Economic Order Quantity-basics

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EOQ 1

- **EOQ** = Economic Order Quantity and limitation of this model
- **EQO** = Deterministic model
- Variables used to derive EOQ basic formula (see slide EOQ5)
  - **Ch** = Cost to hold one unit inventory for a year
  - **Cp** = Cost to place a single order
  - **A** = Demand for the year
  - **Q** = Quantity

- The economic order quantity (EOQ) is the **order quantity** that minimizes total holding and ordering costs for the year. Even if all the assumptions don't hold exactly, the **EOQ** gives us a good indication of whether or not current order quantities are reasonable.

- **Total Relevant Cost (TRC)**
  - **why relevant ? ->because they are affected by order quantity**
- **TRC**= Yearly Holding Cost + Yearly Ordering Cost

$$\frac{Q}{2} * C_h + \frac{A}{Q} * C_p$$

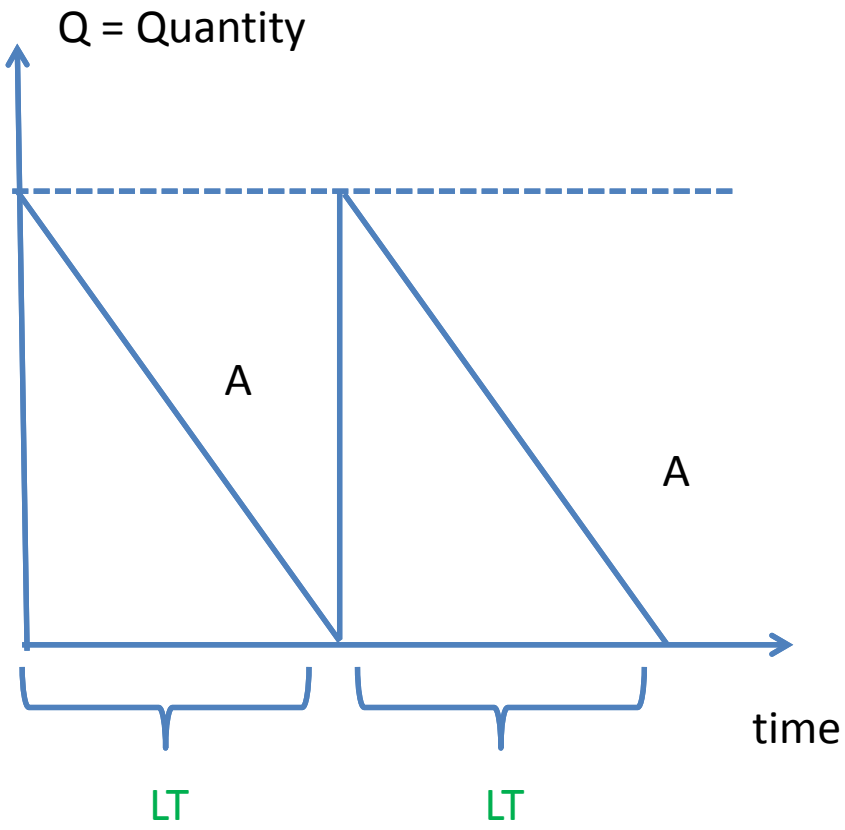
Average inventory carrying cost –see EOQ4 slide

EOQ 2

- **What is the EOQ Model?**
- Cost Minimizing Order quantity (Q)
- **Assumptions=prerequisites:**
  - Single item only
  - Relatively uniform (continuous) & known demand rate
  - Fixed item cost
  - Fixed ordering and holding cost
  - No stock shortage and Instantaneous shipment

- Constant lead time =LT (see slide EOQ3)

EOQ 3



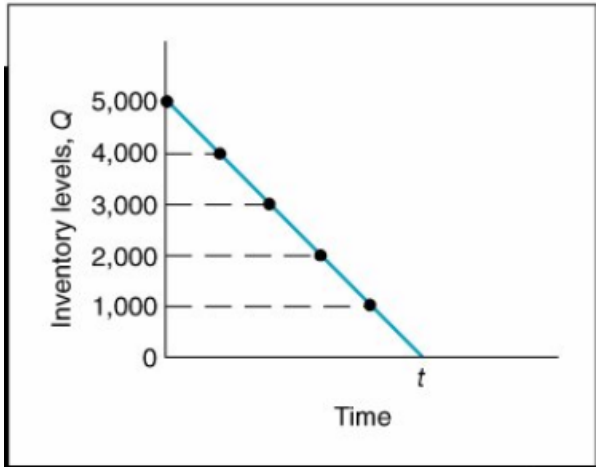
Notice, that inventory never goes below zero; shortages do not exist !!

EOQ4 - Carrying cost

$$\text{Average inventory (carrying) cost} = \frac{Q}{2}$$

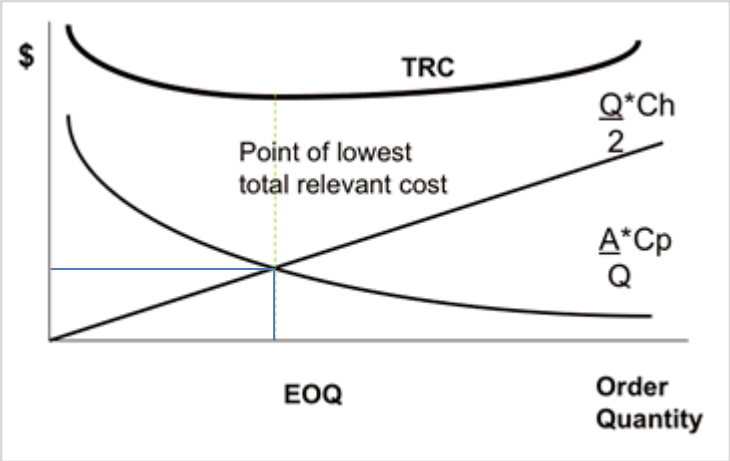
To verify this relationship, we can specify any number of points values of Q over the entire time period, t , and divide by the number of points. For example, if Q = 5,000, the six points designated from 5,000 to 0, as shown in shown figure, are summed and divided by 6:

$$\text{average inventory} = \frac{5{,}000 + 4{,}000 + 3{,}000 + 2{,}000 + 1{,}000 + 0}{6}$$
$$= 2{,}500$$



EOQ 5

TRC= $\frac{Q}{2} * C_h + \frac{A}{Q} * C_p$



To calculate derivative of TRC and put it to 0

dTRC/dQ=0=Ch/2+(A*Cp)/(Q*Q)-> Q= $\sqrt{\frac{2 * A * Cp}{Ch}}$

EOQ 6 – simpe example

- Pam runs a mail-order business for gym equipment. Annual demand for the TricoFlexers is 16,000. The annual holding cost per unit is $2.50 and the cost to place an order is $50. What is the economic order quantity?

$$\sqrt{\frac{2*16{,}000*\$50}{\$2.50}} = 800 \text{ units per order}$$

Thanks for your attention !