IDENTIFICATION AND CONTRIBUTION OF EXTERNALITIES WITHIN COST BENEFIT ANALYSIS FOR INVESTMENT PROJECTS

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Abstract: *The concept of externalities has been well defined in welfare economic theory than half a century, experts who has addressed this issue are trying to maximize the individual and social welfare through an optimal allocation of resources. A correct definition of externalities say that they are: costs and benefits that appear when socio-economic activities of a group of persons have an impact on another group and the first group fail in claiming complete responsible to its impact. We usually meet externalities in any area of economic activity, it also can be defined as third-effects (or spillover) arising from the production and / or consumption of goods and services for which is not paid an appropriate compensation. In this context, cost-benefit analysis is a technique for assessing monetary social costs and benefits of a capital investment project along a given period of time.*

Key words*: Externalities, Cost-benefit analysis, Intangible effects, Economic evaluation*

INTRODUCTION

When prices mechanism does not take into account the full social costs and social benefits of production and consumption, externalities may cause market failure, actual market prices do not reflect the full costs or benefits of producing or consuming an one product or one service. Thus, an externality is a cost or a benefit undelivered through prices, incurred by a part who has not agreed to the action which causing this cost or benefit. In this case, the benefit is called a positive externality or external benefit, while a cost is called a negative externality or external cost. These external costs and benefits are opposed of classics costs and benefits as operating costs or revenues from the sale of energy (called internal or financial costs - nature of these costs is that they are paid at a price determined by the market and this price reflects all actual costs of the goods or services). In the process of economic evaluation of externalities generated by projects financed from structural funds, in particular the investments made to stimulate regional development and growth, innovation and increasing of production, environmental sectors, transportation and infrastructure efficiency, the methodology used is based on replacement cost method. Economic evaluation of externalities is a difficult process done in the following stages: identifying its many effects, effects quantification in physical terms and effects evaluation in economic terms. Many of these projects effects are represented by externalities (intangible effects) which has no prices as a result of not existing market for them. The term "externality" refers to the fact that this effect is outside of the market.

This paper attempts to identify the most important types of externalities that should be considered when developing a project, taking into account that the quantification of

externalities (both positive and negative) is a comprehensive approach which involving the use of econometric tools and many key variables. The objectives of this paper are to identify and propose, a minimum set of positive and negative externalities that should be considered when developing cost-benefit analysis for a project, by type of investment framework, whether they are measurable and monetized or not.

Principles of cost-benefit analysis (CBA) are simple:

1. Evaluation of a project - is an economic project evaluation technique, widely used in projects funded by companies and governments;

2. Incorporating externalities into the equation - may include, where appropriate, the wider environmental social impacts and economic costs and benefits "private" so that externalities are incorporated in the decision process, being able to estimate the welfare effects of an investment .

MATERIALS AND METHODS

POSITIVE AND NEGATIVE EXTERNALITIES

Monetization externalities should be performed when there are external benefits or costs, and they are not included in the financial analysis, or are captured by using conversion factors. The most relevant examples are represented by environmental projects impact, positive or negative, to save lives in case of investments in health, time savings for investment in transport. In most cases, identification and quantification of these externalities are extremely difficult, and often monetization is not possible because the long term effects that may arise.

Monetization externalities can be achieved by using the method of willingness to pay (WTP) estimating a monetary value through revealed preferences studies - questionnaires or stated preferences - studying a statistical summary in comparison with similar behavior observed in other markets .

It is considered that there are externalities for each proposed project, and they depend on characteristics of the project.

Method "willingness to pay" allows estimation of a monetary value through user preferences, disclosed or reported. Where this method is not possible or relevant long-term marginal cost (long-run marginal cost - LRMC) can be standard accounting rules. Usually, the WTP is higher than the empirical estimates LRM and is sometimes appropriate to make an average of them. Positive externalities or benefits will be classified as revenue and negative externalities or costs will be allocated to expenditure categories.

Examples of positive externalities:

- Advantages of reducing the risk of accidents in a congested urban area as a result of the relocation of production plant project;

- Natural persons who had administered vaccines against the flu virus. The individuals which do not are vaccinated get the benefit of a low prevalence of the virus in the community;

- The damming rivers in order to obtain electricity. Damming not only provides for flood mitigation downstream residents but also provides a range of water-related free recreational activities.

Examples of negative externalities

- Water pollution by sectors that adds poisons in water, affecting plants, animals and people;

- Unregulated fishing conducted by a fishing company in the Mediterranean depleting fish stocks available for other companies and can lead to overfishing;

- When car owners use roads freely, they impose costs of congestion and harmful emissions on pedestrians.

Another method of quantifying externalities arise, long term effects, is the inclusion of shadow prices (shadow prices) estimates from other projects or programs.

In the same context must be considered indirect effects, defined as changes in quantity or value arising on secondary markets. These effects should not be included in assessing the costs and benefits of the project whenever price appropriate accounting witness was given primary markets as irrelevant in a general equilibrium setting, and since prices are already captured by witness accounts. However, there are situations when it is necessary to include them in the project, depending on the existence of distortions such as taxes, subsidies, monopoly rents and externalities. If partial equilibrium setting indirect effects arising on distorted secondary markets should be included in cost-benefit analysis, because only on such a market they can represent costs or benefits for society.

Externalities are not easy to assess, since in some cases the full extent of their impact is not known. Currently available following assessment methods:

Treatment quality. - This method requires the description of environmental impacts described in descriptive terms such as no impact, moderate or significant impact.

