Costs and Market

See chapters 9-10 in Mansfield et al

Costs: Introduction

- Cost is complex but important to managerial decision making
- Managerial decisions: pricing output, transfer pricing within firm, cost control, planning…
- So important to look at theory of production in relation to costs and the empirical findings

Costs

- Opportunity cost: an important concept
- Value of other things the resources could have been used for
- Historical cost is different: though important to accountants. Distinguish
  - Explicit costs –ordinary items
  - Implicit costs –costs of resources owned and used
- Accountants ignore the second

Short run costs

- Short run –capital fixed, labour variable
- Define the firms cost function as cost of producing each level of output
- That is total cost function.
- Can distinguish Total, variable and fixed.
- In Mansfield table produces

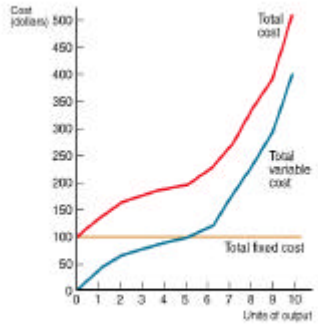

FIGURE 9.1 Fixed, Variable, and Total Costs, Media Corporation

Short run costs

- From this can derive:
- Average fixed cost: TFC/Q
- Average variable cost: TVC/Q
- Average total cost: TC/Q
- Marginal cost: dTC/dQ

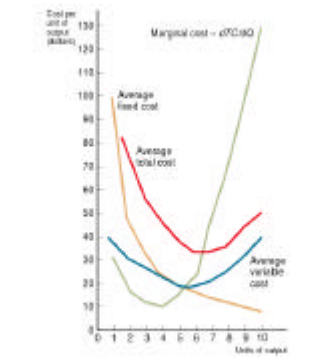

FIGURE 9.2 Average and Marginal Cost Curves, Media Corporation

Short run costs

- Consider: $TC=100 + 50Q- 11Q^2 + Q^3$
  - $MC = \delta TC/\delta Q = 50 - 22Q + 3Q^2$
  - $AVC = TVC/Q = 50- 11Q + Q^2$
- MC equals AVC when it is at its lowest as
  - $\delta TC/\delta Q = -11 +2Q = 0$ so $Q = 5.5$
- Also MC equals ATC when it is at its lowest

Long run costs

- All inputs are variable
- Consider firm can choose different scales : size of plant and then add same labour
- Can have number of short run average cost curves
- If look at all possible levels of plant and associated costs can get LRAC

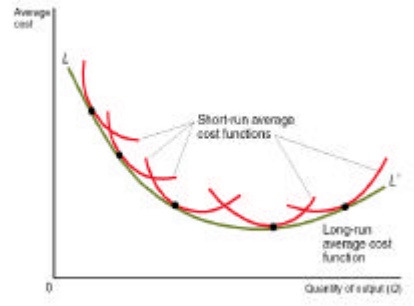

FIGURE 9.4 Long-Run Average Cost Function

Long run costs

- Could get a LRTC curve in a similar way
- Or could derive from the LRAC curve:
  - LRTC=LRAC * Q

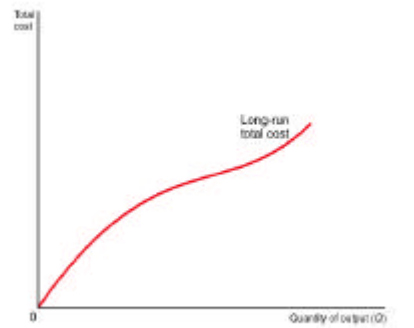

FIGURE 9.5 Long-Run Total Cost Function

Economies of scale

- LRAC curve shows the extent to which larger plants can have cost advantages over smaller ones
- Can work out optimal scale
- Can see if there are economies of scale to be gained
  - –if on declining part of cost curve
- Economies of scale can be important reasons for mergers:
  - Cruise ships
  - Daimler Chrysler

Estimating cost curves

- Important task is to estimate cost curves for firms or industries
- Need choose functional form. Approx
  - Assume SRTC linear function of output
  - So MC constant in relevant range; inappropriate for long range
  - Assume total cost quadratic or cubic
- Taking different TC functions: linear quadratic and cubic gives different MC curves

