Inventory Management

Multi-Period Model

Goods with long selling period with less replenishment period

Manger should answer for three tactical questions

1. How often should we monitor inventory status?
   - Continuous review
   - Periodical review
2. When should we place a replenishment order?
3. How many units should we order?

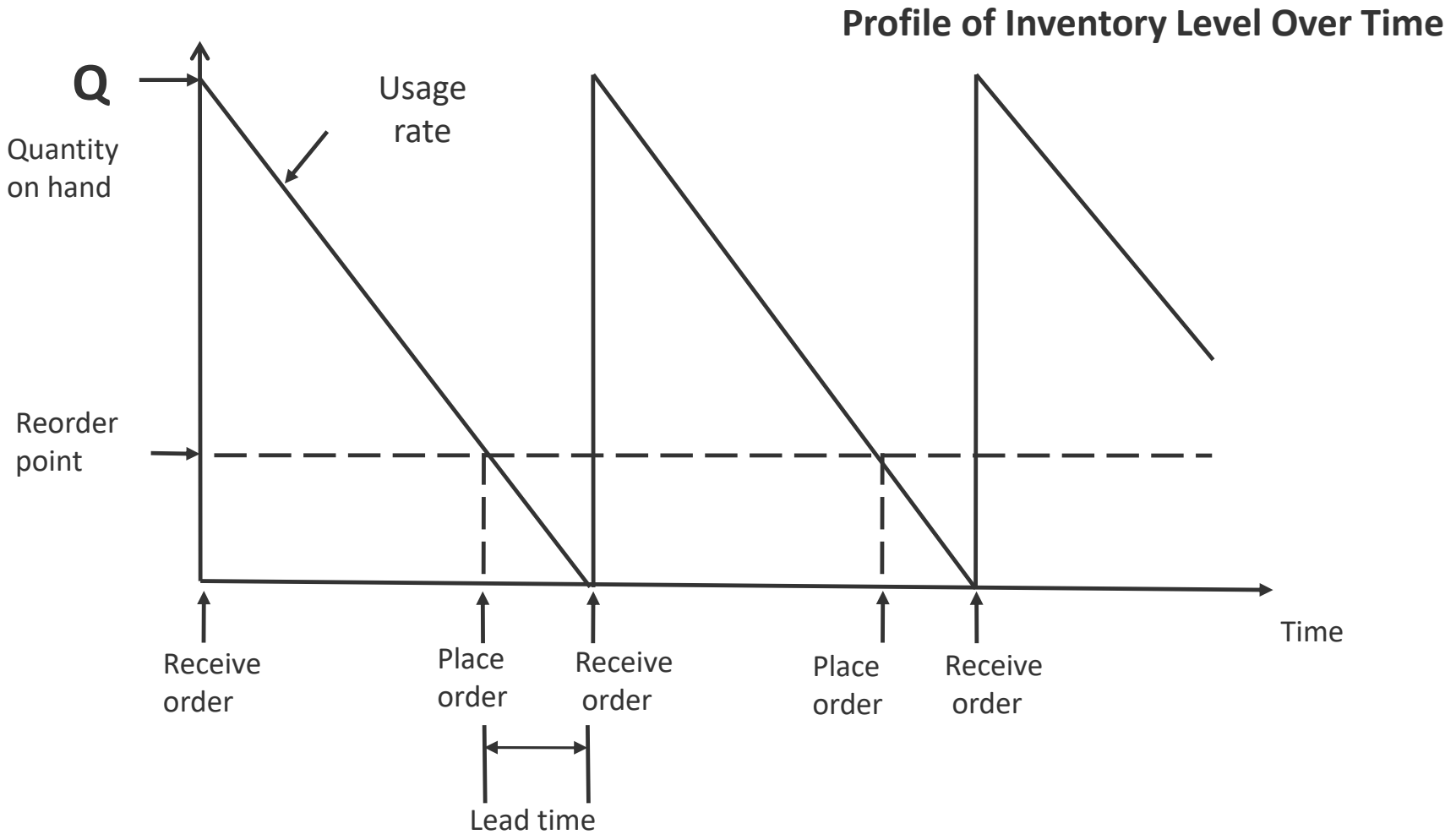
Multi-Period Model

There are two general types of multi-period inventory systems

1. Fixed–order quantity model
   - Also called the economic order quantity, EOQ, and Q-model
   - Quantity (Event) triggered

2. Fixed–time period model
   - Also called the periodic system, periodic review system, fixed-order interval system, and P-model
   - Time triggered

