Chapter 13

The Costs of Production

Introduction

- The starting point of the industrial organization is the supply of the firms

- Decision making depends on multiple factors: one of them is cost of production

- Cost is the price paid to the factors of production (land, labor, capital, entrepreneur)

Total revenue, cost and profit

- **Example**

  You can to make a cake but you have nothing. Each of your friend has helped you with inputs, and now you have to pay them back

- **Total cost (TC):** sum of payment to factor inputs (C*Q)

- **Total revenue (TR):** total payments received by selling the cake (P*Q)

- **Total profit**=TR-TC

Cost and decision making

- Economists considers the **opportunity costs** unlike the accountants

- Opportunity cost is an implicit cost that helps decision making

- Person X wants to buy a bike at Rs. 3 lakhs. If he would have saved in banks with 5 % roi, he could have earned Rs. 15k. Hence, Rs. 15k is the opportunity cost but accountant can't show it

# Economic profit versus accounting profit
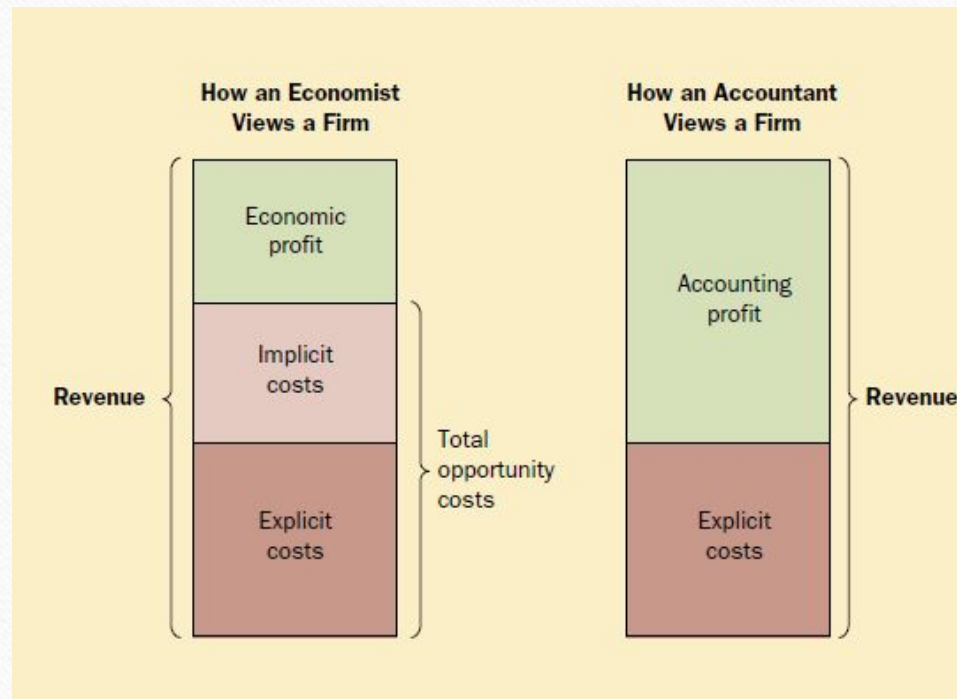
Production and costs

- Production function: relationship between inputs and output

- In the short-run only labor can be varied but everything can vary in the long-run

| NUMBER OF WORKERS	OUTPUT (QUANTITY OF COOKIES PRODUCED PER HOUR)	MARGINAL PRODUCT OF LABOR	COST OF FACTORY	COST OF WORKERS	TOTAL COST OF INPUTS (COST OF FACTORY + COST OF WORKERS)
0	0		$30	$ 0	$30
		50			
1	50		30	10	40
		40			
2	90		30	20	50
		30			
3	120		30	30	60
		20			
4	140		30	40	70
		10			
5	150		30	50	80

