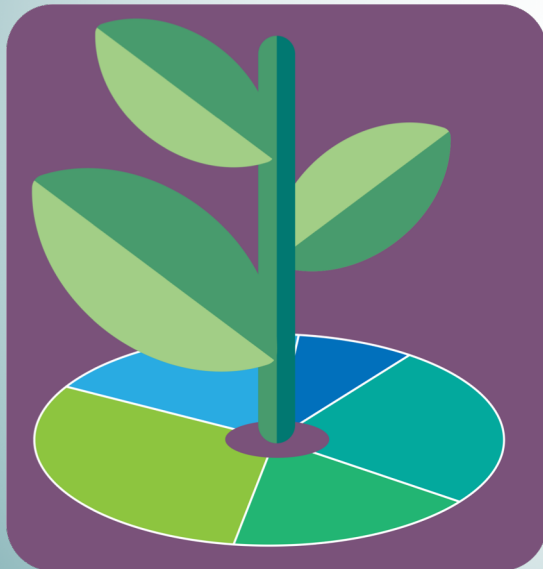


# Economics of Social Expenditure

## CHAPTER IV. ECONOMIC EVALUATION OF PUBLIC AND SOCIAL EXPENDITURE

### 4.1 Cost-Benefit/Cost-effectiveness Analysis of Public Spending and Legal Control of Public and Social Spending



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# 1 . Introduction: public spending and efficiency (I)

In Spain art. 31.2 of the Spanish Constitution establishes that the Public Sector must behave *efficiently* when spending.

## Public spending and efficiency

**The 1st element of efficiency or inefficiency is to consider the cause behind and increase in G (Public Expenditure):**

- Irregular performance Public Sector contributes to increase G.
- quality of provision of Public Services, for example, in the welfare state ( Pref. Goods supply and income maintenance).
- Unfavorable demographic evolution pressure public sector (SS, dependency, health, etc.).
- Inadequate stabilizer function (inflation, deficit, unemployment, etc.) control public sector size to control G.

**Important to control effectiveness and efficiency in G projects (public management).**

# 1. Introduction: public spending and efficiency (II)

- **Efficacy: I achieve the proposed objectives. Degree by % target reached: e.g. waiting lists, km roads, etc. Problem: It does not consider costs, benefits, or alternative methods of reaching the objective.**
- **Pareto Efficiency (PE) (Farrell, 1957): No waste, max. production for a given means or use min. means for a given level of production.**
  - 1) **Technical Efficiency (TE):** Min. means for a given level of production but with a combination of factors. Debreu and Farrell measure TE: the most accepted. It is the max fraction in  $\forall$  all inputs without  $\forall$  production.
  - 2) **Allocative Efficiency (AE):**  $\forall$  production cost to the min. of a certain unit in order to reach an adequate combination of factors according to price and productivity.

$$\mathbf{PE = TE \times AE}$$

- **TE and AE measurement techniques: Econometrics, Linear Programming (DEA-Data Envelopment Analysis and its generalizations), etc.**
- **There are different techniques to measure the efficiency of the public sector, which are different from those of the Private Sector due to prices (social cost) or their non-existence (shadow prices) and objectives (improve well-being or equity, income distribution).**
  - 2 main techniques:
    - Analysis of Social Costs and Benefits (CBA).
    - Cost-Effectiveness Analysis (or Cost - Effectiveness-CEA).

## 2. Cost-benefit analysis and welfare economics (I)

### COST-BENEFIT ANALYSIS (CBA)

- CBA is technique for evaluation public project.
- CBA tries to monetarily evaluate benefits flows and costs that are associated with each of the alternatives that are studied.
- Both cost and benefits are over time and have to be reduced to “present value” by applying a discount rate.
- Once this stage is reached, use a decision rule to choose the most efficient alternative, taking into account project risks and uncertainties and their distributive effects.

### COST-EFFECTIVENESS ANALYSIS (CEA)

- It supposes simplification of the cost- benefit analysis .
- usually applied when it is impossible to make a monetary calculation social benefits and they are calculated based on effectiveness indices (degree in which the pre-set objective is met).
- Difficulties in using these indices:
  - a ) *For public goods. in general there is no market and evaluation is done according to their cost of production. ( Ex : justice, defense,...).*
  - b) *Indicators that indicate the workload of each activity are usually used as outputs, but not the quality of carrying out that activity . ( Ex : per student, per patient,...).*

# 3. Evaluation of costs and benefits (I)

## Cost benefit analysis

- **Distinguish the evaluation of costs and benefits for which exist market prices from the evaluation of costs and benefits for which there are no market prices.**

**Shadow price** intends to offer quantification of the price, costs or benefits that reflects, the social valuation of corresponding resources, goods or services.

