



SIP/2009-WP/12
Business case

Economic assessment

**CHAOUKI MUSTAPHA, Economist,
International Civil Aviation Organization**

**Workshop on the Development of Business Case
for the Implementation of CNS/ATM Systems
(Antigua, 25 – 29 May 2009)**

Outline

- **Macroeconomic considerations**
- **Basic analysis concepts**
- **Cost benefit analysis**
- **Costs and benefits for multinational arrangements**



Macroeconomic considerations



Macroeconomic Issues

- **Insatiable demand**
- **Scarcity**
- **Choice**
- **Resource allocation**
- **Social welfare**

Trends in macroeconomic policy...

- **The objective is to improve social welfare**
- **Through sustained economic growth**
- **Avoidance of recessions**
- **Fighting high taxes and inflation**
- **Eliminate or reduce budget deficit**
- **Small government**



Trends in macroeconomic policy

- **Government out of competitive sectors:**
 - Liberalization
 - “Corporatization”
 - Privatization
- **Focus on:**
 - public services
 - effectiveness and efficiency
- **Improved governance**



Concept of a Public Service

- **Definition varies:**
 - **Geographically**
 - **Over time**

- **A service that is considered vital to the public**
 - **Continuous**
 - **Accessible**
 - **Affordable**



Economic considerations for Project Analysis & Evaluation



Project type

➤ Public

- Objective: To maximize social welfare

➤ Private

- Objective: To maximize the firm's profits



Public project

- Does the project increase social welfare?
- Cost Benefit Analysis
 - Social benefits
 - Social costs



Costs & Benefits

- **Direct & Indirect**
- **Tangible & Intangible**
- **Quantitative & Qualitative**
- **Fixed & Variable**



Partners

- Need to identify all partners/stakeholders
- Costs and benefits identified and evaluated for each partner/stakeholder



Methods and techniques

- **Cost benefit analysis**
- **Cost effectiveness analysis**
- **Least cost approach**
- **Pay-off period**
- **Snapshot approach**
- **Value analysis**
- **Others**



Basic analysis concepts



Discounting concept...

- A project lifetime spans over a long period
- Money is worth more today than tomorrow
- Costs & benefits are estimated in present value terms
- The discounting concept



Discounting concept...

➤ Example:

- Suppose that for you, one dollar today is worth 1.1 dollar next year.
- The discount rate to be used is 10 per cent
- Suppose you get a loan of 1000 dollars today and and you reimburse it in 3 yearly payments of 400 dollars
- For you the present value of the first 400 is $400 / 1.1 = 363.64$; Whereas the present of the second 400 is $400 / (1.1)^2 = 330.58$ and the present value of the third 400 is $400 / (1.1)^3 = 300.53$
- Therefore the present value of the money you will repay is $363.64 + 330.58 + 300.53 = 994.74$
- If you accept the loan, you will gain 5.26 of today's dollars



Discounting concept

➤ In general:

- The present value of an amount A regularly paid during N periods is given by the formula below:
- $$PV = A/(1+r) + A/(1+r)^2 + A/(1+r)^3 + \dots + A/(1+r)^N$$
- Where “ r ” is the discount rate



