Chapter seven
Technology, production and costs

Total cost

- **Total cost is the cost of all inputs that a firm uses in production.**

Total cost = fixed cost + variable cost

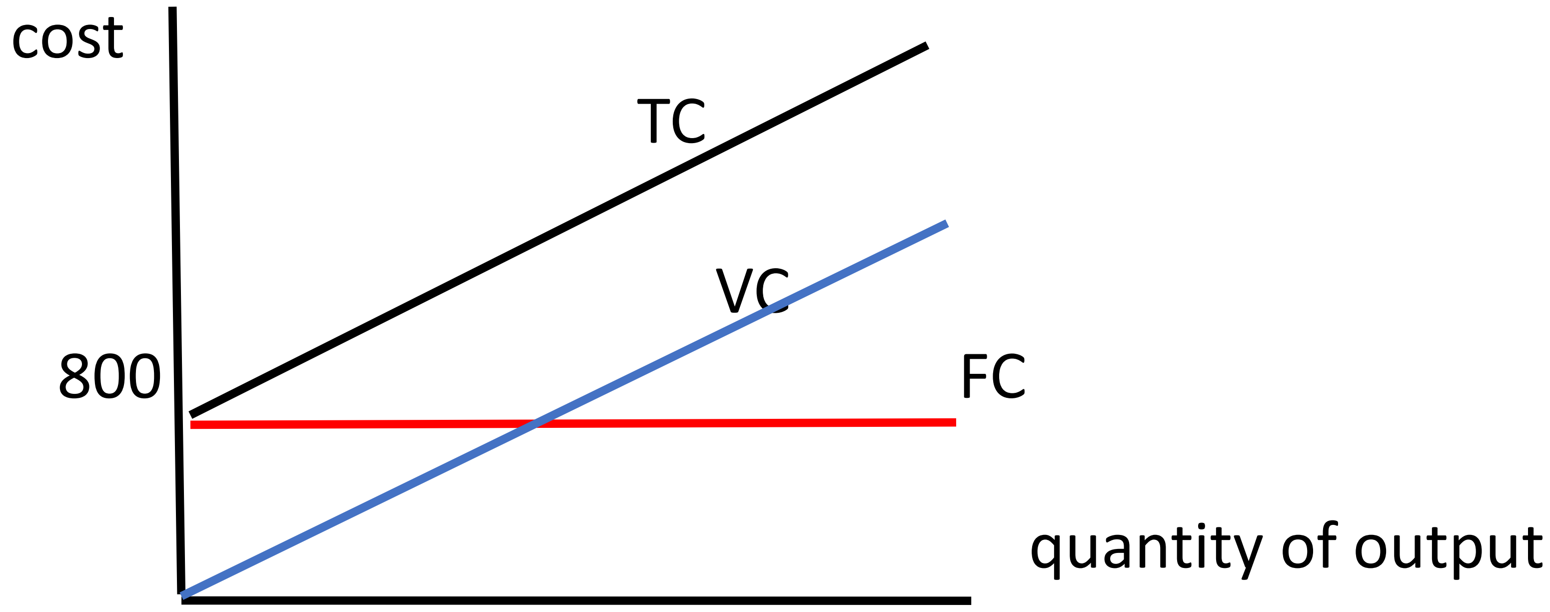
TC = FC + VC

1. **Fixed cost is the cost that remains constant as output changes.** fixed cost includes lease payments, payments for fire insurance, payments for loans and payments for advertising.

2. **Variable cost is the cost that changes as output changes.** Variable cost includes labor cost, raw material cost and electricity cost.

Total cost (TC): *is* the sum of fixed cost and variable cost.