- **When there is a market, the shadow price is obtained from the market price, to which adjustments are made when there are market distortions.**
- **When there is no market, the valuation must resort to special techniques.**

## 3. Evaluation of costs and benefits (II)

### EVALUATION OF COSTS AND PROFIT FOR WHICH THERE IS A MARKET

*Can we simply use those market prices in the valuation of costs & benefits?*

- **Social evaluation is complicated when markets fail and divergences appear between shadow and market prices. For example, in the case of externalities or other market imperfections such as taxes, uncompetitive structures, etc.**
- **Thus, market prices should not be accepted without further consideration in the CBA and often require adjustments.**
- **The CBA approach is based on partial equilibrium analysis, not entirely inappropriate when the project is small. (*If the investment project is so important that it can affect the price structure, the method would not be appropriate since we would need a general equilibrium model*).**

## **3. Evaluation of costs and benefits (III)**

### **EVALUATION OF COSTS AND PROFIT FOR WHICH THERE IS NO MARKET**

**A) Time saving. Contingent valuation techniques (surveys and experiments s/sample users with hypothetical situations) (problems). Other options: Use leisure value.**

**B) Life Value. CEA (problems). Actuarial approach (problems). Approach political process and compensation (problems). Hedonic pricing method.**

- Analyst always aware of possible double counting.
- Life value is not absolute, but adjusted for quality.
- Available techniques only give orders of magnitude and intervals of estimates that exclude value 0.

**C) Environmental impact or other intangibles. For these, the most used methods are contingent evaluation. Travel cost method and Hedonic price method (implicit market valuation; e.g. car ABS).**



## 3. Evaluation of costs and benefits (IV)

*Profit and costs occur over time...*

- **Once monetarily valued we need to compare them to reach a decision.**
- **Value (PV) or Present (VA) of future monetary value is the maximum amount that we are willing to pay today to obtain that future monetary value.**
- **Future Value (FV) of Present Value (PV), within t years, with type of return d is:**

$$FV = PV(1 + d)^t$$

- **If what we have is a flow of values or returns that occur at time R0, R1, R2, ... , its PV will not be their simple sum:**

$$FV = R_0 + \frac{R_1}{(1 + d)} + \frac{R_2}{(1 + d)^2} + \frac{R_3}{(1 + d)^3} + \dots + \frac{R_t}{(1 + d)^t}$$

## 3. Evaluation of costs and benefits (V)

### AN EXAMPLE OF CBA (*Mankiw, 2018* )

- **Suppose you are a councilor of the City Council. Your Engineer says you can spend 10,000 euros on traffic lights at cross streets (Benefits reduce the risk of fatal traffic accidents from 1.6% to 1.1%): Spend money on a new traffic light?**
  - Cost in euros, but b<sup>o</sup> in monetary value of human lives (not infinite, but risk, not for compensation but for insuring them, eg 10 million euros). Traffic light reduces risk of death by 0.5% (1.6% - 1.1%) and expected benefits =  $0.005 * 10 \text{ million euros} = 50,000 \text{ euros}$  (Benefits).
  - 50,000 euros (Benefits) > 10,000 euros (cost) → The project must be approved.

## **4. Discount rates and decision rules (I)**

### **Discount rates**

- **There is no superior rule by which one or the other discount rate can be chosen a priori.**
- **The Economist in each CBA must make rational use of previous concepts and derive the most appropriate discount rate(s).**
- **On many occasions, presenting a reasoned outline of the pertinent decision problem.**
- **Pragmatic approach: apply a set of alternative rates and see if the result of the analysis is very sensitive to variations in the discount rate.**
- **If the sensitivity analysis indicates variations that affect results, the problem is transferred to the decision of the politician, and if the result is insensitive, there is no reason to deal with the problem.**

## 4. Discount rates and decision rules (II)

When choosing the appropriate discount rate (d) for CBA, 2 can be distinguished:

