

Assignment #6
Economics 101 – Section 5
Due Date: Thursday March 4, 2004

Instructions: Complete all questions and sub questions on separate sheets of paper. Make sure to include your name (first and last) and your student number on the first page of your assignment. Staple all sheets together and turn in to my office by the due date.

1. The following table gives the short-run and long-run total costs for various levels of output of Consolidated National Acme, Inc.:

<u>Q</u>	<u>TC1</u>	<u>TC2</u>
0	0	350
1	300	400
2	400	435
3	465	465
4	495	505
5	560	560
6	600	635
7	700	735

- a. Which column, TC1 or TC2, gives long-run total costs and which gives short run total costs? How do you know? (Remember that in the long run all inputs are variable and it is possible to have not cost at all.)
- b. For each level of output, find the short-run TFC, TVC, AFC, AVC, and MC. Keep in mind that you have determined from a. that TC2 gives the short-run total costs.
- c. At what output level would the firms short-run and long-run input mixes be the same?
- d. Starting from producing two units, Consolidated's managers decide to double production to four units. They do this by doubling all of their inputs in the long-run – that is, instead of having one company produce 2 units at a cost of 400 they have essentially 2 companies producing 2 units each at cost of 400 (so their total cost from these two companies will be 800). Comment on their managerial skill.
- e. Over what range of output do you see economies of scale? Diseconomies of scale? Constant returns to scale?

Answers

- a. *TC₁ gives long-run total cost* because it registers the cost of 0 units of output as 0. In the long run, all inputs can be varied, and the cheapest way to produce zero output is to use zero inputs.
Short-run total costs are detailed in column *TC₂*. In the short run, not all inputs can be varied, and there will be some fixed costs incurred, even at 0 output.
- b.

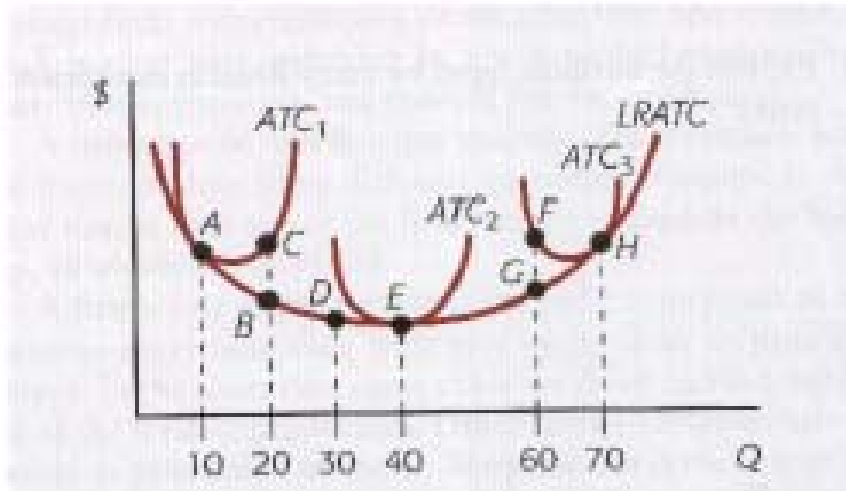
Q	TFC	TVC	AFC	AVC	MC
0	\$350	\$ 0	—	—	
1	\$350	\$ 50	\$350	\$ 50	\$ 50
2	\$350	\$ 85	\$175	\$ 43	\$ 35
3	\$350	\$115	\$117	\$ 38	\$ 30
4	\$350	\$155	\$ 88	\$ 39	\$ 40
5	\$350	\$210	\$ 70	\$ 42	\$ 55
6	\$350	\$285	\$ 58	\$ 48	\$ 75
7	\$350	\$385	\$ 50	\$ 55	\$100

- c. At 3 units and 5 units, long-run total cost = short-run total cost; hence, in the short run, the firm must be producing these output levels with the same input mix.
- d. *Their managerial skills are wanting.* They overlook the economies of scale evident from the fact that when output doubles from 2 units to 4 units, long-run total cost *less* than doubles, implying that it is *not* necessary to double all inputs. Another way of saying this is that the firm is on the declining portion of the *LRATC* curve.
- e. The most straightforward way to answer this problem is to compute *LRATC* at each output level using the total cost figures in the column labeled TC_1 :

Q	LRATC
0	—
1	\$300
2	\$200
3	\$155
4	\$124
5	\$112
6	\$100
7	\$100

There are *economies of scale* (declining *LRATC*) from 1 to 6 units of output, and *constant returns to scale* (constant *LRATC*) from 6 to 7 units.

2. Ludmilla's house of pancakes is currently producing 10 (thousand) pancakes per day at point A on the following diagram. Ludmilla's business partner Hans (brother to Fritz), thinks they should double production immediately.



- What point will likely illustrate Ludmilla's cost situation for the near future if they double production in a very short time? Why?
- If Ludmilla wants to keep producing 20 pancakes, at what point does she want to be eventually? How would the company get there?
- Eventually, the company does very well and expands to 70 pancakes per day. However, after a few years, Ludmilla discovers that profit was greater when she produced only 20 pancakes per day. She wants to scale back production to 20 pancakes per day by laying off workers, selling off equipment, renting less space, and producing fewer pancakes. Hans wants to reduce output by just cutting back on flour and milk and laying off workers. Who's right? Discuss the situation with reference to the relevant points on the diagram.
- Does the diagram tell us what output should be? Why or why not?

Answers:

- Point C.* In the short run, Ludmilla cannot adjust all her inputs to achieve the lowest cost input mix. She will travel along her short-run ATC curve, marked ATC_1 in the diagram.
- Eventually, she wants to be at *point B*. She can get there by adjusting all of her inputs over the long run, to produce 20 units at the lowest possible cost.
- At 70 pancakes per day, the firm is operating at *point H*. Cutting back production to 20 units the way Hans wants to do it (reducing variable inputs only) would move the firm leftward along ATC_3 , substantially raising average cost in the short run. This would *not* return the firm back to its initial higher-profit, lower-output situation at *point B*. Ludmilla's method of scaling back *all*

inputs would move the firm along its LRATC curve, permitting a return to *point B*. If the goal is to return to 20 units, Ludmilla's way will result in more profit in the long run.

- d. We *cannot* tell from this diagram what output Ludmilla should aim for. While *point E* is the lowest-cost output level in the long run, the firm's goal is to maximize profit, not minimize cost per unit. Until we know how much *revenue* the firm would earn at each output level, we cannot say which output level would generate the highest profit.