Total costs (TC) = fixed costs (FC) + variable costs (VC)



For example, if the fixed cost is 800 pounds. in the short run, the variable cost is the cost of labor. The wage is 600 pounds per worker. Estimate total cost.

number of workers	Fixed cost	Variable cost (Labor wage)	Total cost
0	800	0	800
1	800	600	1400
2	800	1200	2000
3	800	1800	2600
4	800	2400	3200
5	800	3000	3800
6	800	3600	4400

Average Cost and Marginal Cost

- ***Average Cost (AC): is total cost divided by the quantity of output.***

Average total cost (AC) = total cost / quantity of output

$$AC = \frac{TC}{Q}$$

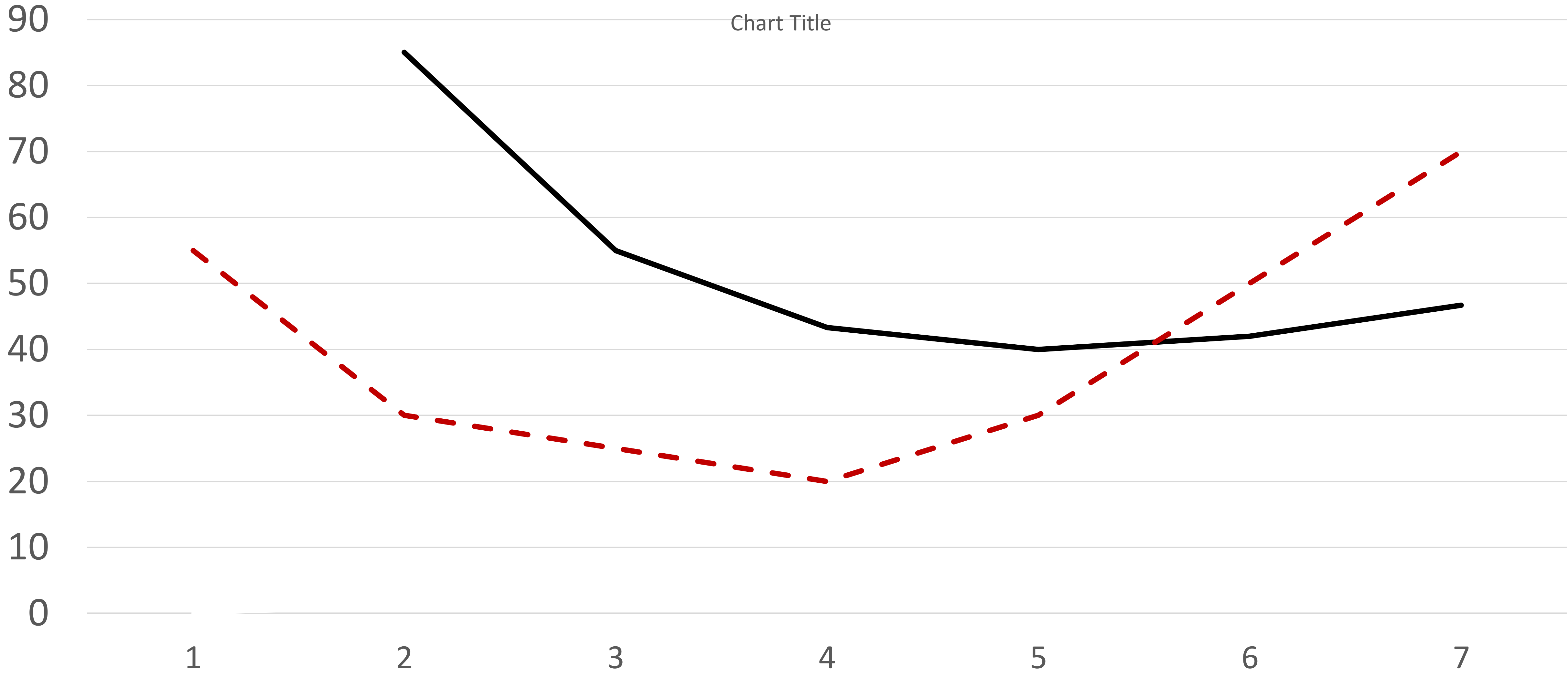
Marginal Cost (MC): is the change in total cost from producing one more unit of output.