### 1- The social marginal rate of time preference (SMR)

- Rate at which the community is willing to move present consumption for the future.
- A high SMR indicates a strong preference of society for present goods over future ones and a low SMR indicates a weak preference.
- Sometimes  $t/i$  is taken as reference for the long term net of taxes, such as  $t/i$  bonds a  $1/t$  net of income tax. If  $i$ : this type of return,  $t$ : tax rate and  $p$ : SMR  $\rightarrow d = p = (1 - t)i$  or hypothesis is made from the of utility intertemporal economic agents function.
- **SMR: discount rate that makes society indifferent between consuming today and doing it tomorrow.**

### 2- The social marginal rate of return on investment / social opportunity cost (SOC)

- Rate at which community effectively transforms present resources into future ones.
- It is also defined and following the opportunity cost: type of return not obtained due to not carrying out an activity displaced by the one actually carried out.
- SOC should represent the social opportunity cost of resources.
- If  $r$ : pre-tax marginal return on investment, under the SOC approach, the social discount rate is  $d = r$ .

## 4. Discount rates and decision rules (III)

### Decision rules: *no uncertainty*

**Risk:** In cases in which the probability of outcomes and their consequences can be determined with well-established theories with reliable and complete data

**Uncertainty:** In situations situations where adequate data may be fragmented or unavailable.

- 1) **NPV (Net Present Value)**
- 2) **Benefit-Cost Ratio**
- 3) **Internal Rate of Return (IRR)**

# 5. Instrumentality of cost-benefit analysis (I)

## Decision rules: no uncertainty

$$VAN(i) = \sum_{j=0}^{t-1} \frac{(I_{ij} - C_{ij})}{(1+r)^j}$$

### 1) NPV (Net Present Value)

$$NPV = B_0 - C_0 + \frac{B_1 - C_1}{(1+d)} + \dots + \frac{B_t - C_t}{(1+d)^t}$$

$$NPV(i) = \sum_{j=0}^{t-1} \frac{(I_{ij} - C_{ij})}{(1+r)^j}$$

### 2) Benefit-Cost Ratio

- If  $B/C > 1$ , the project is acceptable.
- If  $B/C > 1$ , then  $B - C > 0$ , which is a condition of the NPV criterion

### 3) Internal Rate of Return (IRR)

- $\rho$  is that rate that equals the PV of benefits and project costs, or, what is the same, the rate that makes the NPV of the project zero. It is the project's implicit rate of return.
- The decision criterion is to accept all projects whose internal rate of return exceeds the discount rate (we will undertake a project if  $\rho > d$ ). Algebraically we can write:  $\sum_{t=0}^T \frac{B_t - C_t}{(1+\rho)^t} = 0$ ;  $(B_0 - C_0) + \frac{B_1 - C_1}{(1+\rho)} + \dots + \frac{B_t - C_t}{(1+\rho)^t} = 0$

## 5. Instrumentality of cost-benefit analysis (II)

### Decision rules: *with uncertainty*

- 1) **Maximax (or Huwicz criterion )**
- 2) **Maximin (or Wald criterion )**
- 3) **Laplace criterion (or insufficient reason)**
- 4) **mini max remorse ( or Savage criterion )**

## 5. Instrumentality of cost-benefit analysis (III)

- We examine the Net Value of 3 projects, their performance depends on the value that a certain variable adopts that varies from X1 to X3. We don't know the odds.
- Yields/results of 3 projects (A, B, C) within the table in VNP:

| Concept | X1 | x2 | x3 |
|---------|----|----|----|
| NPV (A) | 10 | 6  | 3  |
| NPV (B) | 12 | 4  | 2  |
| NPV (C) | 16 | 3  | 1  |



## 5. Instrumentality of cost-benefit analysis (IV)

1) The deciding agent, if he is **optimistic**, could well choose the **MAXIMAX**.

- This implies that, in its simplest form, choose C that provides the largest possible NPV.
- You can also assign probabilities to worst and best outcomes and being an optimistic individual would give the “best” option a higher probability.

e.g., 0.6 to X1 and 0.4 to X3. With that:

- ✓  $VNP(A) = 10 \cdot 0.6 + 3 \cdot 0.4 = 7.2$
- ✓  $VNP(B) = 12 \cdot 0.6 + 2 \cdot 0.4 = 8.0$
- ✓  $VNP(C) = 16 \cdot 0.6 + 1 \cdot 0.4 = 10.0$

→ And I would choose C.

