Session 4.2
Financial / Economic Analysis and Shadow Pricing

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

<table>
<thead>
<tr>
<th></th>
<th>Financial</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perspective</strong></td>
<td>Project entity or participants</td>
<td>Economy-wide, all members of society</td>
</tr>
<tr>
<td><strong>Benefits and Costs</strong></td>
<td>Financial flows</td>
<td>Welfare Changes</td>
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Why Economic & Financial Analyses Differ: Examples

Different Perspectives (Project Entity vs. Society):

Light House, Pollution, Child Education, Car Alarm System

Consider different things…

Different Valuation (Financial Values vs. Welfare Changes):

Education, Car

Value things differently…
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
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.)
  - market structure (monopolies, imperfect competition)
  - opportunity costs of resource use
### Externalities: Examples of Project Environmental Impact

<table>
<thead>
<tr>
<th>On-site Impacts</th>
<th>Off-site Impacts</th>
</tr>
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<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>
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## Taxes: Examples of Sources of Financial and Economic Price Differentials Along the Production-to-Market Chain

<table>
<thead>
<tr>
<th>Stage of Production Chain</th>
<th>Examples of Potential Sources of Difference between Financial and Economic Prices</th>
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<tbody>
<tr>
<td>Input Supply</td>
<td>Taxes and duties on inputs (e.g., herbicides, pesticides); subsidies on inputs (e.g., fertilizers)</td>
</tr>
<tr>
<td>Primary Production (e.g., cultivation, harvesting, storage, handling)</td>
<td>Taxes or subsidies on agricultural and farm equipment (e.g., tractors, harvesters, silos) or materials (bags, packaging); non-market rate credits to producer</td>
</tr>
<tr>
<td>Transport to Market</td>
<td>Taxes or subsidies on fuels and vehicles</td>
</tr>
<tr>
<td>At market</td>
<td>Free physical marketing infrastructure; state marketing agency or private monopsonistic purchaser buying at fixed price</td>
</tr>
<tr>
<td>Trader/Distributor</td>
<td>State agency without cost-recovery; private traders trading internationally under managed foreign exchange regime</td>
</tr>
<tr>
<td>Domestic Processor</td>
<td>Taxes on inputs (fuel, machinery) used in processing</td>
</tr>
</tbody>
</table>
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
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 \( \text{SERF} \) 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 \( \text{SCF} \) to convert to the world (border) price level
National Conversion Factors

- Unskilled labour typically 0.5 to 0.75 in labor surplus economies
- 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
Shadow exchange rate

• $\text{SER} = \text{OER} \times (1 + t - s) \times (\text{RER}/\text{OER})$
• Or $\text{SER} = \text{RER} \times (1 + t - s)$
• 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
- \( \text{SER/OER} = 1/\text{SCF} \)
- So \( \text{SCF} = \text{OER/SER} \)
- Thus \( \text{SCF} = \text{OER/OER} \times (1 + t - s) \)
- Or \( \text{SCF} = 1/(1 + t - s) \)
- SCF is the inverse of the net tax rate on trade
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
### 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>
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<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>
</tr>
</tbody>
</table>
Thank you.