Marginal cost = change in total cost / change in output

$$MC = \frac{\Delta\, TC}{\Delta\, Q}$$

Quantity of output	Total cost	Average cost	Marginal cost
1	85	85	85
2	110	55	25
3	130	43.3	20
4	160	40	30
5	210	42	50
6	280	46.7	70

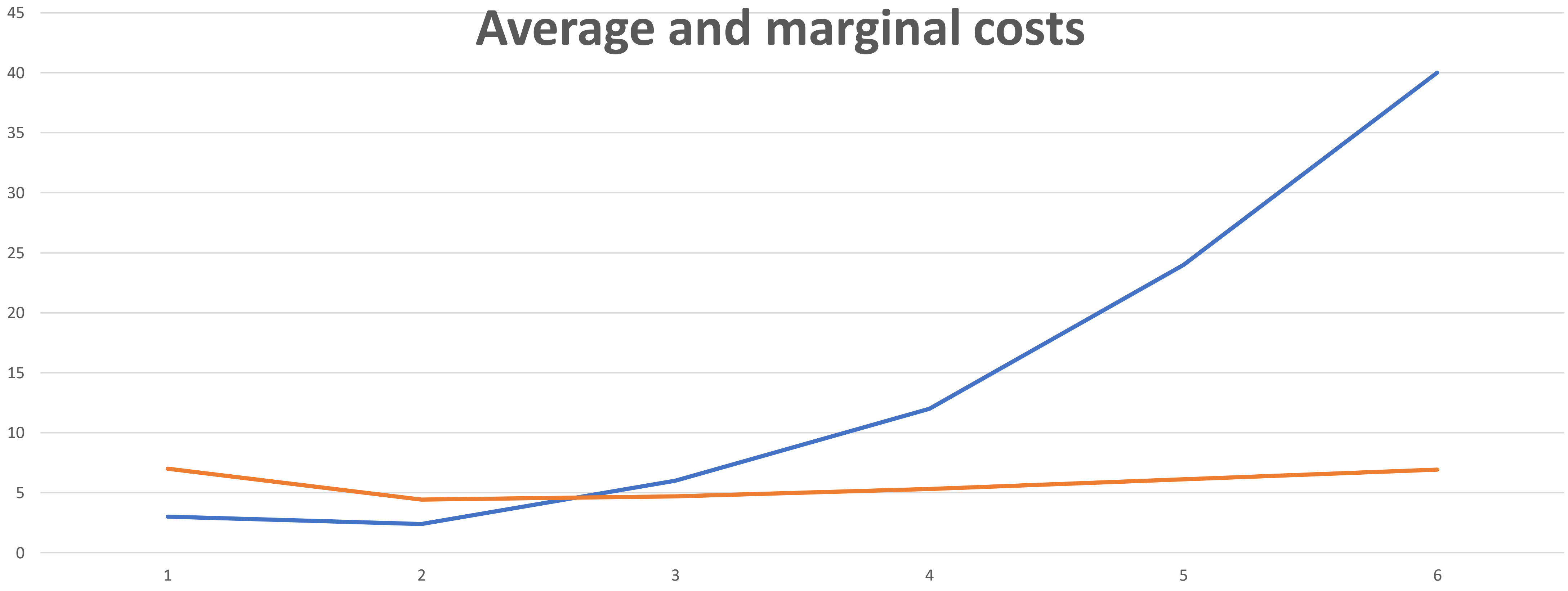
The relation between average cost and marginal cost



This table shows the relation between number of workers, output and total cost. Could you estimate marginal and average costs?

Number of workers	output	Total cost	Marginal cost	Average cost
0	0	800	0	0
1	200	1400	3	7
2	450	2000	2.4	4.4
3	550	2600	6	4.7
4	600	3200	12	5.3
5	625	3800	24	6.1
6	640	4400	40	6.9