The Inventory Cycle



Total Inventory Annual Cost

$$\text{Total Cost} = \text{Annual Holding Cost} + \text{Annual Ordering Cost}$$

$$= \frac{Q}{2}H + \frac{D}{Q}S$$

where

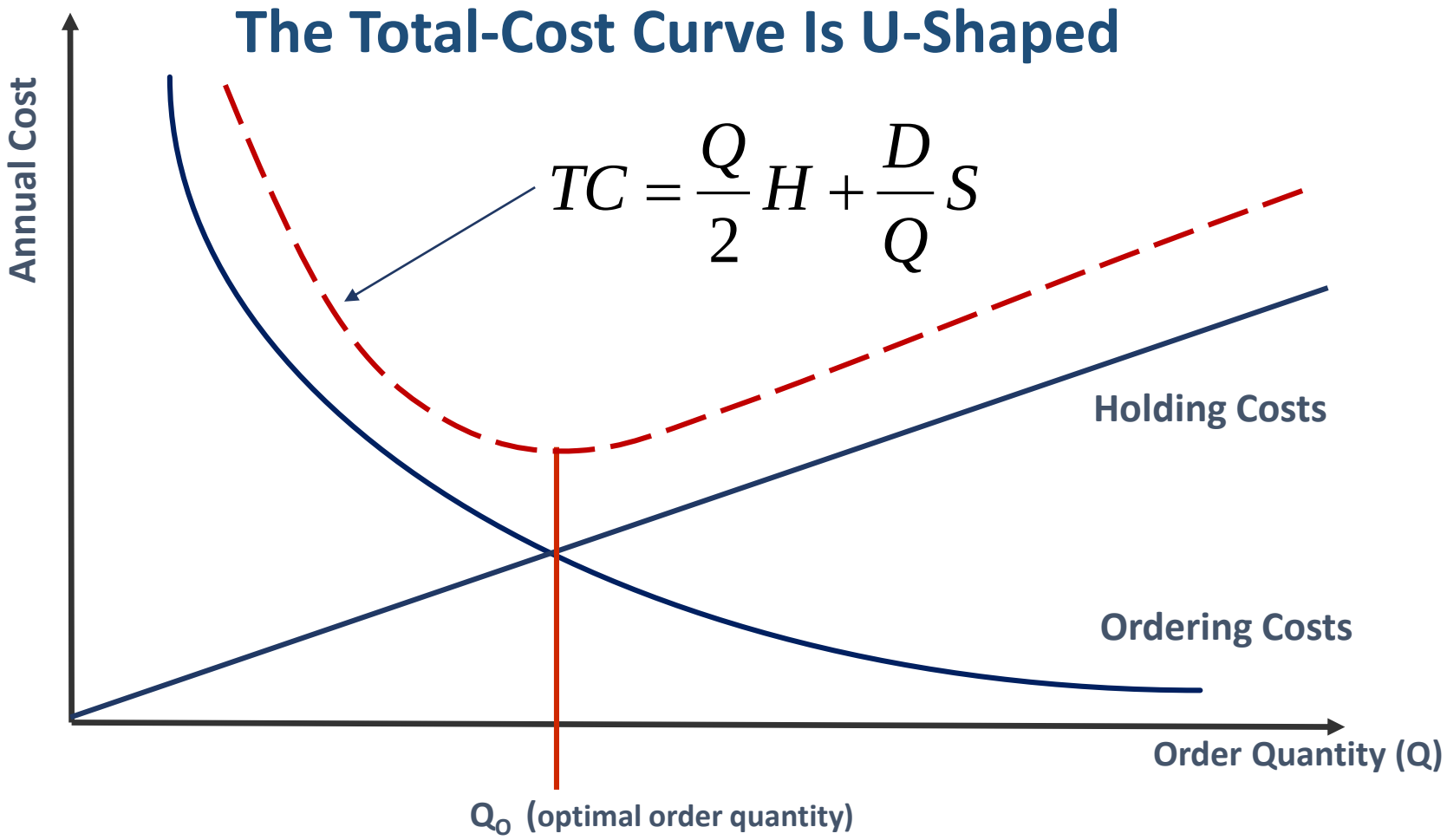
$Q = \text{Order quantity in units}$

$H = \text{Holding (carrying) cost per unit, usually per year}$

$D = \text{Demand, usually in units per year}$

$S = \text{Ordering cost per order}$

Goal: Total Cost Minimization



Economic Order Quantity (EOQ)

EOQ model is used to find a fixed order quantity that will minimize total annual inventory costs.

The total cost curve reaches its minimum where the carrying and ordering costs are equal.

$$Q_O = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(\text{annual demand})(\text{order cost})}{\text{annual holding cost per unit}}}$$

Example Problem - EOQ

Mean of weekly demand	: 200
Standard deviation of weekly demand	: 40
Unit cost of the raw material	: Rs. 300/-
Ordering cost	: Rs. 460/- per order
Carrying cost percentage	: 20% per annum of Unit cost of the raw material
Lead time for procurement	: 2 weeks

<u>EOQ Model</u>

Weekly demand = 200

Number of weeks per year = 52

Annual demand, D = 200*52 = 10,400

Carrying cost, H = Rs. 60.00 per unit per year

Economic Order Quantity = $= \sqrt{2DS/H} = \sqrt{{}^{2*460*10,400}/_{60}} = 399.33 \approx 400$

Number of orders = 10,400/400 = 26

Time between orders = 26/12 = ≈2 weeks once

Determine Re-order-Point (ROP)

Multiply the lead time for replenishment with demand during the lead time

Lead time = 1 week

Two weeks quantity = 400; One week quantity = 400/2 = 200

Re-Order-Point = Demand during lead time x Lead Time

= 200 x 1 = 200

- Thank You