Session 3.2
Financial / Economic Analysis
and Shadow Pricing

Introductory Course on Economic Analysis
of Investment Projects
5-9 July 2009
## Differences between Economic & Financial Analyses

<table>
<thead>
<tr>
<th></th>
<th>Financial</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perspective</td>
<td>Project entity or participants</td>
<td>Economy-wide, all members of society</td>
</tr>
<tr>
<td>Benefits and Costs</td>
<td>Financial flows - revenue minus costs</td>
<td>Welfare Changes - measured by costs savings, WTP, exports minus costs</td>
</tr>
</tbody>
</table>
Financial vs Economic Analysis

- **Financial Analysis**
  - Undertaken from the individual’s/project agency's perspective
  - Consider only benefits and costs faced by production/decision making units
  - Benefits and costs are evaluated using existing market prices
  - Measures the project’s profitability for its participants
  - Narrow focus on direct benefit/cost of project participants
  - Verify incentives for project participants
  - Help verify income increase, poverty reduction
Financial vs Economic Analysis

- **Economic Analysis**
  - Undertaken from society’s perspectives
  - Costs: Opportunity Cost/ Welfare Losses
  - Benefits: Welfare Gains
  - Convert financial benefit to economic benefits
  - Shadow Pricing: financial prices of costs and benefits must be **adjusted** to allow for effects of
    - government intervention (taxes, subsidies, controls, quotas, etc.)
    - opportunity costs of resource use
    - market distortions (trade taxes and controls, labor market distortions)
    - externalities largely environmental
## Externalities: Examples of Project Environmental Impact

<table>
<thead>
<tr>
<th>On-site Impacts</th>
<th>Off-site Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Crop production increments</td>
<td>Chemical pollution in rivers flowing through plantations</td>
</tr>
<tr>
<td>2 Increased forest area</td>
<td>Micro and meso climate change</td>
</tr>
<tr>
<td>3 Increased tourism</td>
<td>Downstream solid waste pollution</td>
</tr>
<tr>
<td>4 Reduced soil erosion</td>
<td>Reduced downstream siltation, more regular river flow and increased hydropower generation</td>
</tr>
<tr>
<td>5 Enhanced mangrove breeding grounds for fish</td>
<td>Increase in fish stocks in nearby coastal waters</td>
</tr>
</tbody>
</table>
Use of conversion factors

- CF = EP/FP
- Composite CFs based on breakdown
- Tradables
- Nontradables
- Labor unskilled
- Labor skilled
- Transfers – taxes, subsidies
Commodity CFs

- CF for specific commodity = Economic Price/Financial Price
- Economic price may be a) at demand margin or b) supply margin
- Either willingness to pay or costs saved/incurred
- For subsidised commodities financial price is kept down and CF > 1
National Conversion Factors

- Unskilled labour typically 0.5 to 0.75 in labor surplus economies (SWRF)
- Implies output lost elsewhere is 50% to 75% of wage
- Shadow Exchange Rate factor (SERF) typically 1.05 to 1.20
- Implies taxes on foreign trade of 5% to 20%
Shadow wage rate factor

• SWRF = opportunity cost/ wage paid
• For skilled labour might be > 1
• For unskilled labour in surplus will be < 1
• Opportunity cost is output lost elsewhere as a result of a worker moving to a new project
• Opportunity cost must be at economic prices
Protected economy

- With a set of taxes, subsidies and controls on trade domestic prices and world prices for trade goods will diverge
- This is after adjustment for transport and distribution costs
- Typically $DP_{av} > WP_{av}$, where $DP$ and $WP$ are domestic and world prices and $av$ is average
Shadow exchange rate

• SER = OER*(1 + t - s)*(RER/OER)
• Or SER = RER*(1 + t - s)
• Where OER is actual exchange rate, t is average rate of tax on trade and s is average rate of subsidy
• RER is long-run real exchange rate for the economy
• Typically assumed OER = RER
Standard Conversion Factor

- Typically derived from SER formula
- SER/OER = 1/SCF
- So SCF = OER/SER
- Thus SCF = OER/OER*(1 + t – s)
- Or SCF = 1/(1 + t – s)
- SCF is the inverse of the net tax rate on trade
Pricing Project Costs and Benefits: Numeraire and Price Level

- Domestic price numeraire = all economic prices expressed at equivalent domestic market price level
  - Adjust all items valued at border prices (e.g., traded inputs and outputs) by a factor \((SERF)\) to convert to the domestic price level

- OR

- World price numeraire = all economic prices expressed at equivalent world market price level
  - Adjust all items valued at domestic prices (e.g., nontraded inputs and outputs, scarce labor) by a conversion factor \((SCF)\) to convert to the world (border) price level
Equivalence of approaches

- If SER = 1.1, then on average domestic prices 10% above world prices and SCF = 1/1.1
- If NPV at DP = 100 then NPV at WP = 100/1.1 = 91
- If NPV at WP = 100 then NPV at DP = 110
- But EIRR (as a ratio) will be the same
## Application of Conversion Factors by Chosen Price Numeraire

<table>
<thead>
<tr>
<th>Item</th>
<th>Using Domestic Price Numeraire</th>
<th>Using World Price Numeraire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traded goods</td>
<td>Border price multiplied by SERF</td>
<td>Border price</td>
</tr>
<tr>
<td>Scarce labor</td>
<td>Calculated opportunity cost at domestic prices</td>
<td>Calculated opportunity cost at domestic prices, multiplied by SCF</td>
</tr>
<tr>
<td>Surplus labor</td>
<td>Calculated opportunity cost at domestic prices (SWRF)</td>
<td>Calculated opportunity cost at domestic prices, multiplied by SCF</td>
</tr>
<tr>
<td>Major cost items</td>
<td>Market price, adjusted by specific conversion factor</td>
<td>Market price, adjusted by specific conversion factor</td>
</tr>
<tr>
<td>Other domestic resources</td>
<td>Domestic market price</td>
<td>Domestic market price, multiplied by SCF</td>
</tr>
<tr>
<td>Net effect of applying conversions</td>
<td>Adjusted domestic market prices</td>
<td>Adjusted world market prices</td>
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</tbody>
</table>
Thank you.