Discount rates

- Social discount rate
- Private discount rate



Discount/interest rate

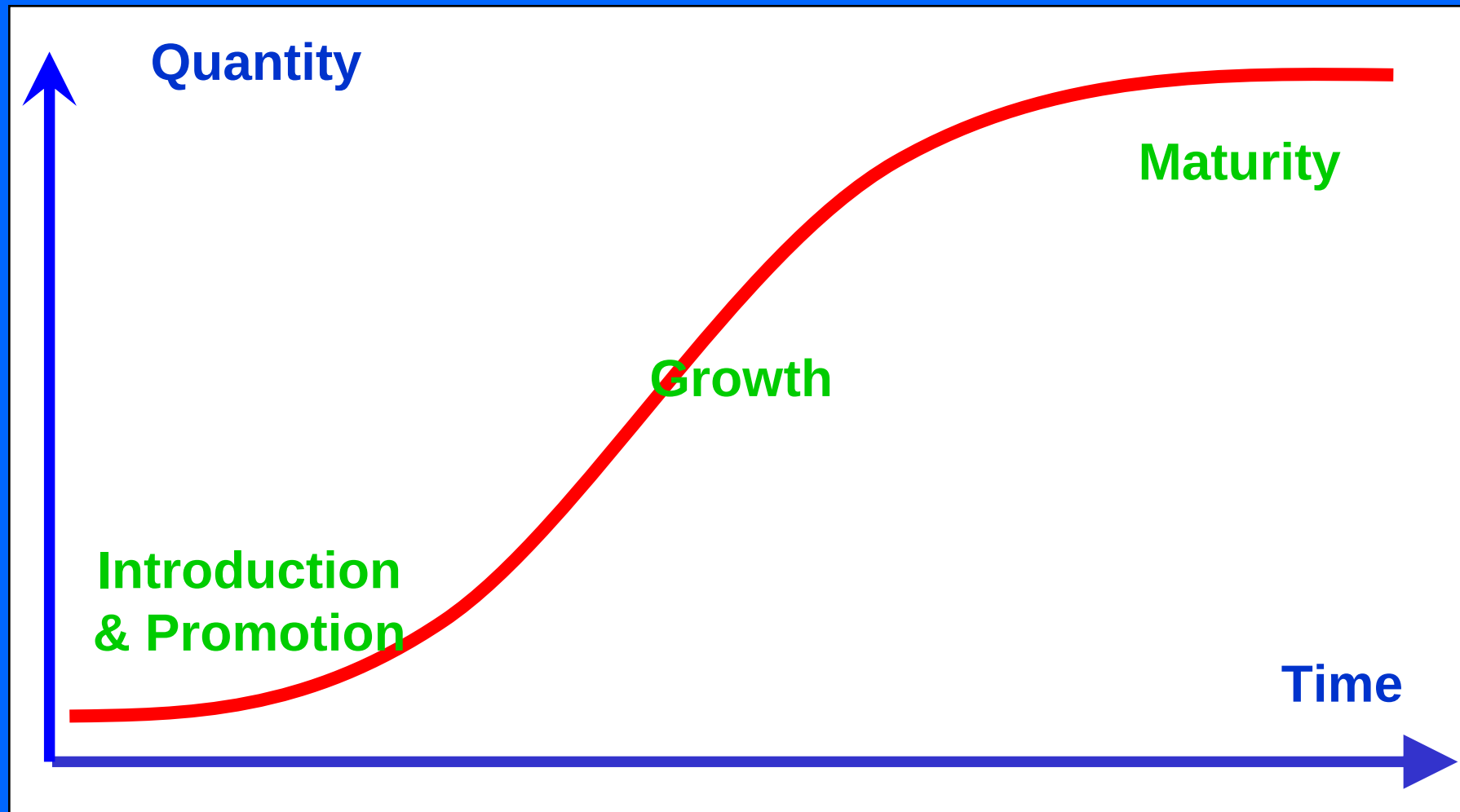
- Interest rate is related to the marginal productivity of capital in the country
- Interest rate might be related to the real long term government bond rate plus a risk premium
- Governments might have an agreed discount rate to apply to public projects



