Overview: Production and Cost I

• Production Processes
  – Trade-offs among inputs

• Economic versus Accounting Profits
  – Key: Opportunity Cost

• Cost Concepts
  – Marginal, Total, Variable, Fixed, Sunk
  – Averages & Relationships
  – Long Run Versus Short Run
Production

• What are some examples of production processes?

• Production function: \( Q = f(K, L) \)
  Represents technology to transform inputs into an output.

• Trade-offs in Inputs - Isoquants

• Why would we care?
TABLE 6.1 Production with Two Variable Inputs

<table>
<thead>
<tr>
<th>CAPITAL INPUT</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>40</td>
<td>55</td>
<td>65</td>
<td>(75)</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>60</td>
<td>(75)</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>55</td>
<td>(75)</td>
<td>90</td>
<td>100</td>
<td>105</td>
</tr>
<tr>
<td>4</td>
<td>65</td>
<td>85</td>
<td>100</td>
<td>110</td>
<td>115</td>
</tr>
<tr>
<td>5</td>
<td>(75)</td>
<td>90</td>
<td>105</td>
<td>115</td>
<td>120</td>
</tr>
</tbody>
</table>

Figure 6.1 Production with Two Variable Inputs
Profits

- Definition:
  Profits = Revenues – Costs

- Okay, what are Revenues and Costs?

- Accountants versus Economists

Accounting Depreciation

- Rules for “writing off” capital expenses

- Other methods
- Issue: appropriate values reflected?
- Divergent results
Opportunity Cost

• Definition:
  – Highest value that could be received for an input
  – ‘Best alternative use’ is comparison
• Examples

• Why important?

Types of Cost

• Variable cost (VC)
• Fixed cost (FC)
• Total cost TC = VC + FC
• Average Cost (AC)
• Marginal Cost (MC)
Solutions 4 U

- **Purpose:** Provide business solutions for small and medium size businesses
- **Business Model**
  - 5 Partners
  - One week engagements
  - Each engagement staffed with 1 Partner and 1 Analyst
- “Production Capacity”: 5 cases per week for 48 weeks per year = 240 cases/year

### Solutions 4 U: Costs

<table>
<thead>
<tr>
<th>Weekly Per Individual</th>
<th>Total</th>
<th>Annual</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner salaries</td>
<td>$3,750</td>
<td>$18,750</td>
<td>$900,000</td>
</tr>
<tr>
<td>Analyst salaries</td>
<td>$1,000</td>
<td>$5,000</td>
<td>$240,000</td>
</tr>
<tr>
<td>Rent</td>
<td></td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td>$2,500</td>
<td>$120,000</td>
<td></td>
</tr>
<tr>
<td>TV Ads</td>
<td>$500</td>
<td>$24,000</td>
<td></td>
</tr>
<tr>
<td>Office Eqmt</td>
<td></td>
<td>$36,000</td>
<td></td>
</tr>
<tr>
<td>Research Tools</td>
<td>$1,250</td>
<td>$60,000</td>
<td></td>
</tr>
</tbody>
</table>

Market Research, Website Design, Billboard and Brochures $150,000
Variable Cost

• Definition:
  – Costs that vary with the level of output

• Examples

Fixed Cost and Sunk Cost

• Definition: Fixed Cost
  – Costs that do not vary with the level of output
  – Recoverable if firm is shut down

• Definition: Sunk Cost
  – Costs that cannot be recovered
  – Zero opportunity cost

• Examples
Marginal Cost

• Definition:
  – The incremental cost of producing an additional unit of output

• Examples

• Why important?

Solutions 4 U:
Costs and Business Decisions

What are the relevant costs:

• Start-up decision?

• Continue operating after
  – 6 months?
  – One year?

• If a company wanted you to add them to your already-full schedule?
Important Distinctions

• Marginal Costs are key to production decisions

• Marginal Costs typically differ from Average Costs

• Average Cost is just a convenient way to look at Total Cost.

• Sunk Cost matters in that it shouldn't matter.
Relationships Among Cost Concepts

• Relationship between MC and AC
  – MC > AC implies AC increasing
  – MC < AC implies AC decreasing

• Why is it important to know this?
Figure 7.1 Cost Curves for a Firm

(a) Cost (dollars per year)

(b) Cost (dollars per unit)
Long Run and Short Run

- Issue is flexibility
  - ‘Long Run’ - all inputs variable, including plant (capacity), as well as possible technologies.
  - ‘Short Run’ – some inputs fixed, typically plant (capacity), and production technology fixed.

- Why important?
Take Away Points

• Understanding cost types and cost structure helps you to see the true profitability of a product or client (economic versus accounting profit).

• Key pitfalls
  – Ignoring opportunity costs
  – Considering sunk costs
  – Not distinguishing between MC and AC (optimal level vs. shutdown)

• Cost structure is also important for strategic issues, such as competitive dynamics and entry barriers.