Cont…

- Output increases with the rise in worker

- Due to diminishing marginal product the total product curve is concave
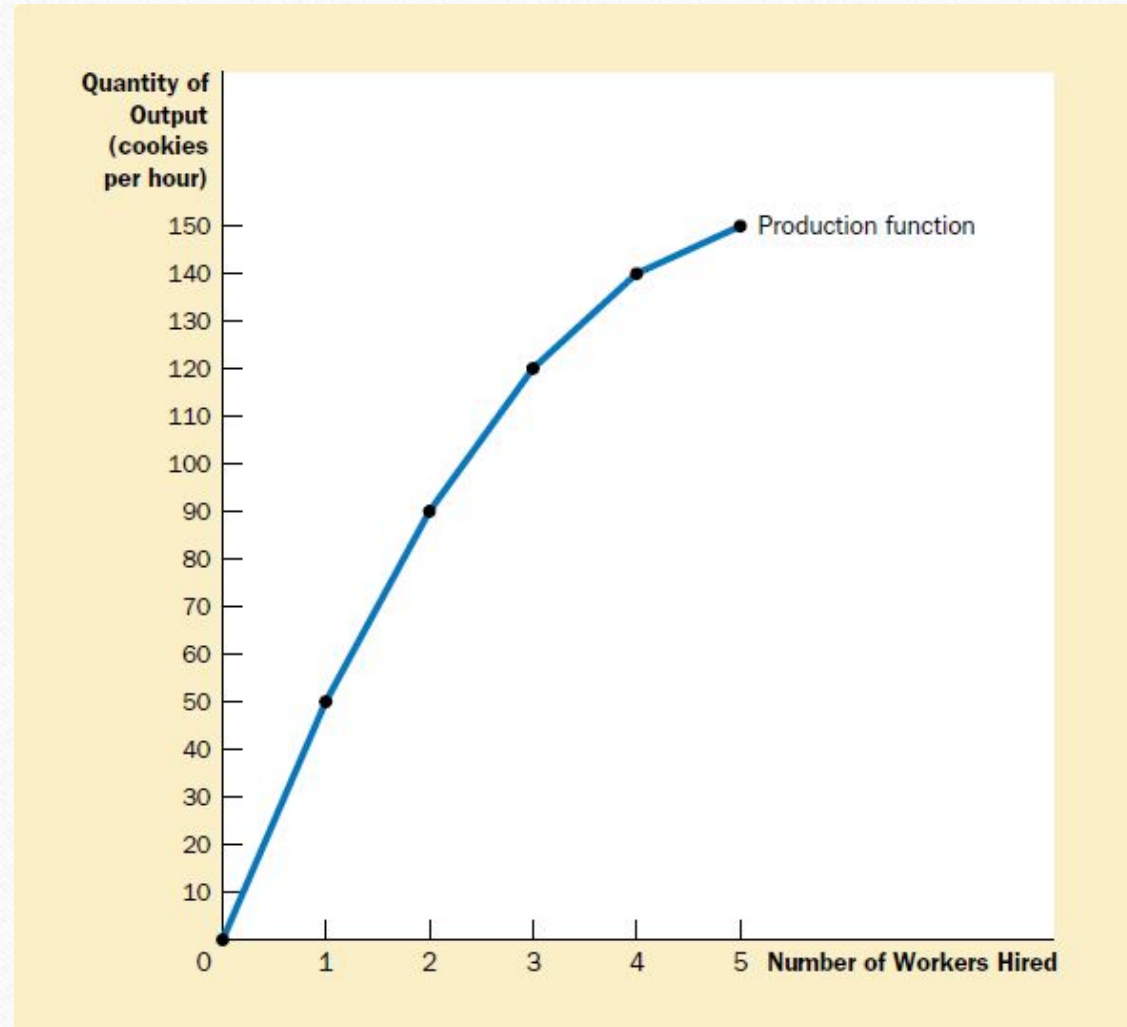
Cost

Total cost is convex due to Diminishing Marginal Returns (DMR)