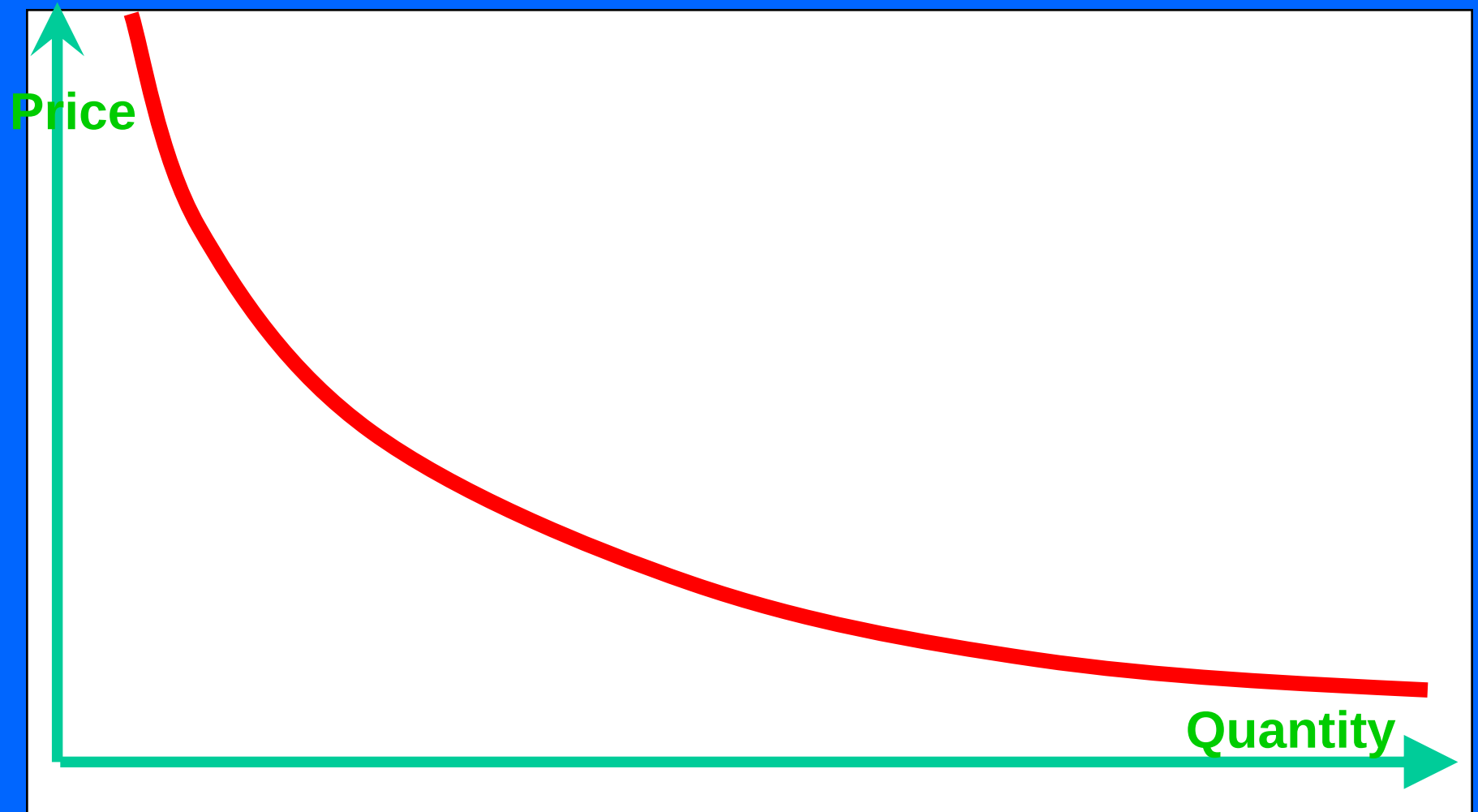
Price changes

- How are price changes treated in a CBA?
- Cost & benefits are most of the time used in constant terms (excluding the effect of price changes)
- The interest rate used for the analysis has also to exclude the effect of price changes
- Real interest rate = Nominal interest rate — Rate of inflation

Product life cycle



Demand curve





Cost Benefit Analysis



Uses of cost benefit analysis

- Gives an indication of the total economic welfare effects of a project;
- Forecast economic performance
- Compare implementation options
- Guidance on timing
- Covers all costs and benefits, both quantitative and qualitative including external costs;
- May serve for the financial analysis which has a narrower scope