The relation between average cost and marginal cost

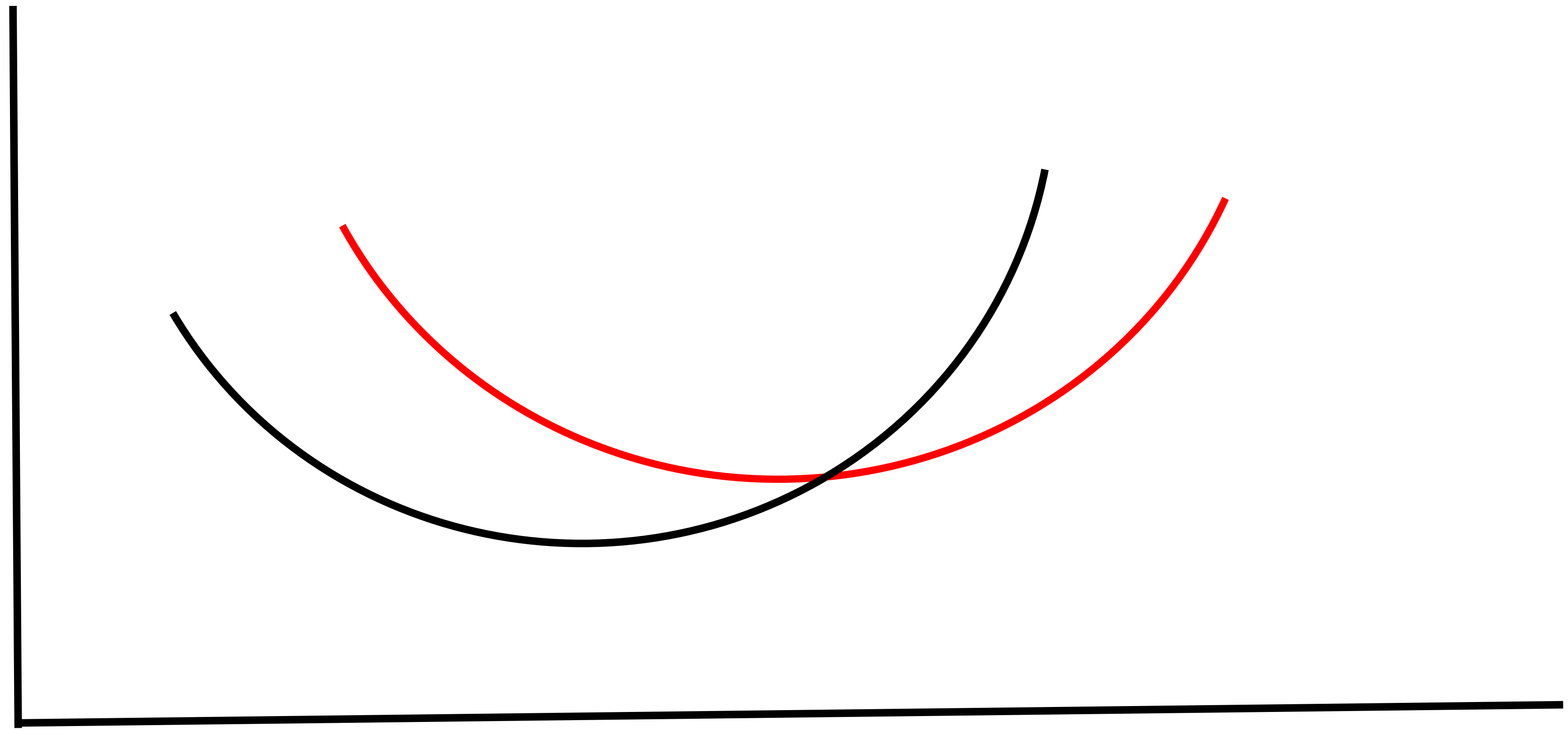


The relation between average cost and marginal cost in the short run

When the average cost falls, the marginal cost is below the average cost.

When the average cost increases, the marginal cost is above the average cost.

Marginal cost intersects average cost, when average cost is at the minimum point.



Marginal and average costs are U-shaped

- **The average cost curve has a U-shape and the marginal cost curve has a U-shape.**

the marginal cost and the marginal product of labor

- **When the marginal product of labor is rising, the marginal cost of production is falling.**
- **When the marginal product of labor is falling, the marginal cost of production is rising.**