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**Lecture 16: Economies of Scope and Scale**

1. Returns to scale
   1. How isoquants are spaced from one another determines our *returns to scale*, or the rate at which output increases when inputs are proportionally increased.
   2. *Increasing returns to scale*—output more than doubles when all inputs are doubled.
      1. One large firm is more productive than several small firms.
   3. *Constant returns to scale*—output doubles when all inputs are doubled.
      1. One large firm is as productive as several small firms.
   4. *Decreasing returns to scale*—output less than doubles when all inputs are doubled.
      1. One large firm is less productive than several small firms.
   5. There are many reasons why returns to scale will differ and they will differ not just from industry to industry but at different points in a firm’s lifespan.
      1. Part of the reason is the same reason why our production curve with one input is S-shaped. Specialization and then decreasing marginal productivity of labor.
   6. Another reason is the distinction between organization costs and transaction costs.
      1. *Organizational costs*—the costs of operating in a hierarchy
      2. *Transaction costs*—the costs engaging in the price system
      3. Coase (1937) argued that firms exist as a balance between these two costs: between millions of self-employed and one single conglomerate
      4. Changes in these costs change firm size (sales tax, information technology, etc)
2. Economies of scale.
   1. *Economies of scale*—output can be doubled for less than a doubling of costs
   2. *Diseconomies of scale*—doubling of output requires more than a doubling of costs
   3. It’s important to highlight the difference: economies of scale require refer to doubling of costs, regardless of how different inputs change in proportion to one another
   4. We can measure economies of scale like an elasticity (EC). Setting aside arc-price elasticity and using the starting values of cost and quantity, we see that:
      1. When EC > 1, diseconomies of scale
      2. When EC < 1, economies of scale
      3. Note that we did not use the arc-price elasticity method. This is to show how it relates to the marginal cost and average cost curves.
3. The Long and the Short Run

L

K

**C**

**B**

**A**

**Long-Run Expansion Path**

**Short-Run Expansion Path**

* 1. As mentioned, the short run described when at least one input is fixed.
  2. Note how total costs increase when K is fixed.
  3. Note also that the short-run labor costs are much higher than the long-run labor costs.
  4. *Long-run average cost curve (LAC)*—Average cost of production to various outputs in the long-run
  5. *Short*-*run average cost curve (SAC)*—Average cost of production to various outputs in the short-run
  6. *Long*-*run marginal cost curve (LMC)*—Curve showing the change in long-run total cost as output is increased by one unit.
  7. *Short*-*run marginal cost curve (SMC)*—Curve showing the change in short-run total cost as output is increased by one unit.
  8. Marginal cost curves intersect average cost curves at the associated average cost curve’s minimum point.
     1. For example, when LAC is decreasing, LMC is lower; when LAC is increasing, LMC is greater.

SAC1

SAC2

SAC3

SMC3

SMC2

SMC1

LMC

LAC

Output

Cost per unit of output

* 1. The LAC envelopes the SMC curves, surrounding the curves.
     1. When the LAC intersects the SMC to the left of the minimum point, economies of scale are in effect.
     2. When the LAC intersects the SMC to the right of the minimum point, diseconomies of scale are in effect.

1. Scope
   1. One firm often produces many different goods, especially when the production of those goods overlap. For example, a rancher will sell both beef and hides.
   2. To capture their ability to make more than one good, we construct a *product transformation curve (PTC)*—or a curve showing the various combinations of two different outputs that can be produced with a given set of inputs.
   3. The convexity of the curve determines if the goods have:
      1. *Economies of scope*—joint output of a single firm is greater than output which can be achieved by two different firms each producing a different product
      2. *Diseconomies of scope*—joint output of a single firm is less than output which can be achieved by two different firms each producing a different product
   4. When there are economies of scope, the PTC is concave. (A) When there are diseconomies of scope, the PTC is convex. (B) When there is no difference, it is a straight line. (C)

Product 2

Product 1

A

B

C

* + 1. Note that when there are economies of scope, the curve looks just like a PPF.