Project Case

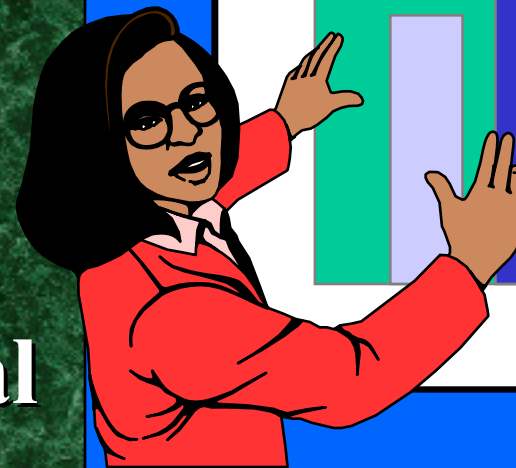
New Investment
CNS/ATM system

Base Case

Replacement Investment
Existing System

Dimensions of system performance

- Cost
- Capacity
- Safety
- Reliability
- Environmental

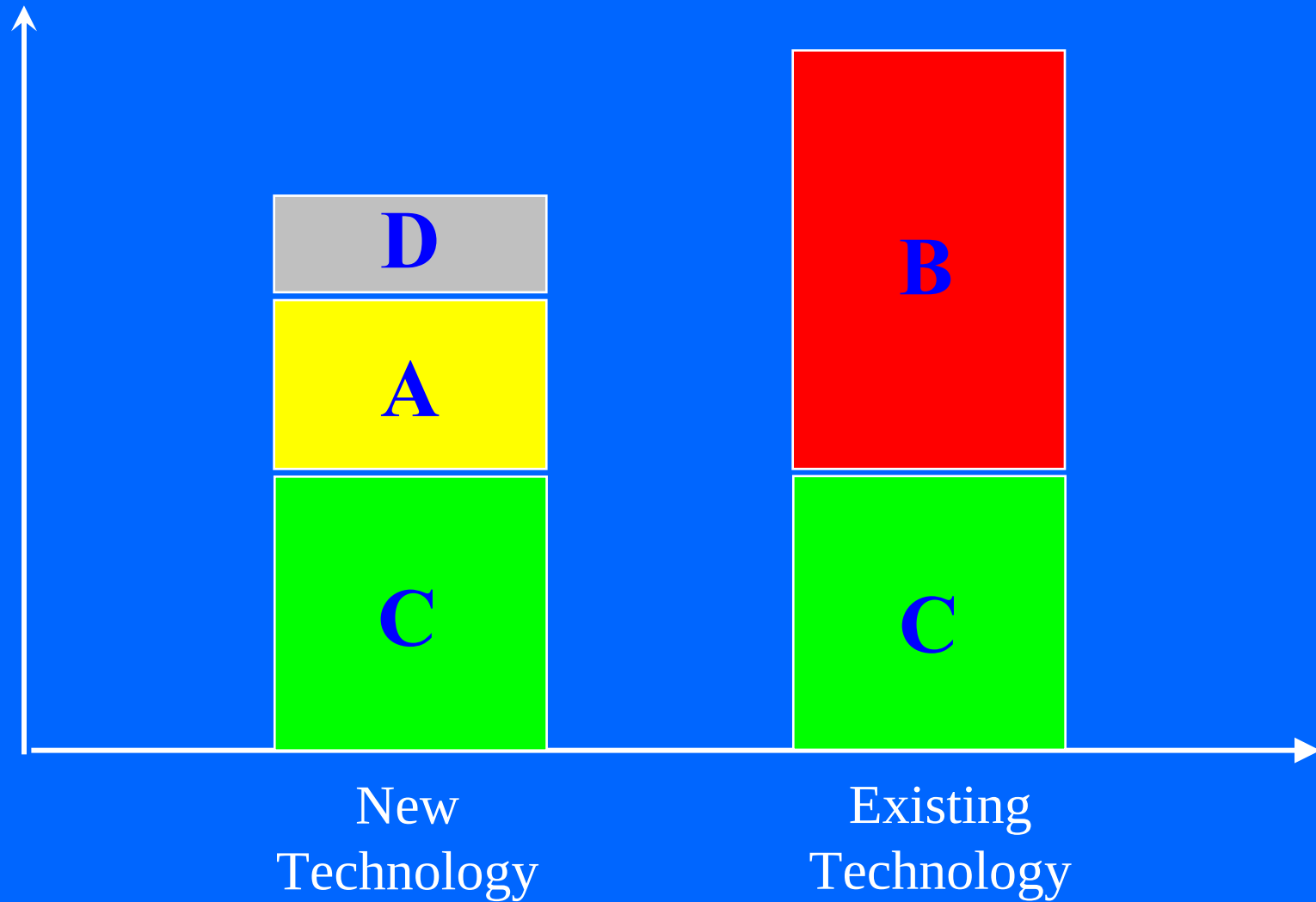