Cost curve will be steeper if the cost of production is higher
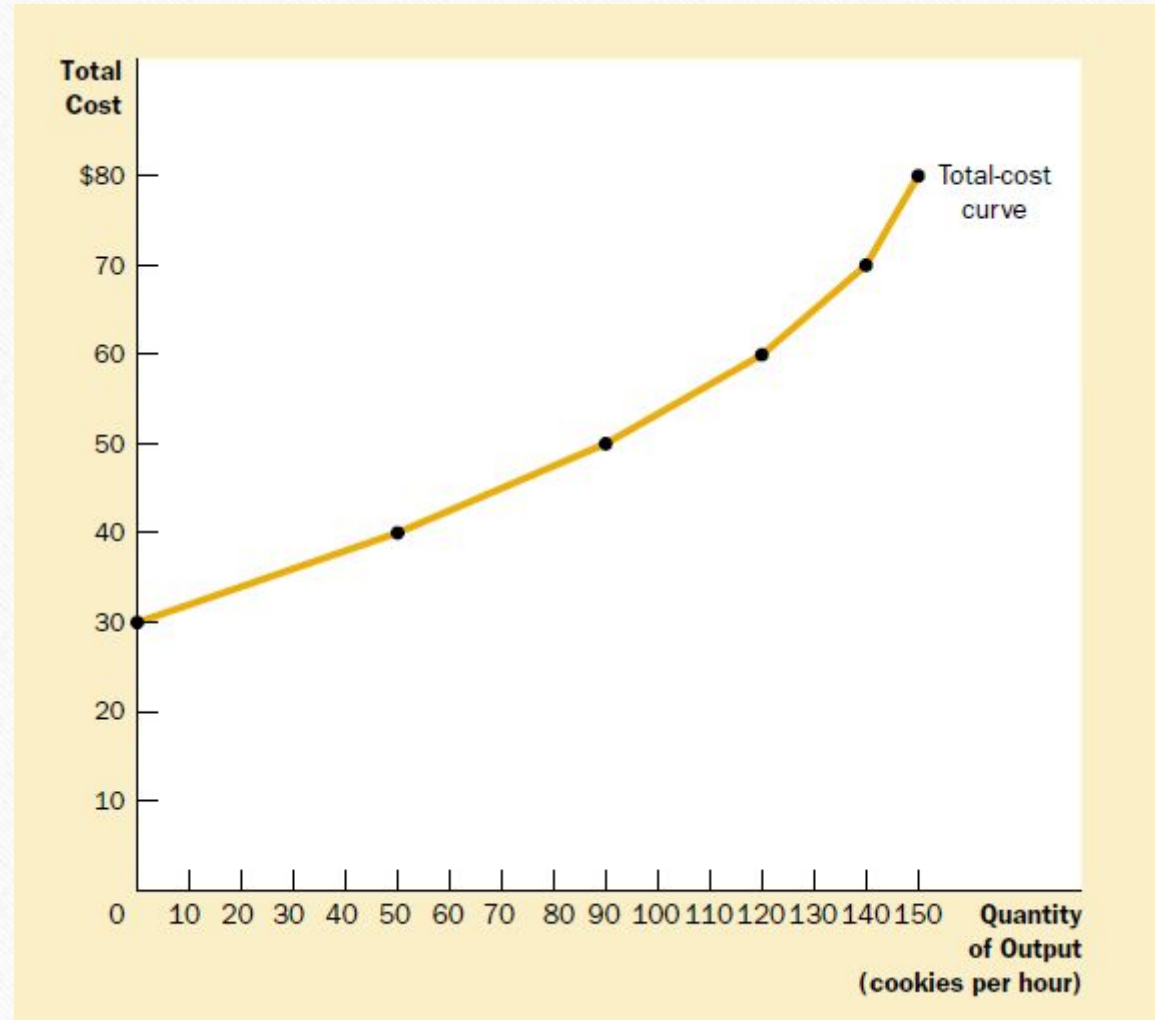
Different costs

- TC=TFC+TVC

- Divide the above equation by output (Q) and get the average total cost (ATC)

