COST - BENEFIT ANALYSIS

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Cost - benefit analysis (CBA) is a method that is used for making investment decisions in public and private sector, and comparing benefits and costs resulting from the investments. This method attempts to determine present value of potential benefits and costs of any intended investment, and selects the project with the most benefits by comparing various projects designed for the investment.

CBA intends to identify the compatibility of proposed projects in developed and developing countries to the macroeconomic policies. This analysis helps deciding how resources are allocated based on the activities and whether public and private sector investments are applicable. In this regard, effects of public projects are addressed at the national (macro) level while those of private projects are evaluated at the business profitability (micro) level.

CBA identifies the issue to be resolved, and puts forward alternative solutions. It then measures potential benefits, costs and other effects of each alternative systematically and consistently, and submits results to the decision - makers' attention. Thus, the CBA is actually a decision - making instrument. The analysis shows clearly what the effective policy is. The suggested policy can include making no regulation, less regulations or more regulations.

Being recognized as a technique of project analysis and assessment, the CBA method is consulted by many countries in making investment decisions. What makes this method important and valuable is that it anticipates effective and optimum allocation of economic scarce factors in meeting a broad range of human needs. There is no single method for the analysis to be adopted in every country. Conducting the CBA for which regulations, at what scale and how, varies depending on the administrative, legal and cultural structure of each country.

CBA is the most advanced activity work in public sector. CBA may assist government to:

- Decide whether a proposed project or program should be undertaken;
- Decide whether an existing project or program should be continued;
- Choose between alternative projects or program;
- Choose the appropriate scale and timing for a project; and
- Determine regulations affecting the private sector.

The basic principle of this method is to take steps where benefits outweigh costs. In practice, however, various obstacles and limitations inhibit taking such steps. The most prominent of these limitations is the lack of resources. Due to the shortage of resources, certain steps with more benefits than costs may not be taken.

CBA has to address social benefit as well as social cost. To identify the social benefit, net total of benefits from various areas of the project needs to be counted. In order to find out the benefit of project, one needs to compare the circumstances where the project exists and where it does not exist. The first theoretical study to assess a public sector investment project in terms of “net social benefit” was conducted by French engineer Jules Dupuit in 1844. Dupuit used the concept of “consumer surplus” in his article to suggest that the contribution of investments such as bridge and road construction to social welfare could not be measured with the monetary income they provided to the national treasury.

Although theoretical foundation of the analysis reaches back this far, it started to be used in 1930's as a decision - making technique and efficiency criterion in public sector investments. CBA was first used in the USA by the "Flood Control Act" of 1936, but the act did not bring any important innovation to the cost and benefit assessment. This analysis was also used in a highway project in 1937. CBA gained importance as the idea that state needed to claim more producer and investor roles in economy of the developing countries during the process of development became widespread in 1950's. The first important practice in the UK was in London - Birmingham highway project in 1960, and then in London subway construction in 1963. The coverage of CBA was expanded in the USA, when Reagan became president in 1981, to include education and health areas in addition to large infrastructure projects.

The main objective of the CBA is to help decision - makers in governing the resources so as to provide the highest benefit for the society. CBA is an investment criterion indicating that the social benefit or social welfare is maximized, and proves that the resources are directed to the most preferred usages of the society. The fact that public institutions within the state budget make the most effective and efficient preferences for expenditure and investments plans is closely related to the achievement of effective resource allocation and fair share of income. In this regard, the CBA is a special practice of the resource allocation theory.

Measuring the Cost - Benefit Analysis

The most important element of the CBA is to measure the benefits and costs. The first stage of the CBA is to identify the benefits and costs. The second stage is to make basic quantitative estimations while the third includes the expression of benefits and costs in terms of currency. A certain interest rate is discounted after the benefits and costs are expressed in monetary terms, by which the present value of the investment project is obtained.

Benefit of a commodity for an individual is the highest price that the individual would accept to pay. Total benefit of a project is the total highest price that all beneficiaries of the project would accept to pay in return for the services they receive in the project. Benefit of public services corresponds to the highest amount (amount paid + consumer surplus) that the individuals would accept to pay for them.

