Economics Costs

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Agenda
- Production Function
- Neo-Classical Costs
- Empirical Implications
- Telecommunications Studies

Theory of Producer Behavior
- Production Possibility
- Technically Efficient
- Minimize Cost

Production Possibility
- Production Possibility Set
- Isoproduct (Isoquant) Curves

Production Possibility
- Production Possibility Set
- Isoproduct Curves
- Cost Minimization
- Expansion Path
Production Possibility
- Production Possibility Set
- Isoproduct Curves
- Cost Minimization
- Expansion Path
- Changes in Input Prices

Production Possibility
- \( Q = f(L, K) \)
- \( Q \) is the output,
- \( L \) & \( K \) are the inputs
- \( \frac{\delta f(L, K)}{\delta L} \) & \( \frac{\delta f(L, K)}{\delta K} \)
- \( \delta \) indicates the partial derivative

Production Possibility
- \( Q = f(L, K) \)
- Supporting Factors:
  \( \frac{\delta MP_L(L, K)}{\delta K}, \frac{\delta MP_K(L, K)}{\delta L} > 0 \)
- Substituting Factors:
  \( \frac{\delta MP_L(L, K)}{\delta K}, \frac{\delta MP_K(L, K)}{\delta L} < 0 \)

Theory of Costs
- Economies of Scale
- Declining Unit (Average) Costs
- Economies of Scope

Production Possibility
If \( \alpha > 1, \) & \( \alpha Q \leq f(\alpha L, \alpha K), \) then
Economies of Scale or Increasing Returns to Scale

Production Possibility
Conversely,
if \( \alpha > 1, \) & \( \alpha Q \geq f(\alpha L, \alpha K), \) then
Diseconomies of Scale or Decreasing Returns to Scale

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Finally, if $\alpha > 1$, &
$\alpha Q = f(\alpha L, \alpha K)$, then

Constant Returns to Scale

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Production Possibility

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Scale Summary

- Economies of Scale, Increasing Returns to Scale: $\alpha Q \leq f(\alpha L, \alpha K)$
- Diseconomies of Scale or Decreasing Returns to Scale: $\alpha Q \geq f(\alpha L, \alpha K)$
- Constant Returns to Scale: $\alpha Q = f(\alpha L, \alpha K)$
  where $\alpha > 1$

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Theory of Costs

- Short Run
- Long Run

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Theory of Costs

- Profit = $R - E$
- Profit = $R - VC(Q) - F$
- Break-even

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Costs

- High Fixed Costs
- Justification for Monopoly
- Only One Efficient Producer

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Costs

- The Competitive Example
Cost Minimization Cost

\[ C(w,q) = \min w \cdot x \quad \text{s.t.} \quad (q,w) \in Y \]

where:
- \( Y \) is the production possibility set
- \( q \) is a vector of outputs
- \( x \) is a vector of marketed inputs
- \( w \) is a vector of input prices

Gasmi & Sharkey, "Towards Endogenization of Firm's Costs in Empirical Studies of Technologies"

Cost Minimization Implications

Function \( C(w,q) \) is:
- non-decreasing in \( w \)
- homogeneous of degree one in \( w \)
- concave in \( w \)
- continuous in \( w \)

iff as defined previously

Cost Minimization Objections

- Market Structure Influences
  - Innovative Activities
  - Regulatory Distortions
- Strategic and Information Issues
  - Regulators Uninformed
  - Strategic Investments
  - Strategic R&D

Production Function

End of Part One
(To be continued)

Empirical Implications

Telecommunications Studies