Weighting and Ranking - A combination of qualitative and quantitative methods, the attribute weights and positions of externalities, in order to assess their relative environmental impacts.

Cost Control - A simpler method that quantifies an externality according to how much control or prevention.

The damage - This approach seeks to determine the amount that people are willing to pay to avoid damage or compensation related to a pollutant or the compensation that people are willing to accept in place of damage.

Adding percentages - A predetermined fixed percentage is added to (or subtracted from) the avoided cost of an option regarding the source. Percentage of added value may be determined by law, costs or cost estimates based on or related to damage control.

Emission Monetization - Used mainly on air pollutants, the current cost per unit volume of pollutant is estimated from its known environmental impacts.

Compensation analysis with multiple attributes - This method attempts to analyze the offsetting of costs and benefits of various strategies and use calitatative and quantitative metrics.

RESEARCH RESULTS

MINIMUM EXTERNALITIES FOR TAKING INTO CONSIDERATION IN SOME TYPES OF INVESTMENT

 national, regional and local transport

Cross-border projects can provide additional concessional and non-concessional funds. Positive externalities (eg., Benefits such as time and cost savings, environmental protection and trade facilitation) and negative externalities (eg. Costs such as environmental pollution, trafficking and the spread of contagious disease) consequences arise when the actions of one or more countries flows across national borders. If the countries involved not conclude cooperation agreements there will arise too little too many positive externalities and negative externalities.

The more extensive are these positive externalities border, the more are justified regional public goods, and therefore, the more solids is economic reasoning for regional cooperation.

Examples of externalities:

- Reduced travel time and transport cost
- Increasing Traffic
- Expanding trade
- Attracting Investment
- Road Accidents
- Illegal logging and deforestation

 environmental, research, technological development and innovation

To discuss how environmental policies induce technological change, let's consider a tax on emissions of pollutants in suspension - as SO2, NOx, suspended particulate matter, CO2 and other greenhouse gases. The objective of a tax on emissions is to make polluters accountable for environmental damage caused by their emissions. For now, we

presume that the fee is determined to fully internalize the environmental damage, or the economic cost of emissions.

In summary, policies to internalize the economic cost of emissions increase the directly or indirectly production of renewable electricity. The direct effect, static is due to reflecting the cost of fossil fuel electricity its negative impact on the environment, which lowers the cost of renewable energy compared to fossil fuel costs. Dynamic and indirect effects due to economic rent that renewable energy producers can win if they manage to reduce their production cost.

 social (social services, health and public safety, infrastructure for education)

Social projects involving numerous externalities, mainly positive, such as savings on health costs directly proportional to decrease the number of people affected by the disease or the number of people who has decreased the seriousness of the disease as a result of project implementation (reduce health costs for those who have avoided the disease, lower costs for hospitalization and convalescence treatment for those who were treated more effectively) avoidance losses in production, given that workers and their families tend to lose a smaller number of days.

 development of regional and local business environment and increasing energy efficiency

Developing local and regional business projects can generate various positive and negative spatial externalities affecting the existing population in a given area.

Land use in cities is subject to constant change, for urban dynamics, due to the requirement for new land use functions (such as infrastructure, recreational facilities). Potential benefits (positive externalities) of a residential area include increasing the number of targets multifunctional shopping and other residents in the neighborhood, increasing the number of public transportation options, and a possible increase in housing prices. However, there are possible drawbacks (negative externalities) of a multi-residential areas as well as inconvenience for employees who park in the area, view office buildings seen from the house and abandon the area after working hours.

 tourism (restoration of historical and cultural heritage, tourism infrastructure)

Investments in tourism specific infrastructure generates positive externalities. Investments in tourism infrastructure can support the development and revitalization of local economies. Also, while the whole area is bordered by the location where the investment is made in tourism will increase in value, land acquisition becomes costly.

 energy production and security of energy supply

Most energy projects should promote efficient energy production and sustainable use of renewable energy sources, diversification of energy networks and interconnections etc. However, most power projects generate negative externalities: the possible impact on the environment (loss of land, destruction of landscape, habitat impact) and on other types of infrastructure, particularly urban networks (negative impact on housing, the

manufacturing sectors and services, the mobility of agricultural infrastructure) cost measures need to neutralize negative effects on air, water and earth.

CONCLUSIONS

Analysis and evaluation of externalities is an important tool for cost-benefit analysis, especially in low income-generating projects and significant economic benefits. There is a substantial need for additional research and have made significant efforts to determine the data required for accurate analysis.

We summarize four important aspects related externalities:

1. Determining the cost externality by normalizing it with a particular unit of service, in order to make a comparison. Ex: In a power plant, emissions from equipment used to obtain damaging the natural environment and are a potential risk cost.

2. Recognition of factors that can be measured or derived. Emission factors are derived fuel BTU unit, the heat resulting from the number of BTU per kilowatt, and the value of environmental damage can be obtained from a regulatory agency.

3. Considering this equation as one example of the many possible applications. In our example, the emission factor is multiplied by the rate of heat with the amount of damage caused to the environment, to calculate the cost of externality. Depending on the business or the situation involved the calculation of externalities must combine all external factors, both positive and negative, affected by the activities of that entity.

4. Understanding that most organizations do not take into account externalities costs in their operations (supply / demand). Externalities are costs or benefits related to operations that can not be controlled.

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