

COST – BENEFIT ANALYSIS GENERAL FRAMEWORK: CONCEPTS AND KEY ELEMENTS

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Abstract: *This research is focused on the general framework of cost-benefit analysis, emphasizing its concepts and key elements that ensure a proper use of the method taking into account the limited character of public resources. Since the decisions process on public resources' allocation aims at enhancing the social decision related to efficient allocation of public resources wich are often reduced, the instrument used in the selection process of alternative policies, programs, projects or regulations is cost - benefit analysis (CBA). Although in practice the analysis involves several complex economic and financial calculations, economists sometimes resort to methods of empirical study. In this respect, we considered necessary to identify and analyze the elements and key concepts used to achieve a proper cost-benefit analysis.*

Key words: *cost – benefit analysis, economic welfare, public decision process, public investments, resource allocation*

INTRODUCTION

The decisions process on public resources' allocation aims at enhancing the social decision related to efficient allocation of public resources wich are often reduced. The instrument used in the selection process of alternative policies, programs, projects or regulations is cost - benefit analysis (CBA).

In this respect, the paper is focused on the general framework of cost-benefit analysis, emphasizing its concepts and key elements that ensure a proper use of the method taking into account the limited character of public resources.

MATERIALS AND METHODS

Nowadays, with the interest of researchers to trace the foundation and guidelines on the methodology of CBA, the scope of the method has been extended and is recommended for all types of projects involving public funding since the economic evaluation is the only method that allows comparisons between projects in different areas based on performance indicators.

A literature study indicates the existence of a single CBA type classification criterion - the moment of its developement (Chavas, JP, et al., 1986). In table 1 below we compared the types of CBA depending on the categories of information provided.

Table 1

Comparison of CBA types according to the information provided

| Types of information sought | Types of CBA | | | |
|--|--------------|------------------|-------------|--------------|
| | Ex ante CBA | In media res CBA | Ex post CBA | Compared CBA |
| Resource allocation decision process | √ | √ | | |
| Efficiency Project | √ | √ | √ | |
| Potential benefits of similar projects | | | √ | |
| CBA effectiveness (omission errors, prediction, measurement) | | | | √ |

At a first glance, cost-benefit analysis seems a simple exercise that involves comparing current and future costs and benefits and choosing the public investment project

with the positive net present value or choosing the project with the highest positive net present value when only one of the projects will be implemented (Văcărel, I., 2004). Although in practice the analysis involves several complex economic and financial calculations, economists sometimes resort to methods of empirical study. Thus, it is necessary to identify and analyze the elements and key concepts used to achieve a proper cost-benefit analysis.

RESEARCH RESULTS

The literature review indicates a multitude of definitions for CBA, irrespective of the mode of expression, reflecting a common vision on the concept: Cost-benefit analysis is a technique that analyzes previous projects proposed or adopted to determine whether their implementation is of public interest or to choose between two or more projects exclusively reciprocally (Zerbe, RO, Bellas, AS, 2006).

The coordinator principle of cost-benefit analysis is an economic one, understood in its global sense: resources are allocated efficiently when driving to maximize total social benefits (Pantea, M., Gligor, D., 2012), the purpose of cost-benefit analysis being to determine whether an appropriate level of public spending can produce a greater benefit than another destination (Sugden, R., Williams, A., 1978).

Our process of identifying key considerations for achieving a cost - benefit analysis is based on one of the most accurate ways of defining the methodology, namely that of Prest and Turvey (1965) who consider that CBA is a practical way to assess projects' opportuneness by involving both a long-term vertical approach (in the sense of identifying the repercussions that may arise in the future) and a broad, horizontal one (in the sense of including all categories of people, industries, regions and so on over which the achieved project's effects impact). This definition suggests focusing our attention on key features and key points of cost - benefit analysis, as follows:

a) Evaluation of public investment opportunity (horizontal approach)

In the private sector, in order to evaluate the effectiveness or usefulness of several alternative investment projects, the decision maker uses the market price mechanism. In economic theory, the value of all activities, namely the allocation of resources to these various activities is achieved through the use of market prices. In short, the theory says that if all goods and services are sold at affordable prices both by consumers and by bidders or manufacturers, and there is an organized system of markets accessible to all, then the resources will be allocated efficiently in the sense of maximizing consumers' welfare (or in other words ensuring mutual satisfaction).

In practice, there are imperfections in the market price mechanism. However, the final decision maker is able to classify different investment projects in terms of efficiency and profitability by comparing the input and output of each alternative project.

When allocating resources in a market maximizes the total welfare then the allocation is considered efficient. Economists judge alternative allocations of resources in terms of efficiency, namely whether or not the allocation maximizes total welfare. It is considered that in an efficient allocation, the units of good consumed are allocated to consumers who cherish it the most and are produced by manufacturers with the lowest cost or, in other words, the total surplus is positive.