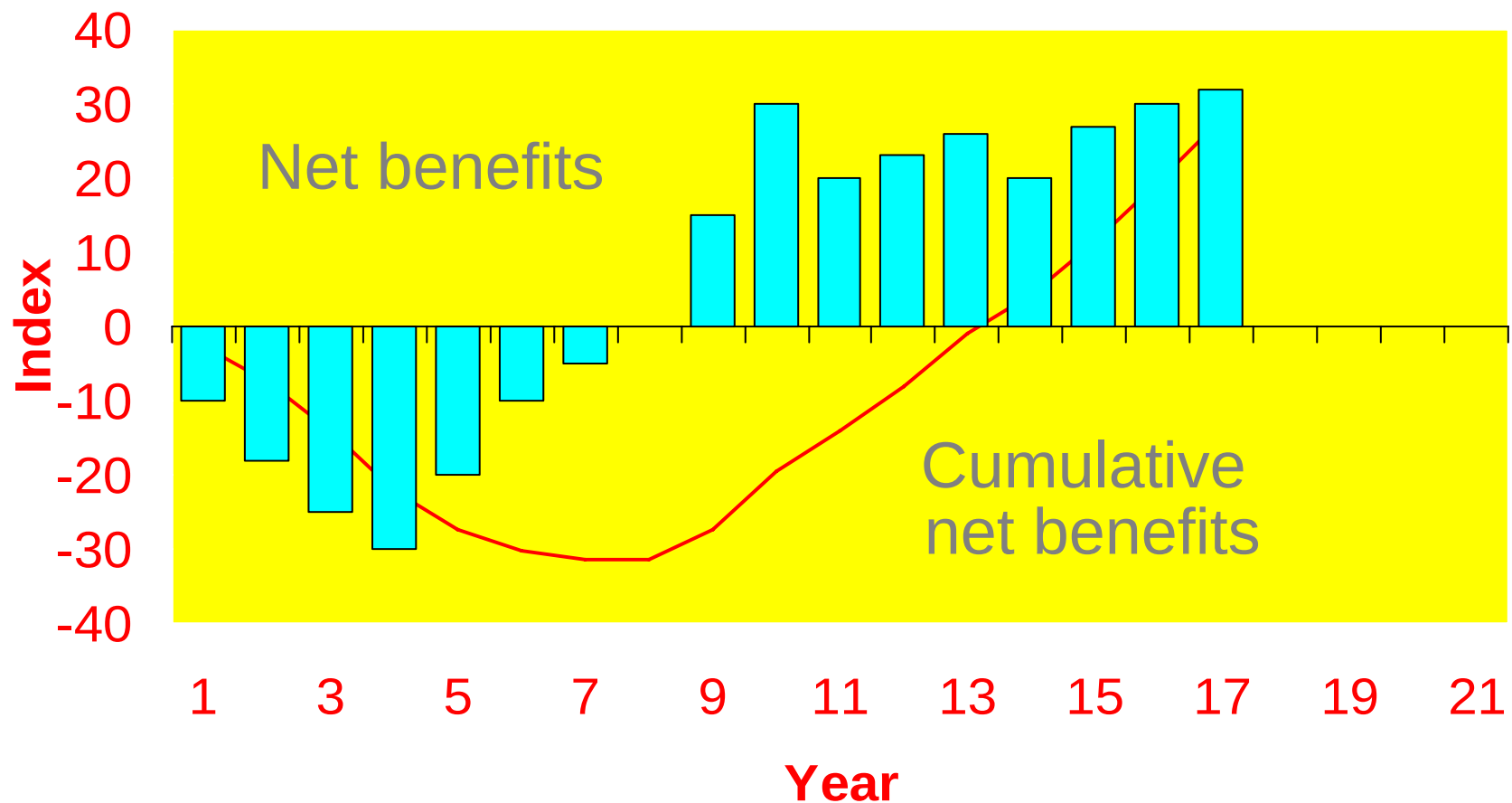
Incremental costs & benefits

- **Costs & benefits incurred only in the project case scenario or the base case scenario**
- **Alternative: Total Cost analysis**
- **To avoid redundancy**
- **To simplify the analysis**

