

Cost Concepts and M&A *Industrial Organization*

Lecture 2
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Cost Concepts and M&A

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Outline

- Cost Functions
- Economies of Scale, Economies of Scope, and Learning
- Scale and Scope economies in multiproduct firms
- Costs and Merger Policy

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Cost Functions

- Total Cost = Fixed Cost + Variable Cost
- Average Total Cost (AC) = Total Cost/(quantity)
- Average Variable Cost (AVC) = Variable Cost/(quantity)
- Marginal Cost = Change in Total Cost with a Change in Quantity

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Cost Functions

$$C(y) = y^2 + 9$$

- What are the variable and fixed costs?
- How do you find marginal cost?
- How do you find average cost?

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Marginal and Average Cost

$$C(y) = y^2 + 9$$

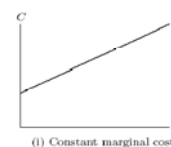
$$MC(y) = C'(y) = 2y$$

$$AC(y) = \frac{C}{y} = y + \frac{9}{y}$$

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Constant Marginal Cost

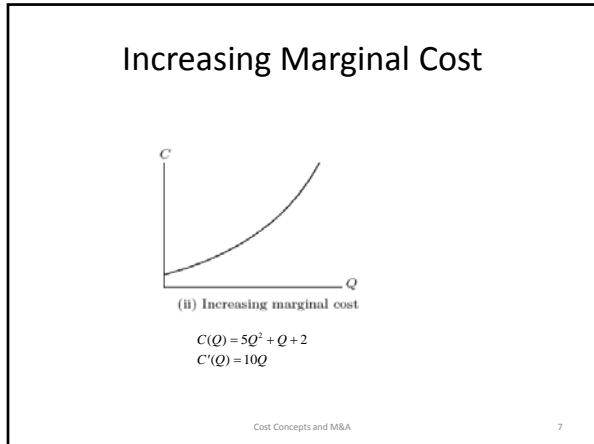


$$C(Q) = 2Q + 3$$

$$C'(Q) = 2$$

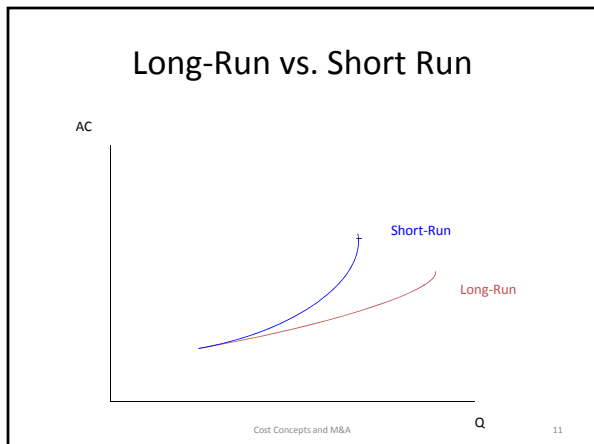
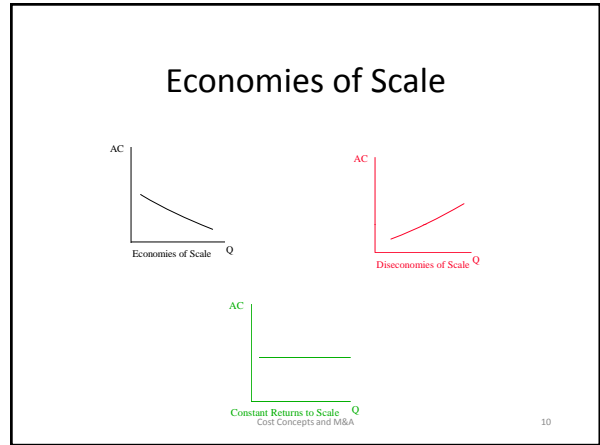
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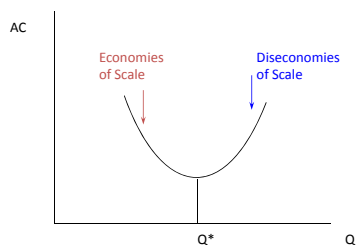
- ### Three Cost Concepts
- Economies of scale
 - Economies of scope
 - Learning
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- ### Economies of Scale
- Economies of scale exist when long run average costs decline as output rises (known as increasing returns to scale)
 - Diseconomies of scale exist when long run average costs increase as output rises (known as decreasing returns to scale)
 - Constant returns to scale exist when output has no effect on long-run average costs
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- ### Sources of Economies of Scale
- Indivisibilities or fixed inputs
 - Specialization
 - 2/3rds rule
 - Volume discounts
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Economies of Scale



Q^* is the rate of output at which long run average costs are minimized

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Economies of Scale Minimum Efficient Scale (MES)

- MES is the smallest output (q^*) a firm can produce such that its long run costs are minimized
- If a firm operates at a size less than Q^* (Q , its position is not sustainable

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Economies of Scope ("Synergy")

- Economies of scope exist when long run average costs decline as the number of different products produced increases
- Economies of scope are present when joint output of a single firm is greater than could be achieved by a group of specialized firms each producing one product.

