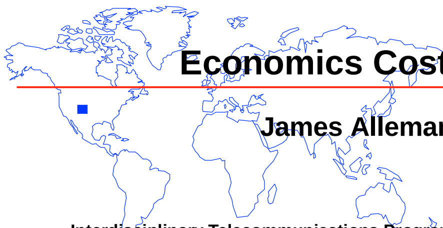

Economics Costs

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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

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
- $MP_L(L, K) = \delta f(L, K))/\delta L$ &
- $MP_K(L, K) = \delta f(L, K))/\delta K$

δ indicates the partial derivative

Production Possibility

- $Q = f(L, K)$
- Supporting Factors:
  $\delta MP_L(L, K)/\delta K$,
  $\delta MP_K(L, K)/\delta L > 0$
- Substituting Factors:
  $\delta MP_L(L, K)/\delta K$,
  $\delta MP_K(L, K)/\delta L < 0$

Theory of Costs

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

Production Possibility

If $\alpha > 1$, & $\alpha Q <= f(\alpha L, \alpha K)$,
then

Economies of Scale or
Increasing Returns to Scale

Production Possibility

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

Diseconomies of Scale or
Decreasing Returns to Scale

Production Possibility

Finally, if $\alpha > 1$, &

$\alpha Q = f(\alpha L, \alpha K)$, then

Constant Returns to Scale

Scale Summary

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

Theory of Costs

- Short Run
- Long Run

Theory of Costs

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

Costs

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

Costs

- The Competitive Example

Neo-Classical Costs

- Cost Minimization

Neo-Classical Costs

- Cost Minimization Cost
  - $C(w,q) = \text{Min } w \cdot x$ s.t. $(q,w) \in Y$

  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"

Neo-Classical Costs

- Cost Function

Relevant economic information of the technology summarized

Neo-Classical Costs

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

Neo-Classical Costs

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

Agenda

- Production Function
- Neo-Classical Costs

End of Part One

(To be continued)

- Empirical Implications
- Telecommunications Studies