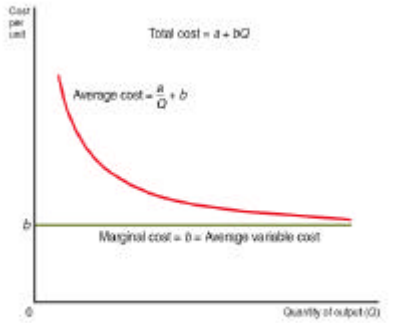

FIGURE 9.8 Average Cost and Marginal Cost, Linear Total Cost Function

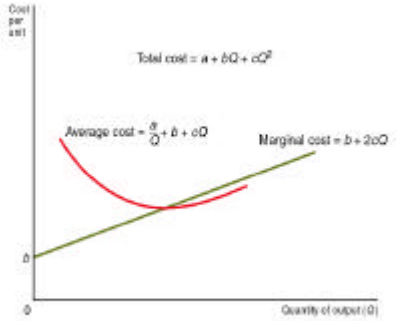

FIGURE 9.9 Average Cost and Marginal Cost, Quadratic Total Cost Function

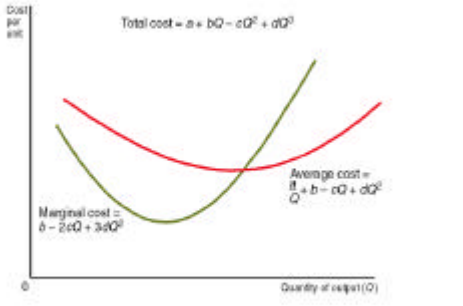

FIGURE 9.10 Average Cost and Marginal Cost, Cubic Total Cost Function

Estimating cost functions

- Regression analysis: Time series; cross section; panel data
- Engineering data
- Problems
  - Accounting data deficient in time period, allocation of overheads, treatment of depreciation, historic cost
  - Cross section: regression fallacy, ie observed costs not equal to minimum costs
  - Engineering data: arbitrariness of allocating joint costs in multiproduct firms; additivity.

Estimation steps

- Definition of costs: relation to opportunity cost
- Deflating to real
- Relating cost to output
- Matching time periods: cost and output data
- 'Ceteris paribus' reasonable? –assuming fixed product, plant and technology
- Number of observations adequate?

Examples

- Mansfield gives some examples:
  - Cross section
  - Time series

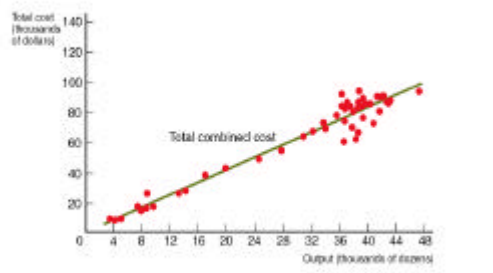

FIGURE 9.13 Regression of Total Cost on Output, Hosiery Mill

Long run cost estimation

- Same regression analysis can be used
- Long run: cross section data more sensible
- Problems
  - Accounting methods differ
  - Input prices may differ
  - Data may not be efficient levels production
- Many studies undertaken;
  - show significant economies of scale at low levels declining
  - But L shaped rather than U

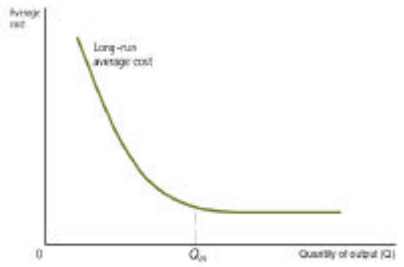

FIGURE 9.14 Typical Long-Run Average Cost Curve

Long run costs

- Minimum efficient scale: smallest output at which LRAC cost curve is at minimum
- Important as if not at it can have competitive disadvantage
- Can estimate
- Or use engineering analysis

Minimum efficient scale

- Or use survivor technique (Stigler):
  - Industry size class outputs at various times
  - If share falls over time, class considered relatively inefficient
  - Suggests below mes
  - Plot average cost by industry share
  - Example: doesn't tell extent of differentials

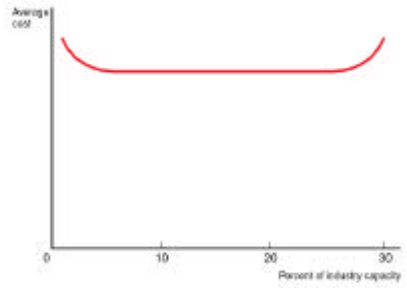

FIGURE 9.16 Long-Run Average Cost Function, Steel Ingot Production

Costs

- Different types of plant: can have different flexibilities -combine
- Economies of scope possible:
- Production or cost advantages from increasing number of products produced
  - Use same production facilities
  - Use by products
- Can be very important in some industries

Other uses

- Break even analysis:
  - assume constant AVC so TC linear and constant MC = AVC
  - Plot total revenue and total cost and will see break even point
- Consider degree of operating leverage in comparing plants:
  - Measure profit sensitivity to sales
  - Useful measue of difference across plants
- Example of break even:

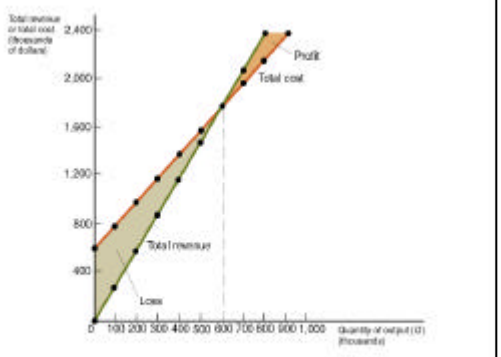

FIGURE 9.18 Break-Even Chart, Clarion Company

Uses

- Profit contribution analysis
  - Difference between total revenue and total variable cost
  - Per unit its difference between prices and AVC
  - Tells what's available to pay off fixed costs and then what's profit

Market Structure

- Market: firms and individuals –buy and sell
- Important social and legal preconditions
- Different structures depending on nature of good, agents and market conditions
- Extremes perfect competition and monopoly
- Important for managers to understand nature of market

Perfect competition

- Nature of demand and supply
- Many suppliers and consumers
- No market power
- Equilibrium price
- Shifting demand and supply

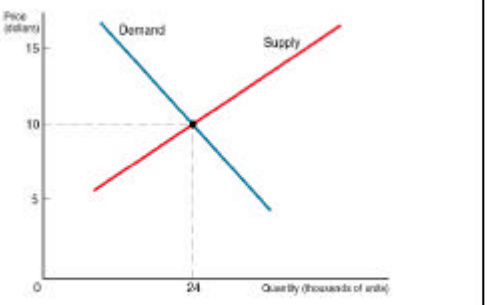

FIGURE 10.1 Determination of Price in a Perfectly Competitive Market

PC firm output

- Can produce as much as it chooses
- So how to choose
- Maximise profit
- MC=MR=P
- Normal profits

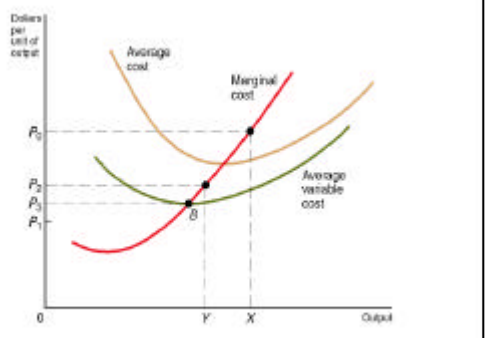

FIGURE 10.4 Short-Run Average and Marginal Cost Curves

Consumer and Producer Surplus

- Consumer surplus: difference between price pay and price willing to pay
- Producer surplus: difference between pice received and that willing to receive

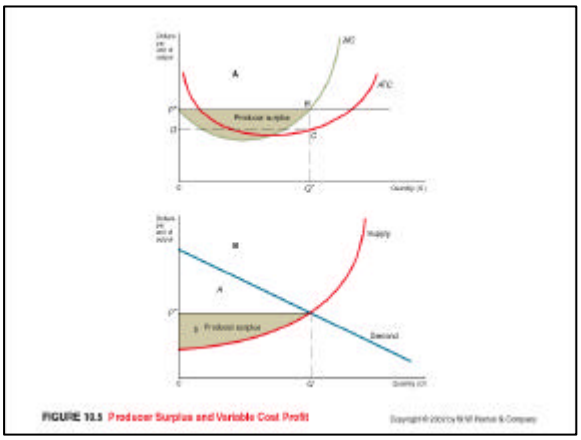

FIGURE 10.5 Producer Surplus and Variable Cost Profit

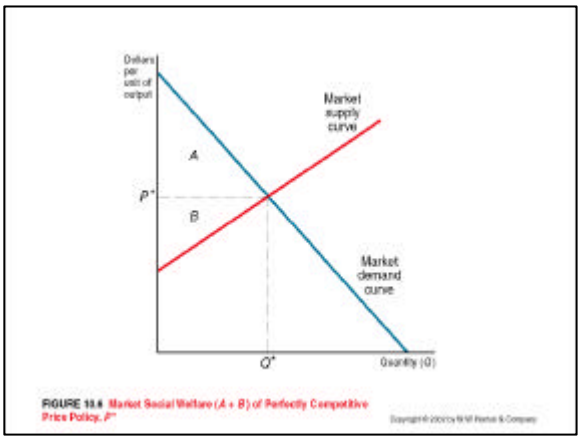

FIGURE 10.6 Market Social Welfare ($A + B$) of Perfectly Competitive Price Policy, P^*

Long run equilibrium

- Economic profits not accounting profits
- Produce if make normal profits
- Can change capital in LR
- Competition to lowest point LRAC