- ATC=AFC+AVC

- MC=dTC/dQ

Quantity of Lemonade (Glasses per Hour)	Total Cost	Fixed Cost	Variable Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	$ 3.00	$3.00	$ 0.00	—	—	—	
							$0.30
1	3.30	3.00	0.30	$3.00	$0.30	$3.30	
							0.50
2	3.80	3.00	0.80	1.50	0.40	1.90	
							0.70
3	4.50	3.00	1.50	1.00	0.50	1.50	
							0.90
4	5.40	3.00	2.40	0.75	0.60	1.35	
							1.10
5	6.50	3.00	3.50	0.60	0.70	1.30	
							1.30
6	7.80	3.00	4.80	0.50	0.80	1.30	
							1.50
7	9.30	3.00	6.30	0.43	0.90	1.33	
							1.70
8	11.00	3.00	8.00	0.38	1.00	1.38	
							1.90
9	12.90	3.00	9.90	0.33	1.10	1.43	
							2.10
10	15.00	3.00	12.00	0.30	1.20	1.50	

Cost curves

- Minimization of ATC ensures MC will pass through the minimum point of ATC

- General case: MC is U-shaped
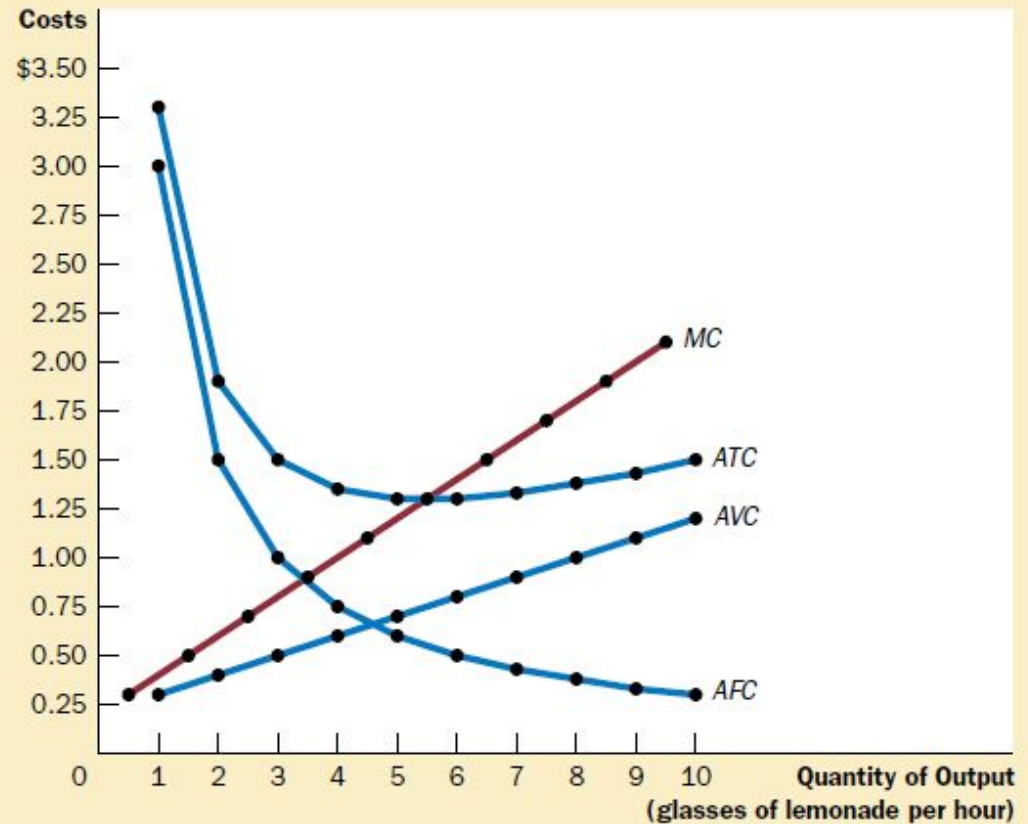
General case

