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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Public Sector</th>
<th>Private Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of investment</td>
<td>Large</td>
<td>More Medium to small</td>
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<tr>
<td>Life estimates</td>
<td>Long (30-50 years)</td>
<td>Short (2-25 years)</td>
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<td>Cash flows</td>
<td>Costs, benefits, disbenefits</td>
<td>Revenues and costs</td>
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<td>Taxes, fees, bonds, donations</td>
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<td>Interest rate</td>
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<td>High</td>
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<td>Decision criteria</td>
<td>Multiple criteria (with noneconomic factors)</td>
<td>Based on profitability (PW, ROR)</td>
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<tr>
<td>Decision Environment</td>
<td>Politically inclined</td>
<td>Primarily economic</td>
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</table>
• **Public and private sectors partnership, BOT**
  ➢ 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.\(^1\)

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\(^1\) 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 \( \geq 1 \), 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.

**Remark.** 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.