of payments from social point of view and are often ignored in economic analysis.

5.5.4 DISTRIBUTION OF BENEFITS

A private sector organization may not be concerned about how the benefits are distributed among the various groups in the society. From the point of view of the society, however, such distribution of the benefits to a particular section of the population may be considered more valuable than the same to other sections. For example, the state may decide to promote an adult education program or a balanced nutrition program for schoolchildren, even though these may not be considered necessary from private point of view. Nevertheless, these are important from the social perspective.

5.5.5 CONCERN FOR SAVINGS

In economic analysis, savings and investments are considered as more valuable than consumption. A private firm does not bother about differential valuation on savings and consumptions. From a social point of view, however, difference between consumption and savings is relevant since saving will lead to investment, particularly in capital-scarce countries.

5.5.6 SHADOW PRICING

Actual expenses and revenues from goods and services do not always reflect the measurement of the costs and benefits to the society. For evaluating such expenses and revenues in terms of social costs and benefits, adjustments are required in the expenses and revenues in order to make them reflect their proper market value. These adjustments are known as shadow pricing. The principle of shadow pricing applies to both the cost stream and the benefit stream. Shadow pricing technique is adopted basically for overcoming the following difficulties.

5.5.6.1 Imperfect Pricing Mechanism

In many countries, particularly in developing countries, because of lack of perfect competition, domestic pricing mechanism does not operate perfectly. Relative costs, benefits and scarcities are not always reflected correctly in the pricing mechanism. This is due to direct and/or indirect influences on the demand and supply of goods and services emanated from operations by government agencies. As a result, domestic prices are not in line with the rates at which they could be traded in the international market. Such difficulties can be overcome with the help of shadow pricing technique.

5.5.6.2 Variation in Wages Rates

Due to unemployment problems in many developing countries, the wages of labor, particularly in the non-organized sectors, are often regulated by the government and tend to be lower than the logical level. This is primarily due to mass underemployment and unemployment at existing wages rates. In the organized industrial sector, on the other hand, labor forces have strong trade unions and wages tend to be higher than the opportunity cost of labor. Thus, actual wages of the labor need to be adjusted for calculating the labor cost for the purpose of shadow pricing.

5.5.6.3 Disparity in Interest Rates

Cost of capital is generally indicated by the interest rate. In developing countries, the majority of the population are impoverished with low savings level and therefore do not have the propensity to save and invest. Moreover, the relationship between supply of capital and interest rates prevalent in the country is minimal. There is thus wide disparity between interest rates prevailing in different geographical areas. To overcome such problems, shadow rate of interest is estimated based on the interest rates paid by private investors.

5.5.6.4 Disparity in Exchange Rates

In general, the developing countries suffer from adverse balance of payment in the foreign exchange area. As a result, the rate of foreign exchange tends to be lower in the open market than the official rate. The problem is solved by fixing a higher exchange rate than by fixing the official exchange rate in the project. This is tantamount to attaching weight to the cost of foreign exchanges in the project.

5.5.6.5 Inflationary Forces

Some projects take considerable time from conception to completion. During this period, due to inflationary trend, cost of labor, material, equipment, etc. may go up. Similarly, benefits arising out of the project tend to be higher in future years for the same reason. Since relative costs and benefits remain almost the same, it is often common to disregard inflationary effects both in the cost and in the benefit streams. However, where these can be distinctly identified, these need to be considered in the analysis.

5.5.6.6 Limitations

Major limitations of shadow pricing technique are discussed in the following paragraphs:

- a. Success of shadow pricing technique depends largely on availability of authentic data. However, this is often not easily available in developing or underdeveloped countries;
- b. In developing or underdeveloped countries, it is not always possible to have a complete knowledge of demand and supply functions which are based on the existing socioeconomic environment in these countries. Thus, shadow prices are not easy to determine under the existing institutional structure;

- c. Time dimension presents another problem. Shadow prices are generally used to overcome difficulties in the evaluation of projects which are basically progressive and not static. The anomaly arises because all inputs and outputs for shadow prices are valued at limited times, while investment projects relate to comparatively longer periods.

5.6 PREPARATION OF ECONOMIC APPRAISAL

In simple terms, the process for economic appraisal involves the following steps.

5.6.1 DEFINITION OF OBJECTIVE AND SCOPE

Objective and scope of the project must be defined very clearly and unambiguously at the very early stage.

5.6.2 IDENTIFICATION OF OPTIONS

Options that are realistic and at the same time far reaching are to be identified. This step should be taken as early as possible. Tendency to identify the solutions that have been attempted and discarded in the past should be avoided, as this can lead to dismissal of potentially successful option at the early stage without proper investigation.

5.6.3 IDENTIFICATION OF QUANTIFIABLE MONETARY COSTS AND BENEFITS

Economic appraisal should be based on all capital and recurrent monetary costs and benefits associated with a project. The degree of accuracy of the analysis depends on the authenticity of the source of the data.

5.6.4 CALCULATION OF QUANTIFIABLE NET BENEFITS

The quantifiable costs and benefits are expressed in net present value (NPV) terms using an agreed discount rate. By using discounting process, the operating costs and benefits, which may extend far into the future (may be 15–20 years), are brought back to a common time dimension – present value – for the purpose of comparison. (Basically, the process of discounting is a compound interest calculation worked backward.)

Based on the discounted stream of costs and benefits, the following decisions may be arrived at:

- a. *Net present value (NPV)*: a project is potentially worthwhile if the NPV is greater than zero.
- b. *Net present value per unit of investment (i.e., NPV/I)*: projects with the highest ratio of NPV/I would be potentially worthwhile.
- c. *Benefit/cost ratio (BCR)*: if the BCR is greater than 1, i.e., if the present value of benefits exceeds the present value of costs, the project is potentially worthwhile.

- d. *Internal rate of return (IRR)*: a project is worthwhile if IRR is greater than discount rate. (Internal rate of return (IRR) is the discount rate at which the NPV of a project is zero, i.e., discounted benefits equal discounted costs.)

(Note: For detailed discussions on NPV, BCR, etc., see Chapter 6.)

5.6.5 IDENTIFICATION OF QUALITATIVE FACTORS AND PREPARATION OF SUMMARY OF THE RESULTS

Apart from the quantifiable factors, there are qualitative factors that are also very important in the economic appraisal of a project and should be identified. These include environmental considerations, social and regional impacts, resource availability, marketing prospect, funding, distribution of benefits and costs, which also need to be taken into consideration.

5.7 CONCLUDING REMARKS

The basic philosophy behind economic appraisal is to maximize social benefits from spending of the public money. Although this technique is used mostly in public sector and public utilities projects, the same is often used for private sector projects also. There are instances that private sector organizations (nongovernmental organizations – NGOs) carry out corporate social responsibility (CSR) and promote healthcare units, educational institutions, etc. Economic appraisal of projects will be useful for such organizations also.

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