- Total cost is initially concave but it is convex beyond a threshold

QUANTITY OF BAGELS (PER HOUR)	TOTAL COST	FIXED COST	VARIABLE COST	AVERAGE FIXED COST	AVERAGE VARIABLE COST	AVERAGE TOTAL COST	MARGINAL COST
0	$ 2.00	$2.00	$ 0.00	—	—	—	
							$1.00
1	3.00	2.00	1.00	$2.00	$1.00	$3.00	
							0.80
2	3.80	2.00	1.80	1.00	0.90	1.90	
							0.60
3	4.40	2.00	2.40	0.67	0.80	1.47	
							0.40
4	4.80	2.00	2.80	0.50	0.70	1.20	
							0.40
5	5.20	2.00	3.20	0.40	0.64	1.04	
							0.60
6	5.80	2.00	3.80	0.33	0.63	0.96	
							0.80
7	6.60	2.00	4.60	0.29	0.66	0.95	
							1.00
8	7.60	2.00	5.60	0.25	0.70	0.95	
							1.20
9	8.80	2.00	6.80	0.22	0.76	0.98	
							1.40
10	10.20	2.00	8.20	0.20	0.82	1.02	
							1.60
11	11.80	2.00	9.80	0.18	0.89	1.07	
							1.80
12	13.60	2.00	11.60	0.17	0.97	1.14	
							2.00
13	15.60	2.00	13.60	0.15	1.05	1.20	
							2.20
14	17.80	2.00	15.80	0.14	1.13	1.27	