Regarding the public sector, the main problem is that the market price mechanism can not be used in most cases. For a market to function, traded goods and services must be identified and appropriate, the product can be provided to some people but refused to

others (Newton, T., 1972). In this case, an individual producer can sell his product to consumers willing to pay the market price, while those who choose not to purchase the product do not appreciate its utility.

The category of public goods, whose utility can not be restricted to people who are willing to pay to get them (Băbăiță, I., et al., 2005), is a special case of the public sector. In other words, an investment that produces these goods should benefit everyone, whether they were paid for or not. Transport infrastructure, health, education etc. are examples of public goods that can not be sold based on the willingness to pay.

All these examples show that public goods may have a high and different value for each person, the benefits of having such a good often exceeding the total cost. However, a person is expected to benefit from public goods whether they pay for them or not, they may decide not to pay and therefore receive no cost. Since it is impossible, and certainly unprofitable for a private contractor to operate in this situation, public authorities intervene and provide public goods and services recovering costs through taxation.

The main concept in cost - benefit analysis, which distinguishes it from other investment evaluation techniques, is described by Prest and Turvey (1956) as a horizontal or wide approach. This means that a decision in one area of the public sector will affect several areas or different areas of the same sector. All these external effects are relevant to the initial decision and will be considered as additional resources involving public authorities.

There are also effects which are usually omitted called social repercussions. In this respect, the decision-making process poses both private and public welfare issues, the potential differences between the two sectors will be eliminated by the intervention of public actions. This distinction between private costs and social costs is the basis of cost - benefit analysis.

Thus, public investment opportunities must be approached from a social point of view and not a financial one due to the nature of goods that cause a divergence between the expected benefits of an entrepreneur (private, financial benefits) and the correct way to measure total benefits referred to further as social benefits.

b) Identifying and quantifying costs and benefits

The first step in developing a cost - benefit analysis is to identify all relevant costs and benefits of the considered investment project.

Currently, there are different classifications for types of costs and benefits, such as: private, social, direct, indirect, etc. However, only two distinctions are necessary, namely between efficient and inefficient costs and benefits and between costs and benefits measured in terms of GDP or any other efficient or effective effects.

Cost - benefit analysis is mainly concerned with the efficiency effects of public investment projects. Thus, two types of effective costs and benefits can be distinguished: those that directly express their effects on GDP (often measured in terms of market prices) and those that can not be related to a change in GDP such as for example loss of comfort.

Clear identification of all relevant effects of an investment project is a very complex process since the effects can be infinite. From a practical standpoint, it is impossible to identify all relevant costs and benefits, however major impacts of a project can be identified.

The most important aspect in formulating an appropriate framework to develop a cost - benefit analysis and identifying the costs and benefits need to be taken into account is the delineation of key points. Such a key element may be the geographical aspect of a project.

Thus, a transport infrastructure project will not only benefit local residents, but also the road's users or a shopping center's redevelopment in a city imposes real costs on the occurrence of other shopping centers in nearby cities.

Another key point can be considered the number of different sectors of the community for which it is necessary to analyze the potential costs and benefits. For example, the construction and operationalization of a new metro line affects at first glance its users in terms of recovery time and comfort. However, the most significant impact of this investment occurs on road users receiving such a road traffic congestion due to the redirection of part of the metro traffic.

All of these costs and benefits, once identified, need to be measured or quantified. Regarding the key points above, quantification is not a relevant criterion because by including only the measurable elements in the analysis, the inconvenient of selecting a project with real social disadvantages occurs.

Thus, in developing a cost - benefit analysis, the significant problem is the quantification of the costs and benefits identified.

Earlier, we suggested calculating profit for investment projects, based on the idea that both costs and benefits derive from market prices (benefit is the maximum amount that an individual is willing to pay for a good). We also noted that most goods and services produced in the public sector have a given market price. In this regard, when the effects of a project are estimated, they should be given a monetary value based on other information. As the benefit for a person can be defined as the maximum amount of money that he is willing to pay for a given quantity of a good, this value should be attributed to each individual. In other words, to objectively evaluate the benefits, it is necessary to build a demand curve for that good.

There is a limited number of sources of information needed to assess the expected benefits: market, individuals and individual evaluations. The analysis' objective is to obtain a social surplus estimate and determine the real value. Therefore, a natural starting point is to ask a large number of individuals to be prepared to pay for the project.

The willingness to pay concept refers to the amount that consumers are prepared to pay for final goods or services (Layard, R., Glaister, S., 2003). If a consumer's willingness to pay for an asset exceeds its price, the consumer enjoys a rent (consumer surplus).

