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**Lecture 21: Short and Long Run Decisions**

1. What’s black about “Black Friday?”
2. Deconstructing ATC
   1. So far we’ve been treating ATC as a singular curve. But recall it is actually the combination of two curves: AFC and AVC.
   2. Of course, the firm cares about both covering its fixed costs and covering its variable costs.
   3. But what if a fixed cost is actually sunk? Since they are sunk, we shouldn’t consider them when optimizing production, even if we eventually have to pay them off
   4. In other words, we make the distinction between shutting down for the short run and shutting down for the long run.
3. The Shut-Down Rule
   1. To operate, a firm must be able to pay for its costs which *can* be retrieved. This includes not just paying the workers and paying for materials (variable costs), but also paying for fixed costs which can be returned or resold
   2. Technically, a sunk cost is neither a fixed nor a variable cost.
      1. Both fixed and variable costs are “economic costs,” or there is an opportunity cost (either in the short-run or the long-run) to using it. A sunk cost, however, is not economic. If a firm permanently abandons a line of business, it would not be able to recover from when it committed to these costs.
      2. Another way to think about a sunk cost is as any payment you are stuck with: specialized machines which cannot be resold, employee pensions, etc.
      3. For simplicity, assume ***no*** variable cost is sunk and ***some*** fixed costs are sunk.
   3. Sunk costs explain why ice cream parlors and resort hotels remain open during the winter.
      1. The sunk costs they must pay are large: payments for construction, rent and taxes on the land, basic upkeep on the building, etc. These are sunk because it’s not feasible to sublet the building (it’s too specialized) or to tear it down and put something else in its place, only to rebuild it in time for summer again.
      2. The non-sunk costs are relatively small: paying staff, providing food, running the electricity. All of these costs can be avoided if the hotel or parlor shuts down for the winter.
      3. If sales can cover these non-sunk costs, then the firm will be open, even if the sales cannot cover all of the sunk costs.
   4. The *Shut-Down Rule*—the firm should shut down if the price of the product is less than the average economic cost of production at the profit-maximizing output.
4. Mathematics
   1. Sometimes we assume that AFC is sunk and AVC is not. Graphically, we use AVC to determine the shut down point.
   2. But consider a standard cost function: TC = 10 + Q2. If “10” is the fixed cost (which mathematically it is since as Q increases, it doesn’t change) and we assumed it was all sunk, then our cost function would just be Q2, which means the zero economic profit price is zero.
      1. This is why you see AVC as a U-shape.
   3. Of course, we can construct our cost curve differently if we want it to make sense with the graphs. For example, if we wrote TC = 1 + Q-1 + Q2, then it would be U-shaped without the fixed cost (the “1”).
   4. To determine when the short-run shut down point is, rewrite the equation so it includes only economic costs. Then proceed normally.
   5. For example, last class we used TC = 4 + 2Q2 and TR = PQ. Suppose half of the fixed cost is sunk. (We denote TCe as total economic costs (as in, TCe ignores sunk costs.)
      1. Then TCe = 2 + 2Q2
      2. (2 + 2Q2)/Q = 4Q
      3. 2 + 2Q2 = 4Q2
      4. 2 = 2Q2
      5. 1 = Q; P = 4
      6. Recall before the breakeven price was 5.657. The price drops even further but stays above 4, the firm will remain open in the short-run.