Cont…
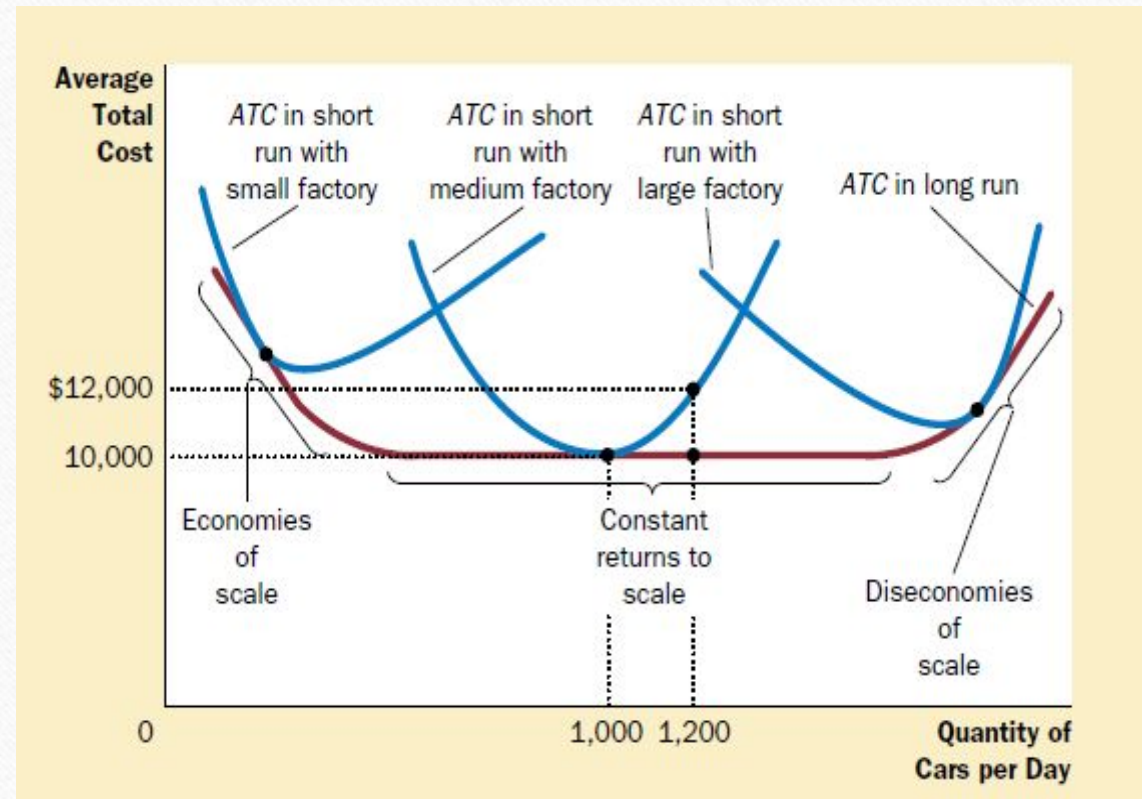

(a) Total-Cost Curve
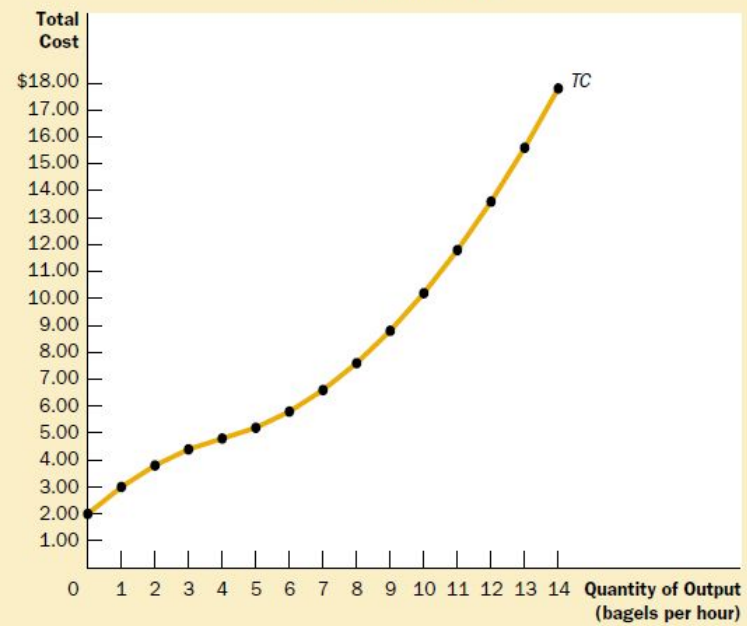
(b) Marginal- and Average-Cost Curves
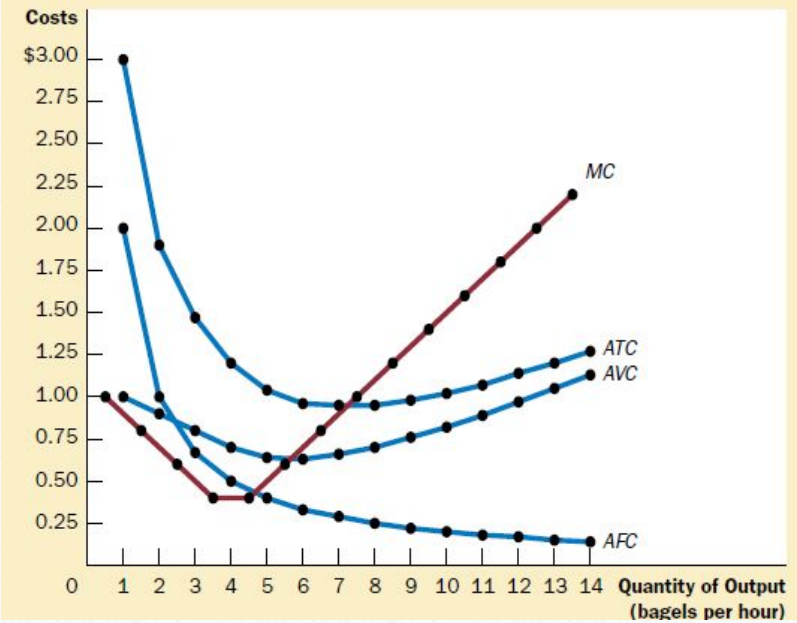
Short-run and long-run

- The short-run cost curves in the envelop forms the long-run cost curve

- Cost and output relationship is defined by scale economies

Returns to scale

- Properties of long-run:
  - Increasing returns to scale (IRS)
  - Constant returns to scale (CRS)
  - Decreasing returns to scale (DRS)