



Business and Industry Advisory Committee to the OECD

Comité Consultatif Economique et Industriel Auprès de l'OCDE

BIAC Position Paper

Cost-Benefit Analysis: The Integration of Socio-Economic Analysis in Chemical Risk Management

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Background

The benefits of chemicals in modern society are visible in everyday life. At the same time, the widespread use of chemicals has led to increasing concern over the potential effects of certain substances upon both people and the environment. Such risks are context-specific and vary substantially depending upon the substance of concern, its form, the nature of its use and level of exposure. For those substances which have been identified as having the potential for damage, a range of regulatory controls exist at both national and international levels.

The approaches adopted in setting such controls and in managing the associated risks vary across countries and regulatory agencies. One approach, which is increasingly being used to assess the risk, cost and benefit trade-offs associated with regulatory controls, is that of social cost-benefit analysis. It has long been used in fields such as transport safety, nuclear safety, flood and coastal protection, and now its application to chemical safety is also becoming more widespread. This growth in use is being driven, to a degree, by calls for more coordinated regulation at the international level (such as within the OECD) and thus the need for consistent approaches towards regulatory analysis across different countries.

Cost-benefit Analysis

Cost-benefit analysis is based on the premise that a balance should be struck between the costs involved in reducing risks and the benefits stemming from risk reductions. It provides a framework for examining the trade-offs involved in chemical safety management where these include the impacts on industry, consumers, society more generally, and the environment.

Such analyses cannot be undertaken in the abstract, but must instead take into account the specific context of each use of a potentially hazardous substance (or its existence as a chemical contaminant), the associated risks, and the costs and benefits arising from the use of alternative substances. Much work has gone into the development of a generalised framework which builds upon information provided by risk assessments and which can give a consistent structure to the analysis consisting of several steps.

Steps in Cost-Benefit Analysis

1. Identification of the risks of concern and determination of the objectives of the assessment;
2. Specification of the initial risk reduction options to be considered (recognising that additional options may be identified at later stages in the assessment);
3. Identification of the key impacts to be examined (including implications for producers & consumers, human health & safety and the environment);

4. Collection of base data on production and consumption of the chemical and on potential substitutes;
5. Review of risk assessment data on the environmental and human health risks associated with production, use and disposal of the chemicals;
6. Estimation of the economic implications of different regulatory controls, including private costs and benefits (changes in producer and consumer surplus) and social (environmental and health) costs and benefits;
7. Evaluation of the economic versus risk trade-offs associated with different risk management control options;
8. Determination of the risk reduction option of choice after peer review of the above analysis;
9. Following a period of implementation, evaluation of the cost-effectiveness and environmental benefits of the decision taken.

Depth of the Analysis

For the analysis to be systematic, it needs to address all of the costs and benefits associated with a given risk control option. For some hazardous substances issues, a considerable amount of information will exist on the implications for producers and consumers, for human health and the environment, owing to long-established use or high levels of concern with regard to a particular effect. In other cases, little information is likely to exist, particularly for newer chemicals and/or processes.

In some cases, a qualitative assessment may be sufficient to indicate how the safety benefits to human health and the environment compare with the costs to producers and other stakeholders. For most risk management decisions, however, a qualitative assessment will not be detailed enough to show whether the benefits from improved safety outweigh the costs. As a result, more quantified assessments are likely to be required, where these may take the form of either a semi-quantitative or a fully quantitative assessment.

Substitutes, Production Processes, Enforcement and Employment

For most regulatory issues, it should be possible to develop estimates of the costs and benefits involved in adopting and implementing a risk management option. Similarly, many of the economic impacts associated with the use of a hazardous substance which would fall on producers and other stakeholders may be readily calculated. These include the costs (and benefits) stemming from the adoption of substitute chemicals and/or the need to change production processes, and changes in regulatory and administrative costs where these include monitoring and enforcement. There may also be wider macroeconomic effects on productivity, unemployment and international competitiveness.

Professional Judgement

With regard to human health and the environment, risk assessment techniques can provide information on the change in risks. Where data are available on the frequency of risk outcomes, it may be possible to place a monetary value on the level of risk reduction. Specialist techniques have been developed to assist in valuation, but their application is often hindered by the lack of necessary data. Where such valuation is feasible, the expression of safety benefits in the same units as the costs of control allows the merits of the proposed regulation to be more readily evaluated and should help ensure that regulatory decision making becomes more consistent.

In general, the more quantitative the approach, the more robust the analysis is likely to be, but also the more resource intensive. The analysis of the risks, costs and benefits associated with proposed regulations inevitably involves uncertainty and requires informed professional judgements. As a result, achieving a balance between the thoroughness of the analysis and practical limits to carry out analysis is essential.

Making the Decision

The final step is then to bring together the information on changes in risks, costs and benefits in order to provide decision makers with a full understanding of the implications of proposed regulations. There is a range of techniques which can be used to assist in presenting such information, where these include the use of checklists, diagrams, matrices and comparison of results against strict criteria. Overall, it must be remembered that decision makers need documents which present the key findings in a clear and precise manner, stating assumptions, data sources and uncertainties contained within the analysis. It is essential that both the analysis and any conclusions reached are transparent.

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