The concept of consumer surplus and its use as an objective to be maximized is based on the assumption that markets are perfect anywhere in the economy. Since this principle isn't always applied, we consider it necessary to avoid market prices in a cost-benefit analysis and replace them with shadow prices (prices that account the opportunity cost of goods, different from current market prices and regulated tariffs), which more accurately estimate the real cost of resources in terms of willingness to pay.

c) Impact of time

Based on Prest and Turvey's definition, we observed the importance of approaching the investment decision process in a long term manner, since public and private investment costs and benefits do not occur immediately but over time.

Time preference theory states that people prefer to consume today rather than in the future and pay in the future as opposed to the present.

Developed by the Austrian economist Eugen von Bohm - Bawerk (1922), time preference indicates consumer's desire to benefit from a good or a service now than in the distant future. There is no practical distinction to demarcate "high" or "low" preference only comparisons between persons either individually or aggregated. Thus, a person with a

high preference for personal satisfaction is entirely focused on the present and immediate future, while a low-priority person focuses on well-being in the distant future.

It is thus reasonable for the society as a whole to show the same preference in making public investment decisions or, in other words, update benefits by applying a discount rate. Methods based on discounting contribute to assessing the effectiveness of investment projects in an objective manner. Comparisons between investment costs and profits generated by the project is achieved by eliminating the influence of time, bringing all operations at the same time reference.

The discount rate is set at the average interest rate adjusted for inflation and risk premium (equity financed investment) or the weighted average cost of capital that takes into account economic and financial risk.

For this reason, the costs and benefits associated with any investment must be discounted to present value to reveal a real comparison between costs and benefits over time.

CONCLUSIONS

Based on our literature study, we drew the following conclusions regarding cost – benefit analysis framework:

1. CBA is an analytical tool that helps decision makers in allocating capital - resources effectively.

As stated, the problem of an optimal allocation of resources is based on two aspects: the scarcity of productive resources and the unlimited and continuous nature of human needs. In this context, cost-benefit analysis allows decision makers to allocate resources for a project as long as the marginal social benefit exceeds the marginal social cost, thus facilitating a more efficient allocation of society's resources. The method's strength is that it offers a logical and coherent framework to decision-makers in order to analyze the provided information that is actually an element of decision.

By accounting the consequences of a decision, the decision maker will consider the impact on the society and will identify who are the main beneficiaries and losers for various alternatives considered, both from a geographical and temporal perspective.

2. CBA involves identifying and measuring in monetary terms all positive (benefits) and negative (costs) effects of an intervention.

What distinguishes the cost-benefit analysis from the other methods of economic evaluation, as we emphasized in this paper, is that this method takes into account non-monetary items derived from the environmental impact, not only from a monetary classical point of view. CBA assigns monetary values to each input and output of a project which are then compared. In a primary sense, if the value of the benefits is greater than that of the cost the project is deemed worthy and should be executed.

Assigning a monetary value to each impact identified is a relative phase, often difficult to achieve, because some of these consequences have similar characteristics to market goods or services for which estimates can be obtained. If relevant, cost categories are usually readily expressed in monetary terms but social benefits often have no market value and therefore are difficult to quantify. Traditionally, costs and benefits are assessed by considering the difference between "with project scenario" and an alternative scenario: "without project scenario " (the so-called "incremental approach").

3. CBA analyzes an intervention's impact on the society.

A project's impact is required to be assessed against predetermined objectives and this analysis is usually accomplished by taking into account all individuals affected directly or indirectly by the investment.

By evaluating a project based on microeconomic indicators, CBA can assess the degree of compliance with specific macroeconomic objectives.

The level of analysis used in CBA should be defined in relation to that part of the society for which the project has a relevant impact. Costs and benefits can be paid and collected at different geographical levels, so it requires a decision upon which costs and benefits should be taken into account. Usually, this depends on the size and scope of the project.

4. CBA proves its usefulness mainly in the public sector.

Ruben P. Mendez (1992) believes that cost-benefit analysis is a method of evaluation of public investment projects more developed than the analysis of business profitability, but not rigorously applied.

In the case of public investment projects, institutional organizations do not pursue profit maximization, as in the private sector, but they aim to maximize social welfare, which is manifested by health insurance, national defense, law and order, education, road construction etc. In this case, the purpose of CBA is to determine if a certain level of public spending can produce a greater benefit than if those funds would be used for a public program or the alternative would have been diverted to the private sector.

The use of cost-benefit analysis in the public sector is supported fervently by many scholars, but the public sector usually manifests an attitude of rejection since the method is very complex due to the existence of future costs and benefits as well as social benefits difficult to assess by conventional methods.

In conclusion, although the CBA topic remains controversial and widely debated in the literature, the usefulness of the method in maximizing the welfare of a society through efficient allocation of public resources makes it the recommended method of evaluation of public interventions.

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