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Economies of Scope: Measurement

- Economies of scope refers to the cost savings the result from producing goods together
- $SCP = (C(X, 0) + C(0, Y) - C(X, Y)) / C(X, Y)$
- $SCP > 0$: Economies of Scope
- $SCP < 0$: Diseconomies of Scope

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Sources of Economies of Scope

- Natural by-products
- Inputs that are public goods within the firm
- Transactions cost savings

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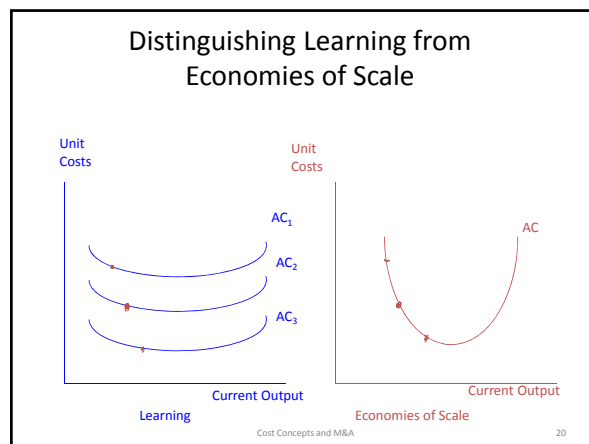
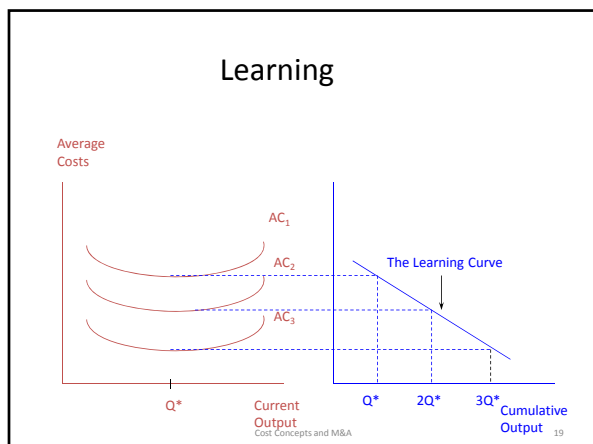
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Learning

- Learning occurs when the cost of producing a given level of output falls with the experience of doing so period by period
- Learning occurs when costs depend on cumulative output

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Economies of Scale and Scope in a Multiproduct Firm

- For economies of scale in a multiproduct firm, need a slightly new concept: the ray average cost. The reason is that there is no unambiguous measure of average costs, but that it depends on the proportions in which product 1 and product 2 are produced.

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Example

- Suppose $C(q_1, q_2) = 100 + q_1 + 2q_2$
- Then, if q_1 and q_2 are produced in equal proportions, the Ray Average Cost (RAC) is
 - $(100 + .5q + 2 \times .5q)/q = (100 + 1.5q)/q$
 - In this situation, RAC falls as q rises, indicating increasing returns to scale

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Costs and Mergers and Acquisitions

- Merger: A transaction in which the assets of one or more firms are combined in a new firm
 - includes acquisitions
- 3 types of mergers
 - Vertical merger
 - Horizontal merger
 - Conglomerate merger

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Reasons for Mergers and Acquisitions

- Through economies of scale and scope, firms can become more efficient through a merger
- However, mergers can also result in market power:
 - Merger can reduce efficiency because of diseconomies of scale or scope
 - Merger could increase profits because it allows firm to exercise market power and raise prices

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A difficult case

- What if the merger creates market efficiencies but also increases market power?
- Previously in the US, the merger guidelines did not allow efficiency gains as a defense for a proposed merger in which the concentration of an industry is increased
- However, that has changed in the 1997 merger guidelines
 - Efficiencies can provide a justification for a merger that results in increased concentration if the efficiencies would lead to lower prices.
- Merge guidelines are generally tougher in Europe.

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Conclusion

- The different types of costs
- The importance of costs in Merger Policy

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