2) If the decision agent is **pessimistic**, he would possibly choose the **MAXIMIN**.

- Thus, it will consider the worst results and choose the worst, which in this case corresponds to X3 and would choose A. “*THE BIGGEST*”.

## 5. Instrumentality of cost-benefit analysis (V)

### 3) LAPLACE CRITERION "INSUFFICIENT REASON".

- With this rule, each outcome is assigned equal probability on the basis that there is no reason to expect different probabilities. In our example, 0'33 (= 1/3 = 1/N) would be assigned.

✓  $VNP(A) = 10 \cdot 0'33 + 6 \cdot 0'33 + 3 \cdot 0'33 = 6'27$

✓  $VNP(B) = 12 \cdot 0'33 + 4 \cdot 0'33 + 2 \cdot 0'33 = 5'94$

✓  $VNP(C) = 16 \cdot 0'33 + 3 \cdot 0'33 + 1 \cdot 0'33 = 6'60$

→ And I would choose C.

### 4) MINIMAX REMORSE: the perspective of cautious decision-makers who seek to minimize errors that they may incur is addressed.

- First of all: remorse matrix is built.

## 5. Instrumentality of cost-benefit analysis (VI)

- 4) **MINIMAX REMORSE:** the perspective of cautious decision-makers who seek to minimize errors that they may incur is addressed.

*First of all: remorse matrix is built.*

| Concept | X1 | X2 | x3 |
|---------|----|----|----|
| NPV (A) | 10 | 6  | 3  |
| NPV (B) | 12 | 4  | 2  |
| NPV (C) | 16 | 3  | 1  |



| Concept | X1       | x2       | x3 |
|---------|----------|----------|----|
| NPV (A) | <u>6</u> | 0        | 0  |
| NPV (B) | <u>4</u> | 2        | 1  |
| NPV (C) | 0        | <u>3</u> | 2  |

- *Minimum of greater remorse values.*
- *Next step: select the highest remorse values for each alternative and take the minimum of them.*
- *A has maximum remorse of 6, B of 4, and C of 3, so the decision maker would choose C.*

# **5. Instrumentality of cost-benefit analysis (VII)**

## **DISTRIBUTIVE EFFECTS**

- **Important: the most direct procedure to introduce distributive judgments in the CBA is a system of weightings with marginal value with which the authority sees increases or reductions in the real income of various social groups.**
  
- **The CBA distributive question can be approached from other approaches:**
  - I. **That in projects that do not pursue explicitly redistributive goals, the social weights are ignored.**
  - II. **Instead of the laborious and debatable weighting of all costs and benefits of the different groups, it is enough to establish specific distributive objectives as objectives to be achieved.**
  - III. **Criterion of presenting the distributive effects in an organized manner, as an improvement of information for decision-making.**

# 6. Legal control of public and social expenditure (I)

## Legal control of public spending

- In the case of the Spanish public sector, since the drafting of the constitutional text, the postulates of good management, which imply the implementation of control procedures, have become evident with respect to the financial activity of the Public Administration.
- These procedures are divided by the legislation into **internal ones** , in the case of being carried out by some body/organ of the public entity, **or external ones** , when, on the contrary, the control is carried out by entities other than the one that is controlled.
- Both internal and external control, with its particularities, have a similar objective " as the activity of an economic-financial nature of public entities and, more specifically, their assessment in terms of their adjustment to the double requirement legal (in a broad sense) and economic (principles of efficiency and economy) ".

# 6. Legal control of public and social spending (II)

## Internal control

- The control of the use of public funds carried out by the **General Intervention of the State Administration (GISA)** is, without a doubt, one of the most traditional and oldest controls of all those that have been developed in Spain. Framed in the Secretary of State for Budgets and Expenditures, it is the internal control body for the economic-financial management of the state public sector and the managerial center and manager of public accounting.