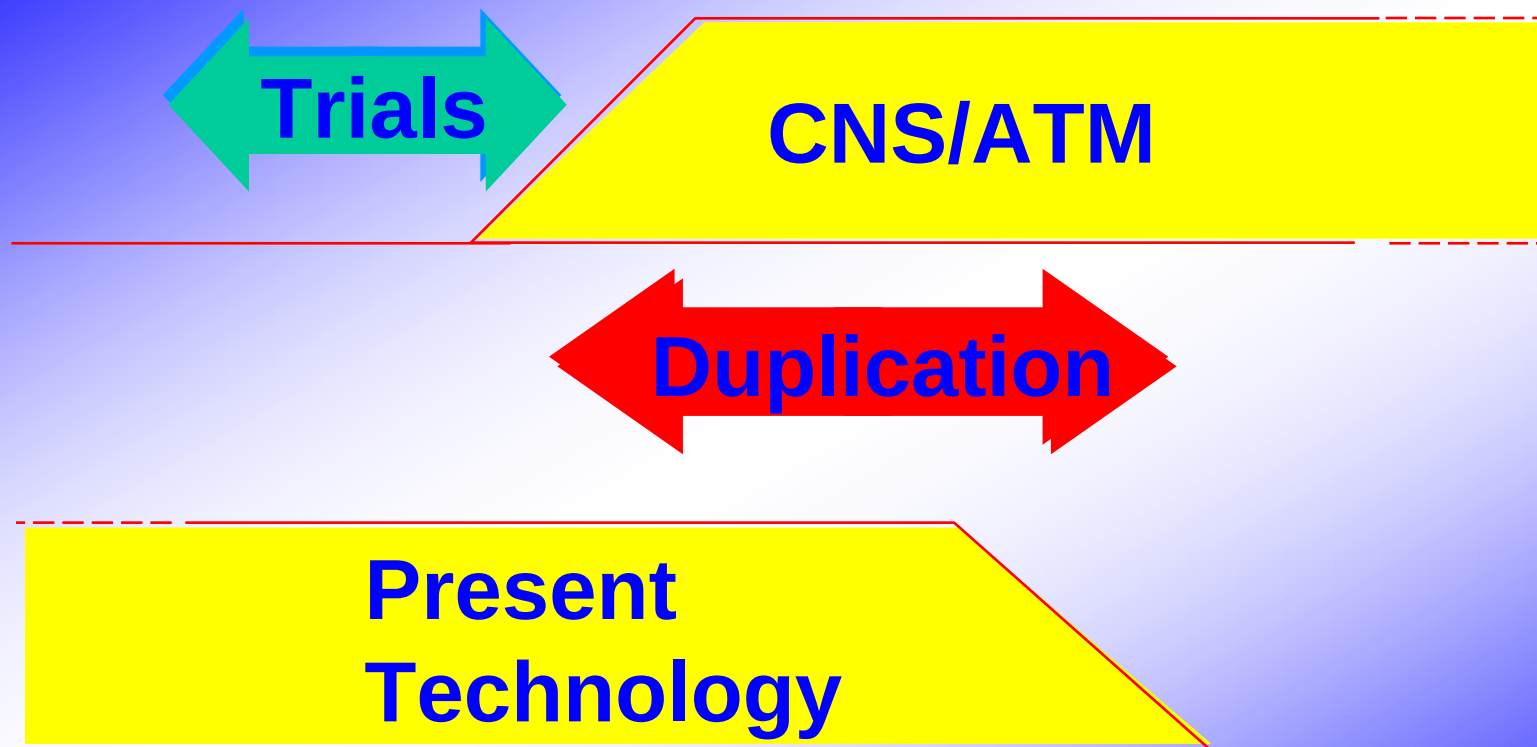
Incremental costs



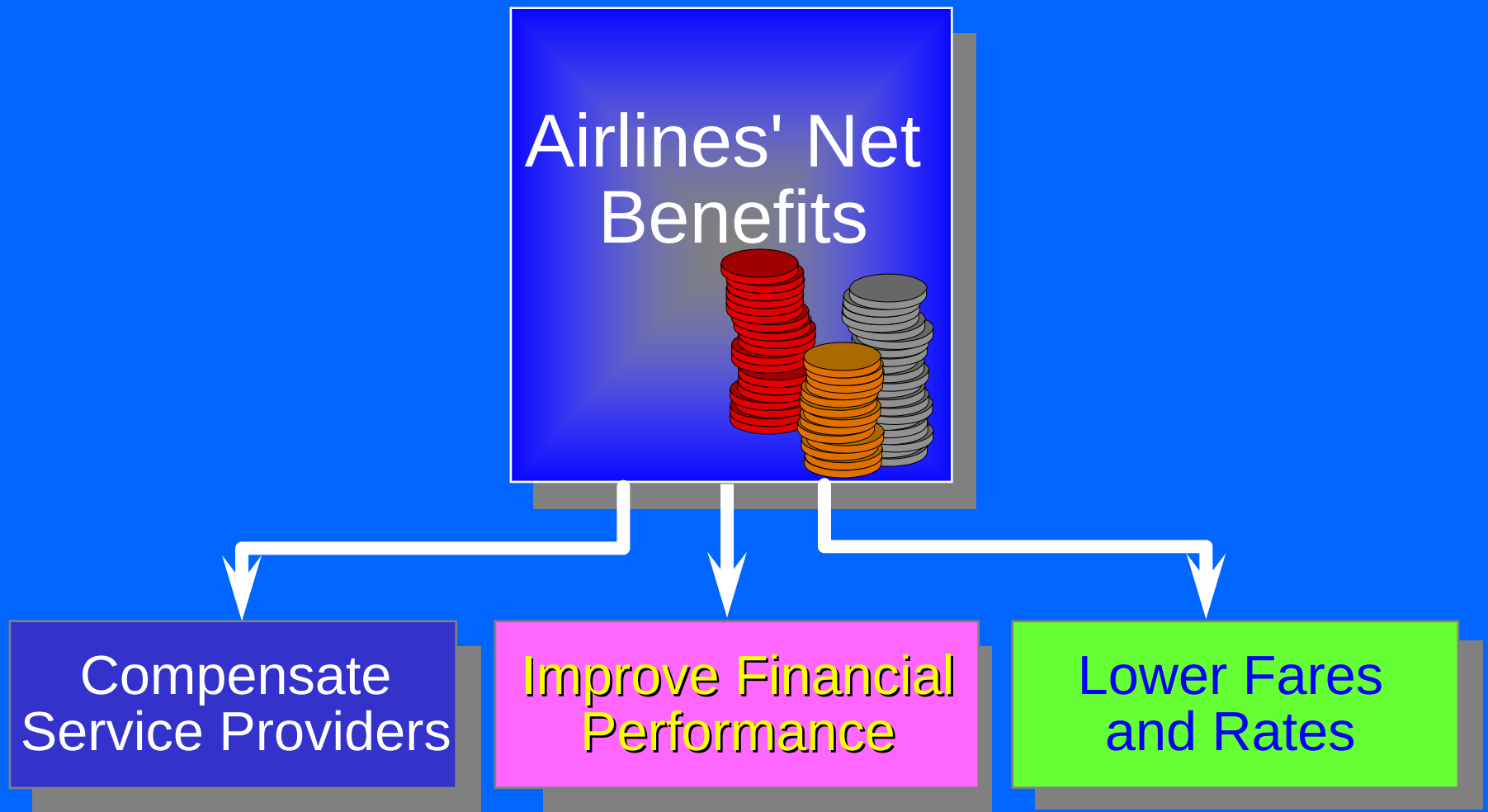
Net benefits and cumulative net benefits of CNS/ATM



Possible transition scenario



Distribution of benefits





Costs and benefits for multinational arrangements



Main benefits of multinational arrangements ...

- **Sharing of costs and elimination of redundancies, including:**
 - the cost savings associated with the possible reduction of personnel at the national level;
 - the avoided costs resulting from the non replacement of old facilities and equipment at the national level;
- **Provision of services otherwise impossible to provide by a single State**



Main benefits of multinational arrangements

- **The provision of a better service to the airspace users which might lead them to make additional cost savings through more efficient routings**
- **The more effective collection of user charges**



Main costs of multinational arrangements ...

- **Costs of the study of the various multinational arrangements (legal, technical, organizational, financial, etc.) to allow for a substantiated selection**
- **Implementation costs (acquisition and installation of facilities and equipment)**
- **Recruitment and training costs for the new personnel**
- **Operations costs of the multinational system**



Main costs of multinational arrangements

- **Maintenance costs for the new facilities and equipment**
- **Possible restructuring costs for the national provider**
- **Possible additional coordination work with partner States**
- **Decommissioning of old facilities and equipment at the national level**



Main economic and financial issues for multinational arrangement ...

- **The financial viability of the multinational venture**
- **The choice of the currency to be used for the budgeting and accounting of the multinational venture**
- **The provision of funds to set up the multinational arrangement and the cost sharing scheme**
- **The use of loans and other financing alternatives to fund the implementation of the multinational venture**



Main economic and financial issues for multinational arrangement

- Loans might be more difficult to obtain if the borrower is a multinational venture (institution or organization) in its initial phases
- The cost recovery policy and the sharing of revenues when their generation through user charges is initiated
- The possible loss of direct revenues to the State
- The handling of possible future cash deficits of the multinational venture and the guaranties to the continued provision of services