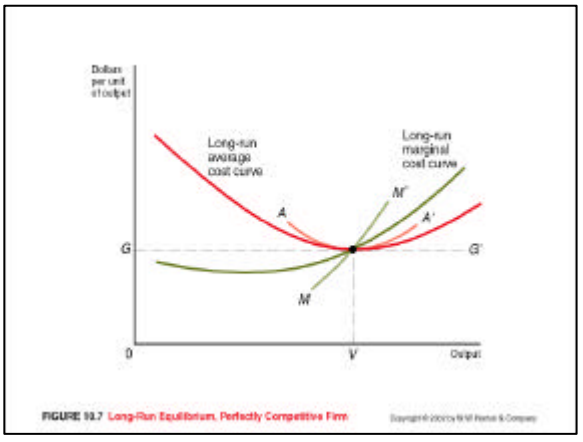

FIGURE 10.7 Long-Run Equilibrium, Perfectly Competitive Firm

Long run industry adjustment

- Constant cost industry
- Increasing cost industry

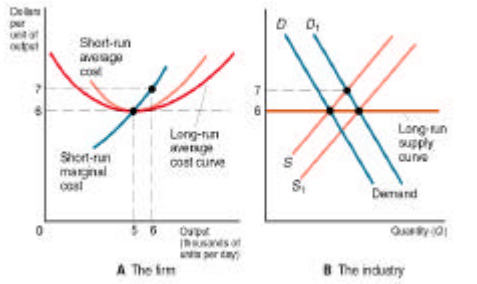

FIGURE 10.8 Long-Run Equilibrium: Constant-Cost Industry

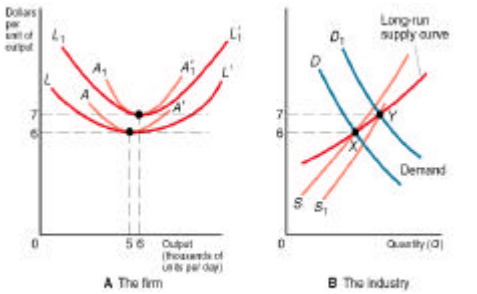

FIGURE 10.9 Long-Run Equilibrium: Increasing-Cost Industry

Resource allocation

- Important pointers to real world phenomena
- Short run equilibrium after change in demand
- Long run market adjustment: when capital variable
- Transfers of resources between commodities
- Walras and Marshall

Monopoly

- Downward sloping demand curve
- Maximise profits
- MC=MR

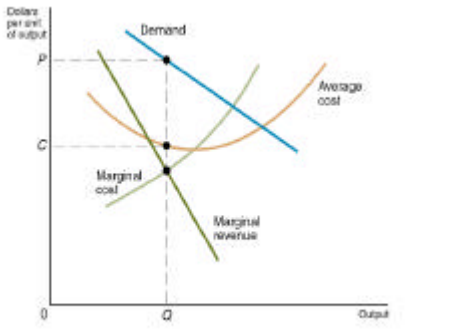

FIGURE 10.12 Output and Price Decisions of a Monopolist

Monopoly

- Max Π=TR-TC
- d Π/dQ = dTR/dq – dTC/dQ=0
- dTR/dQ – dTC/dQ
- MR=MC
- Now for monopolist MR=MC=P (1+1/η) where η is the price elasticity of demand
- P=MC/ (1+1/η)
- As η<0 (1+1/η)<1 then price is higher than MC
- Monopoly leads to higher price and lower output than PC

In Between

- Two-part tariffs
- Bundling
- Franchising
- Patents

Monopolistic Competition

- Perfect competition but product differentiation
- Some monopoly power
- Downward sloping demand curve

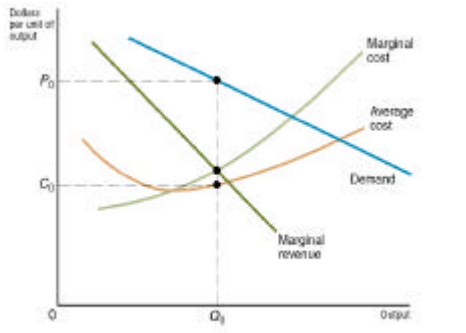

FIGURE 10.14 Short-Run Equilibrium, Monopolistic Competition

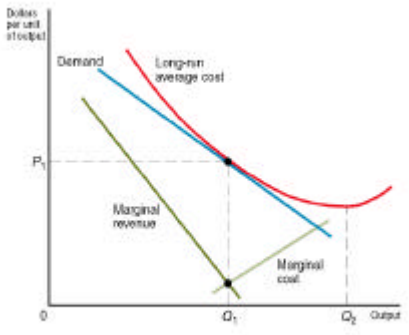

FIGURE 10.15 Long-Run Equilibrium, Monopolistic Competition

Advertising

- With product differentiation comes advertising
- How much to spend?

FIGURE 10.10 Optimal Advertising Expenditure