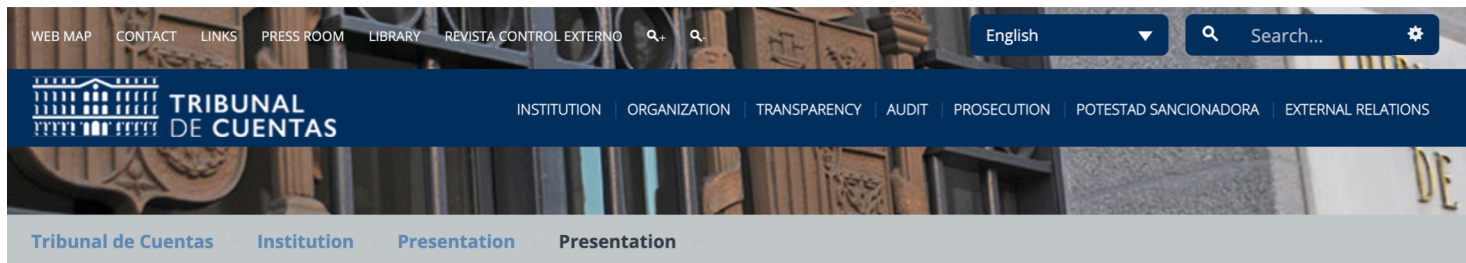
### Functions:

- Internal control through the exercise of the supervisory function and financial control and public auditing.
- The monitoring and control of subsidies and public aid established in the Law.
- The direction and management of public accounting in the terms established in the Law.
- The formation of the economic accounts of the public sector.
- Advice to management bodies derived from their control functions.
- The management of the economic-financial information derived from the exercise of its accounting and control functions.
- The relationship with the territorial treasuries for the purposes of the accounting information that must be sent for the formation of the economic accounts of the public sector.
- The planning, design and execution of the computer policy of the Secretary of State for Budgets and Spending and of the General Intervention of the State Administration, the computer support of the activities and the advice, coordination and instrumentation of the computer projects of its bodies .

## 6. Legal control of public and social spending (III)

### External control

- For the purposes of external control of the economic-financial activity of the public sector, the **Court of Audit ( CAu - Tribunal de Cuentas)** is the jurisdictional body in charge of such control.



### Presentation



The Court of Audit is the external audit body recognized by the [Spanish Constitution](#), which is configured as the supreme audit body of the accounts and the financial management of the public sector, without prejudice to its judicial function focused on the prosecution of accounting liability incurred by those who are responsible for the management of public funds. It has been also conferred the audit of the financial-economic activity and regular accounting of political parties, as well as of the contributions received by foundations and associations linked to the political parties represented in the Spanish Parliament.

It reports directly to the Spanish Parliament and performs its duties by delegating them in the review and acknowledgement of the General State Accounts. Nevertheless, the Court of Audit enjoys full independence in the exercise of its functions, being recognized by the Spanish Constitution that the members of the Court of Audit shall have the same independence and tenure and shall be subject to the same incompatibilities as judges.

# 6. Legal control of public and social spending (III)

## Court of Audit - FUNCTIONS

The two functions with which the CAu develops the external control of the economic-financial activity of the public sector are the supervisory and the jurisdictional.

- **SUPERVISORY FUNCTION:** refers to the submission of the economic-financial activity of the public sector to the principles of legality, efficiency and economy, in relation to the execution of income and expense budgets
  - it is adapted to certain procedures and its results are reflected in Reports, Motions or Notes, whose addressee is the Cortes Generales, through the Mixed Commission for Relations with the Court of Accounts.
- **JURISDICTIONAL FUNCTION:** consists of prosecuting the accounting responsibility incurred by those who are in charge of the management of public property, wealth or effects.
  - This responsibility is refined and required by means of three jurisdictional procedures (the trial of accounts, the reimbursement procedure by scope and the bond cancellation file) and the resolutions issued by the bodies of the accounting jurisdiction (the Account Counselors and the Chamber of Justice) are subject, in the cases and in the legally established manner, to appeals and review before the Administrative Litigation Chamber of the Supreme Court, thus guaranteeing the principle of jurisdictional unity and the junction of jurisdiction accounting with the Judiciary.



## **6. Legal control of public and social spending (IV)**

- **Given the decentralization of the Public Administration, the autonomies have also provided themselves with regional external control bodies (OCEX) with similar functions to the CAu but restricted to the regional sphere → 12 OF 17.**
- **The external control bodies of the Autonomous Communities will coordinate their activity with that of the Court of Audit → greater efficiency in the results and avoid duplication in auditing actions .**