

ECONOMIC EVALUATION OF TRANSPORT PROJECTS :

A COURSE ON COST-BENEFIT ANALYSIS

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Rationale and aims

Transport infrastructure projects are generally expensive and this challenges the opportunity cost of limited public and private resources. The main objective of the economic appraisal of a transport project is to identify and quantify the project's contribution to social welfare in order to assure the best use of economic resources. This course introduces to students one of the most common methods to evaluate public investments in transport infrastructure and services: cost-benefit analysis (CBA). The existence of an opportunity cost for social resources implies that society as a whole should always consider whether what it gains from the project exceeds what it might have obtained allocating the same resources to alternative uses. This is the rationale and intuition behind cost-benefit analysis. Therefore, this course is of interest for anybody interested in the economic evaluation of transport infrastructure projects coming from different disciplines: economists, engineers and other professionals in public administration.

Teaching approach

The course consists of 5 sessions, each about 90 minutes duration. Each session will focus on different aspects of cost-benefit analysis for transportation projects. A detailed outline of each session is given below. Most sessions are theoretical but frequent examples of cost benefit analysis applications are exposed to illustrate the main issues explained. Also some numerical exercises and examples will be used to show the methods main mechanics. The last session is devoted to real applications and case studies of cost-benefit analysis applied to different modes of transportation.

Main Readings

- Brent, Robert J. *Applied Cost-Benefit Analysis*. Edward Elgar Publishing, Cheltenham, UK, 2006
- European Commission (2008). *Guide to Cost-Benefit Analysis of investment projects*, DG Regional policy.
- De Rus, G (2010) *Introduction to cost-benefit analysis: looking for reasonable shortcuts*. Edward Elgar, Cheltenham, UK.
- De Rus (2010) Economic Evaluation of transport projects: Guidelines. Project: Socioeconomic and financial evaluation of transport projects. Centro de Estudios y Experimentación de Obras Públicas (CEDEX). Spanish Ministry of Transportation. Ref. PT-2007-001-02IAPP
<http://www.evaluaciondeproyectos.es/EnWeb/Results/Manual/PDF/EnManual.pdf>

Complementary readings

- Boardman, A.E., Greenberg, Vining and Weimer (2001), *Cost-Benefit Analysis*. New Jersey: Prentice Hall.
- Zerbe, Richard O., Bellas, Allen S. (2006) *A Primer for benefit-cost analysis*. Edward Elgar Publishing, Cheltenham, UK, 2006.
- Button, K.J. *Transport Economics*, 2nd edition. Edward Elgar, 1993.
- Layard, R. and S. Glaister, *Cost -Benefit Analysis*. Penguin, 1994.

Sessions: Outline and contents

Session 1. The basics of cost-benefit analysis

Contents:

Why evaluate transport infrastructure projects? What is a cost-benefit Analysis? This session starts motivating the study of cost-benefit analysis as a tool for socioeconomic assessment of government projects and policies. The information provided by a CBA can help inform the decision-making process and reduce the number of policy errors that, in the field of transport infrastructure, can involve huge amounts of public and private resources. This session covers the basics needed to understand its mechanics and implementation. This session highlights the differences between cost-benefit analysis and standard financial analysis, offering the intuition and principles of cost-benefit analysis, its sequence. Also, it covers some specific aspects of the methodology as the choice of discounting methods, decision tools and decision making processes based on cost benefit analysis.

Session 2. Monetary values for externalities and indirect impacts

Contents:

This session covers the economic (monetary) valuation of the external and indirect effects of transportation projects. These play a key role in the process of evaluating transportation projects under a cost-benefit analysis, given that the method considers the direct incorporation of those impacts caused by a project and not considered by the market. Because these impacts do not have a direct monetary valuation it is necessary to apply different methodologies and assumptions in order to transform external and indirect impacts into monetary costs and benefits that can be included in the model and be compared to the rest of monetary impacts. Among others, the session will study the economic valuation of time savings, the value of statistical lives, environmental externalities, etc.

Session 3. Forecasting methods for traffic demand and costs

Contents:

The economic impact of a transportation project depends largely on the anticipated future demand and costs for the infrastructure or evaluated transport mode. Major projects benefits are derived from reductions in the time and monetary costs of travel for existing users and an increased willingness to pay for the new travelers induced by the project. It is, therefore, essential to have a reliable method for the prediction of demand in situations with and without project. Because the main costs of transportation project depends on construction costs and operating and maintenance costs, it is also important have appropriate tools to estimate how they will evolve over time. This session includes a description of standard methodologies for forecasting demand and costs and the presentation of facts and conclusions derived from real applications.

Session 4. Risk and uncertainty in cost-benefit analysis

Contents:

Cost-Benefit analysis of transportation infrastructure projects involves the necessary treatment of future uncertainty and risk. This session offers a brief introduction to the methods used to ascertain how risk and uncertainty affect results of CBA in order to evaluate the reliability of results delivered by this methodology. Considering risks and uncertainties impels the analyst to identify and quantify sources of risk and uncertainty at an early stage of the CBA that can produce a deviation from the expected economic evaluation of a project. Explicit quantification of the imprecision of the estimated economic impact can thus lead to a deeper understanding of the problems of the CBA and contribute to a better and more reliable selection of projects and policies.

Session 5. Cost-benefit analysis: Applications and case studies.

Contents:

This session is devoted to illustrate the implementation of cost-benefit analysis to different real-life transport infrastructure and service projects. It covers different modes of transportation in order to treat specific and unique features of transport infrastructure and services. Thanks to these illustrations it is possible to see the implementation of the methods and techniques covered during the first 4 sessions of this course. This session will also include an exercise in class that requires the active participation of students to reproduce a real cost-benefit analysis for a specific investment project and the elaboration of a decision making process on different investment alternatives.

Schedule

	Monday 6th		
9.30 – 11.00	Session 1		
11.30 – 13.00	Session 2		
	Tues 7th	Wed 8th	Thu 9th
11.00 – 12.30	Session 3	Session 4	Session 5