The concept of cost does not only cover those which are faced as the expenditures or by the investing institution, but defines them for the overall economy. The costs faced by the institution(s) that carry out the project are defined as direct costs while those which are faced by other individuals or institutions are defined as indirect costs. Calculation of the cost needs to account for both types of cost.

When deciding for an investment, it is deemed to be feasible if the present value of benefit (B) is greater than the present value of cost (C). Thus, the present value of an investment project is obtained through deduction of a certain interest rate from the resulting net benefit.

Net Benefit (NB) = Benefit (B) – Cost (C)

$$\text{Present Value (PV)} = \frac{\text{Net Benefit (NB)}}{\text{d (Deduction Rate)}}$$

These formulas are explained with an example below. Assume that the estimated annual return (B) of an investment project with an infinite life is $150,000 and annual cost (C) of the project is $ 50,000. This means that the project's net benefit (NB) is $ 100,000. In case a certain interest rate, e.g. 10 %, is deducted from the net benefit, the project's present value (PV) would be calculated as $ 1,000,000. If

this investment project requires expenditure below $ 1,000,000, then it is feasible to carry out. If it requires a greater amount of expenditure, it is better to cancel the investment.

CBA incorporates serious practical concerns in defining both cost and benefit, their coverage, and expressing them quantitatively. For example, assume that the public project in question includes the transition to rail system to resolve urban transportation issue. When assessing the benefits of project, it is important to consider the ticket sale incomes as well as the benefits of shortening the journey times and counteracting the traffic congestion in the society. Similarly, it is not sufficient to consider only the land expropriation, construction and operation expenditures as a cost factor in an airport construction project. In addition, it is needed to take account of the noise caused by airplanes and environmental degradation as factors that lead to welfare loss.

Fields of Application

Public sector and private sector act with different purposes when evaluating the investment alternatives. As a matter of fact, private investments aim at profitability whereas the main purpose of public investments is to maximize welfare level of individuals in the society, instead of earning revenue (profit) for the state budget.

CBA is the comparison of earnings or loss of welfare of the society as a whole from a project. This method of analysis is more applicable in public investments. Production of public goods and services to meet social needs requires both investment and current expenditures whereas the cost - benefit analyses were developed more for investment projects, and current expenditures were neglected. The basic reason for that is, because the service obtained from investment expenditures cover a long term, decisions to be made binds the future for while, and the costs of discontinuation are high in case the mistake is found out. However, if there is any ineffectiveness in current expenditures, it is easier to immediately cut off these expenditures and transfer the resources to the financing of other public needs.

CBA are typically applied for the public projects with a calculable market value. These analyses previously applied for only waterworks but then used frequently in physical infrastructure investments such as transportation projects (highway, subway, port construction, etc.), social infrastructure projects such as health, education as well as projects related to research, residential sector, cities and environment. CBA plays an important role, especially in measuring the effects of changes in health policies.

In some countries, the use of CBA when making capital market regulations is made a matter of regulation. The capital market is one of the sectors that have the most extensive regulations and involve the greatest number of individuals and institutions, which are affected by the regulation. If the regulations made in these markets are not properly carried out or not applicable, the system fails and the sector and investors face with major costs. Moreover, costs arising from the responsibilities such as information generation, storage and reporting for the purpose of public disclosure and scrutiny are high in such a market where direct financing applies. Therefore, it is of great importance to conduct cost - benefit analyses in order to increase the quality in financial regulations and the costs of compatibility to them. Through the measures to be taken and policies to be applied, it is possible to minimize the costs undertaken by millions of investors and thousands of companies and capital market organizations. As a matter of fact, one of the reasons behind the establishment of autonomous ‘regulatory’ bodies for these markets is to make relevant, effective and transparent regulations. Therefore, for example, the Financial Services Authority (FSA) in the UK, which is responsible for regulating financial markets, is also held responsible, by the Financial Services and Markets Act, for conducting the CBA and publishing the results of analysis in the form of report.

Keywords

Cost - Benefit Framework; Utility Function; Welfare Economics