Outline

• Define economies of scale and scope
• Four major sources of economies of scale
• Special sources of economies of scale
• Diseconomies of scale and their sources
• Learning curve
Defining Economies of Scale

• Economies of scale = average cost (i.e. cost per unit of output) declines
  – i.e. “bigger is better”
• If average cost is increasing, we call this diseconomies of scale
• We don’t have a fancy name for constant average costs
Example

Economies of scale

Diseconomies of scale

Price per unit

Quantity

AC
Another Example

Price per unit

Economies of scale

MES

Constant average cost

Quantity

AC
What is MES?

• Minimum Efficient Scale
• MES is the smallest quantity where firm minimizes average cost
• Beyond MES, average costs are identical across firms
Defining Economies of Scope

- Economies of scope = cost savings when different goods/services are produced “under one roof”
  - $\text{TC}(Q_x, Q_y) < \text{TC}(Q_x, 0) + \text{TC}(0, Q_y)$
  - i.e. Firm’s total cost of producing X and Y together is lower than cost of producing X and Y separately
  - Difficult to illustrate graphically
Comparing Scale and Scope

• Economies of scale
  – Looks at production of one good
  – Focuses on average cost of that good

• Economies of scope
  – Looks at production of multiple goods
  – Focuses on total costs for multiple goods or “set” of goods
Four “Major” Sources of Scale and Scope Economies

1) Spreading of fixed costs
2) Specialization
3) Saving on inventories
4) Engineering principles associated with “cube-square rule”
(1) Spreading Fixed Costs

- Every company has fixed costs
- Example: firm has to pay the same costs of renting / owning the factory for operating factory 8 or 24 hours a day
- Choice of production volume affects economics of scale in short run
- Choice of technology affects economies of scale in the long run
(1) Fixed Costs - Examples

• Now, we will discuss a couple of examples to illustrate this concept
• Book Example 1 – Webvan
• Book Example 2 – Aluminum cans
• Another example – Hellenic Seaways Ferries
(2) Specialization

- Book calls this “increased productivity of variable inputs”
- Economies of scale more likely when production is capital intensive
- As markets increase in size, economies of scale enable specialization
  - Larger markets lead to specialized firms
  - Firm may switch to “in house” production due to economies of scale
(2) Specialization – Examples

• Book example – pet store versus exotic bird store

• Another example – Greek food
  – Small village has one store with cheese, bread, and wine
  – Larger cities have separate cheese stores, bakeries, and wine shops
(3) Saving on Inventories

• Firms have inventories to meet unexpected increases in demand
• If a firm runs out of a product, we call it a “stock out”
• “Stock outs” result in lost sales and affect customer loyalty
• Bigger firms can have smaller inventories relative to sales volume
(3) Inventories – Examples

• Example 1 – Dia and Champion Marinopoulos
  – Both part of Carrefour group
  – They share inventories, reducing each store’s inventory need

• Example 2 – Eurolines
  – Co-operation of 32 bus companies
  – If they share buses, they could reduce their inventory of extra buses
(4) Cube-Square Rule

• Based on following mathematical principle
  – Double diameter of hollow sphere and ...
    • Volume increases by factor of eight
    • Surface area increases by factor of four

• Best applied to manufacturing (especially liquids)
(4) Cube-Square Rule – Examples

• Example 1 – Mythos brewery
• Example 2 – natural gas pipelines (such as South Caucus Pipeline)
Other Sources of Economies of Scale and Scope

• Purchasing
• Advertising
• Research and development (R&D)
Purchasing

• Large buyers receive volume discount
  – Reduced transaction costs
  – Cost of service (per unit) is lower for large buyers
  – Assured flow of business for the supplier

• Example: large brewery may be able to buy glass (for bottles) at lower prices than small micro-breweries
Advertising

• Larger firms may experience lower cost per potential customer when compared with small regional firms
  – Consider two advertising options for Mercedes-Benz: make same ads for all dealers or make dealer-specific ads
  – If two ads cost the same, then Mercedes would make same ads for all dealers to minimize cost per potential customer
Advertising (Continued)

• Large firms may convert larger share of potential customers into actual customers
  – Example: SPAR (or Starbucks in U.S.)

• Umbrella branding
  – New products easier to introduce when the brand name is already established
  – Example: Peugeot began as bicycle manufacturer, then expanded to autos in 1892 and motorcycles in 1903
Research and Development

• It is not clear whether small firms or large firms have advantage for R&D
  – Average cost of innovations is smaller at large firms
  – Smaller firms may be more suitable for motivated researchers
Diseconomies of Scale

• In some situations, larger firms may be more expensive (per unit) than smaller firms

• Sources of diseconomies of scale
  – Labor intensive firms
  – Bureaucracy
  – Scarcity of specialized resources
  – Conflicts of interest
(1) Labor Intensive Firms

• Firms that are labor-intensive are less likely to benefit from economies of scale
• Workers in large firms are paid more than “identical” workers in small firms
  – Larger firms more likely to be unionized
  – Workers may prefer smaller firms
• However, turnover is lower in larger firms
(2) Bureaucracy

• As firm size grows, managers have more difficulty:
  – Monitoring and communicating with workers
  – Evaluating and rewarding individual performance

• Larger firms may discourage creativity of workers
(3) Scarcity of Specialized Resources

• Some resources have limited availability, so larger firms will have less access to this resource

• Examples:
  – Talented chefs
  – Coastline (or desirable location more generally)
(4) Conflict of Interest

- Professional services firms may find it difficult to sign up a client if a competitor is already a client of the firm
- The need to share sensitive information may impose a limit to the growth of the firm
- Examples include advertising agencies, management consultants, and lawyers
Learning Curve

• Similar concept to economies of scale and scope, but not identical
• Idea is that firms learn by doing
• Firms become more efficient as they become more experienced
  – Learning economies depend on cumulative output rather than the rate of output
Learning Curve (Continued)

![Graph showing the Learning Curve with points AC\textsubscript{Q} and AC\textsubscript{2Q} at Q and 2Q cumulative quantity, respectively. The price per unit decreases as the cumulative quantity increases.](image-url)
Learning Curve (Continued)

• If firms have learning curves, then they should expand output rapidly to benefit from the learning curve and achieve a cost advantage.

• This strategy is not as profitable in the short run but will lead to larger profits in the long run.
Learning Curve – Example

• Consider a successful business person who wants to “retire” and open a winery
• He thinks he knows a lot about the wine business but in fact he knows little
• But he is a shrewd business person and quickly learns how best to make and sell his wine
• Therefore, his per-bottle costs may decrease as he produces more wine
Summary

• Economies of scale and scope are similar concepts
  – Fixed costs, specialization, inventories, complex mathematical functions

• Some firms face diseconomies of scale
  – Labor intensity, bureaucracy, scarcity of resources, and conflicts of interest

• Some firms “learn” and experience cost savings based on cumulative output