

Production Costs, Supply and Price Determination

Chapter 6 - Agricultural Economics & Agribusiness by Cramer et al.

Carlos García

Introduction to Agricultural Economics
AGEC 2003

Dept. of Ag. Economics & Agribusiness
Louisiana State University A&M
October 25-27, 2010



Outline

- Identification
 - Fixed and variable costs
 - Opportunity cost
 - Length of run: SR & LR
 - SR costs of production
 - Measuring per unit costs an return
 - Search for an optimum
 - Profit
 - SR Supply curve
- Market supply
 - Changes (MC) & adjustment
 - Elasticity of Supply
- Price Determination
 - Demand
 - Equilibrium in the market
 - Disequilibrium and adjustment

Chalkboard:
Formulas
Derivations
Graphs

Identification

- Explicit costs
 - Monetary expenditures
 - Labor
 - Capital
- Implicit costs
 - Cash outlays don't exist in production period .
 - Expenditures are allocated according to the flow of rendered services.
 - Depreciation scheme allowed by regulators (e.g. IRS)
- Opportunity cost
 - Indirect costs of alternative use of resources.
 - Forgone benefits of alternative economic opportunity.
 - Examples
 - Land
 - Savings vs. Stocks

Direct Costs of Production

- Fixed costs
 - Output independent
 - Land
 - Machinery
- Variable costs
 - Output dependent
 - Seeds
 - Organic pesticides

Profit

- Gross profit = Revenue – Costs
 - Directly tied to production.
- Operating profit = EBIT
- EBIT = Gross profit - operating expenses
 - Sales and marketing, Research & development, interests, taxes, general & administrative, extraordinary items
- Net Profit = EBIT- I-T
- Economic Profit = Explicit – Implicit costs (opportunity)

Length of Run

- Short run
 - The mix of production inputs are fixed.
 - e.g. pickers and combine machines
- Intermediate run
 - Few items of the mix of production inputs can vary.
 - Fertilizer > yield
- Long run
 - The mix of production inputs can vary.
 - Search for optimal mix of inputs
 - Substitution of pickers by a combine machine

Costs, Revenue, Profits

- Input X
- Output Y

- $TC = \text{Total fixed Cost (independent of Y)}$
 $+ \text{Total variable cost (Dependent of Y)}$

- $\text{Profit} = \text{Total Revenue}$
 $- \text{Total Cost}$

Per-Unit Costs

- Output Y
- $\text{Total Cost} = TFC + TVC$
- Average
 - variable costs
 - fixed costs
 - total costs
- Marginal cost
 $\text{Change in TC} / \text{Change in total output}$
- Marginal Revenue
 $\text{Change in total revenue} / \text{Change in total output}$

Search for an Optimum

- Marginal cost
 - $\text{Change in TC} / \text{Change in total output}$
- Marginal revenue = price of a unit of Y
 - $\text{Change in total revenue} / \text{Change in total output}$
- Optimum
 - Marginal cost = Marginal revenue

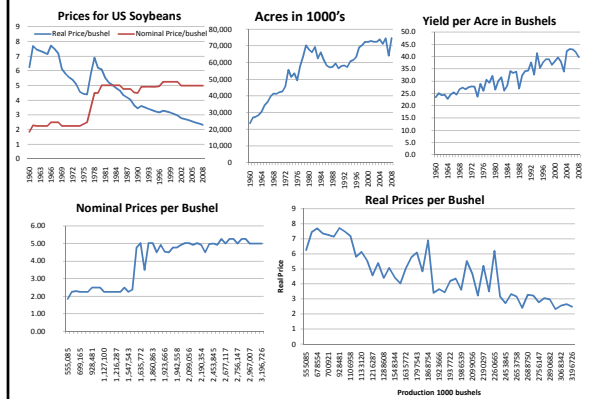
Supply Curve

- Optimum
 - Marginal cost = Marginal revenue
- The supply curve
 - The roll of marginal revenue
 - Relation between price and output
- As price of a unit of Y changes, optimum production schedule changes.
 - Change in Y
 - Change in Profits

Market Supply

- Changes in market supply (Sum of output by firms)
 - Expansion >
 - Changes in technology
 - The case of soybeans > demand driven
 - Population
 - Income
 - Consumption of high quality foods
 - Consumption by livestock

Soybeans in USA: 1960-2008



Market Supply

- Changes in market supply (Sum of output by firms)
 - Contraction <
 - Changes in weather conditions
 - Brazilian Supply of Coffee - Cold
 - Russian Wheat Supply – summer drought
- Price Elasticity of Supply (US Soybeans)
 - Percentage change in supply as price changes by 1%.

Time	Production in 1000 bushels	Price \$ per bushel
1960	555,085	1.85
2008	2,967,007	5.00
-	2,411,922	3.15
+	3,522,092	6.85
	0.68	0.46
Price Elasticity of Supply	1.49	

Price Determination

- Equilibrium
 - Supply
 - Demand
- Supply
Demand

→

Price
Quantity
- Adjustments to
 - Surplus
 - Shortage
 - Shifts in the supply curve
 - Shifts in the demand curve

In summary

- Length of run
 - SR (inputs fixed), intermediate run (few inputs are allowed to change, remaining inputs-fixed), & LR (all inputs vary)
- Direct costs of production
 - Fixed and variable costs
- Economic Profit
 - Explicit and implicit costs (including opportunity costs)
- Total revenue, Total cost, Total variable cost, total fixed cost
- Average fixed cost, Average variable cost, Average total cost

In summary

- Fixed costs are decreasing in output.
- For simplicity we say that the marginal cost curve has 2 phases: decreasing and increasing.
- The marginal cost curve is influenced by:
Marginal physical product (MPP) of the production process.
- Marginal revenue curve is influenced by price of output, P_y
Individual farmer does not influence the price, it is driven by market forces.

In summary

- Farmers' supply curve
 - Search for an optimum
 - Marginal cost & marginal revenue
- Market supply curve
 - Sum of output produced by farmers

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