

Chapter 9

Benefit/Cost Analysis and Public Sector Economics

- **Public Sector Projects**
 - Public sector projects have a primary purpose to provide services for the public good at no profit.
 - Examples include hospitals, schools, utilities (electricity, water, phone), roads, bridges, etc.
 - Public sector projects are often analyzed using benefit/cost ratio.
- **Public vs. Private Sector Projects**

Characteristic	Public Sector	Private Sector
Size of investment	Large	More Medium to small
Life estimates	Long (30-50 years)	Short (2-25 years)
Cash flows	Costs, benefits, disbenefits	Revenues and costs
Funding	Taxes, fees, bonds, donations	Stocks, bonds, loans, owners equity
Interest rate	Low (4-8%)	High
Decision criteria	Multiple criteria (with noneconomic factors)	Based on profitability (PW, ROR)
Decision Environment	Politically inclined	Primarily economic

- **Public and Private Sectors Partnership**

- A modern trend is for the private sector to partner and execute public projects.
- A popular form is BOT (Built-Operate-Transfer) where a private company is responsible for the full design, financing, and operation of a project (e.g. a highway, mobile phone network).
- In return, the company in a BOT arrangement collects revenues (e.g. toll booth fees) for a period of time (e.g. 10 years).
- After this period the project ownership is transferred to the government.
- BOT is sometime referred to as BOOT (Built-Own-Operate-Transfer).
- Sometime a BOO (Built-Own-Operate) agreement is adopted, where the company owns the project permanently.
- BOT is a much debated idea in Lebanon's public sector.

- **Elements of benefit/cost analysis**

- Costs - estimated expenditures to the governmental entity.
- Benefits - economic advantages experienced by the public.
- Disbenefits - undesirable consequences to the public.
- Benefits and disbenefits are difficult to estimate for most public sector projects.

- **Benefit/Cost Analysis of One Project**

- Benefit/Cost (B/C) ratio:

$$B/C = \frac{\text{value of benefits}}{\text{value of costs}}.$$

- If $B/C \geq 1$, accept the project. Otherwise, reject it.
- To estimate the value use PW, AW or FW. (All give the same results – However, ratios may not be equal).

- Conventional B/C ratio:

$$B/C = \frac{\text{benefits} - \text{disbenefits}}{\text{costs}}.$$

- Modified B/C ratio:

$$B/C = \frac{\text{benefits} - \text{disbenefits} - \text{M\&O costs}}{\text{initial investment}}.$$

- Both ratios give the same result.
- Salvage value is subtracted from the denominator.

- **Comparing Two Alternatives with B/C Analysis**
 - As with ROR analysis, incremental analysis is required.
 - Incremental analysis is done by subtracting costs and benefits (minus disbenefits, if any) of the low cost project from the other (high cost) project.
 - If the resulting B/C ratio ≥ 1 , accept the project with high cost. Otherwise, accept the project with low cost.
 - With unequal life spans find the B/C ratio using PW over LCM of lives, assuming cash flows repeat over the LCM.
 - With long life spans in public projects, finding B/C ratio based on AW is advantageous, assuming cash flows repeat.
- **Comparing Three or more Alternatives with B/C Analysis**
 - Rank the alternatives from smallest to largest cost.
 - Compare first alternative (with smallest cost) with the second alternative as discussed above.
 - Compare the winning alternative with the third alternative.
 - Continue with this pair-wise comparison until all alternatives are considered.

Remarks

- If the do-nothing alternative could be selected, then start the analysis by eliminating all the alternatives with $B/C < 1$.
- If all alternatives have $B/C < 1$, the do-nothing alternative wins over other alternatives considered.