UGBA 141
Discussion 9

Agenda: Review and practice problems

- Quick response

- Contracts

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Quick Response

- Made-to-Stock (MTS)
  - Newsvendor
- Made-to-Order (MTO)
  - Initiate production only after demand is observed
  - Pros: Eliminate mismatch cost; No lost sales
  - Cons: Still need to carry component inventory; Make customers wait
- **Quick Response** = capability to place multiple orders during a selling season

Practice Problem: Quick Response

Berkeley Goose (Q1-5)

Berkeley Goose (BG) sources a parka from an Asian supplier for $10 each and sells them to customers for $22 each. Leftover parkas at the end of the season have no salvage value. The demand forecast is normally distributed with mean 2,100 and standard deviation 1,200. Now suppose BG found a reliable local vendor in Oakland that can produce parkas very quickly but at a higher price than BG's Asian supplier. Hence, in addition to parkas from Asia, BG can buy an unlimited quantity of additional parkas from this Oakland vendor at $15 each after demand is known.

Q1. Suppose BG orders 1,500 parkas from the Asian supplier. What is the probability that BG will order from the Oakland supplier once demand is known?

Practice Problem: Berkeley Goose (Continued)

Berkeley Goose (Q1-5)

Berkeley Goose (BG) sources a parka from an Asian supplier for $10 each and sells them to customers for $22 each. Leftover parkas at the end of the season have no salvage value. The demand forecast is normally distributed with mean 2,100 and standard deviation 1,200. Now suppose BG found a reliable local vendor in Oakland that can produce parkas very quickly but at a higher price than BG's Asian supplier. Hence, in addition to parkas from Asia, BG can buy an unlimited quantity of additional parkas from this Oakland vendor at $15 each after demand is known.

Q2. Again assume that BG orders 1,500 parkas from the Asian supplier. What is the Oakland supplier's expected demand; that is, how many parkas should the Oakland supplier expect that BG will order?

Q3. Given the opportunity to order from the Oakland supplier at $15 per parka, what order quantity from its Asian supplier now maximizes BG's expected profit?

Practice Problem: Berkeley Goose (Continued)

Berkeley Goose (Q1-5)

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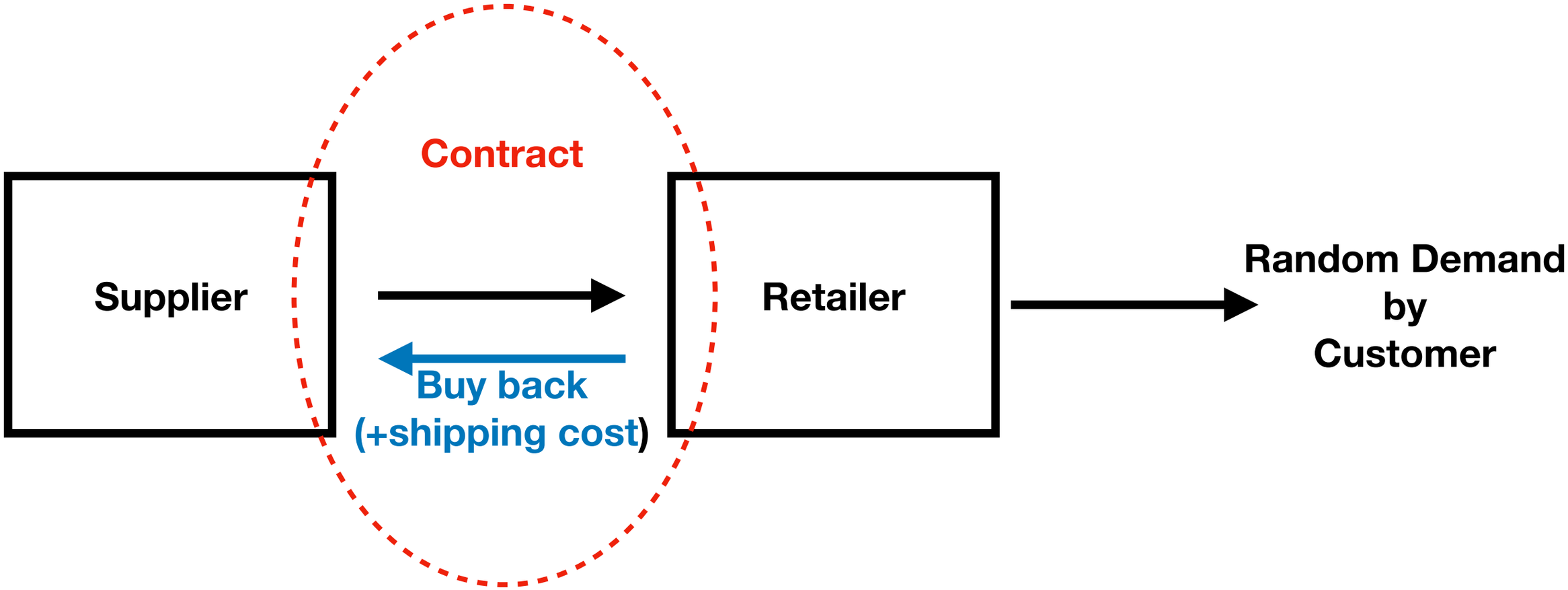
Q4. Given the order quantity evaluated in Q3, what is BG's's expected profit?

Q5. If BG didn't order any parkas from the Asian supplier, then what would BG's expected profit be?

Supply Chain Contracts

- Buy-Back Contract



- Contracts can increase the overall profit of the supply chain

Buy-Back Contract

- Retailer's expected profit without buy-back contract

$$(\text{Price} - \text{Wholesale Price}) \times \text{Expected Sales} - (\text{Wholesale Price} - \text{Salvage Value}) \times \text{Expected Leftover Inventory}$$

- Retailer's expected profit with buy-back contract

$$(\text{Price} - \text{Wholesale Price}) \times \text{Expected Sales} - (\text{Wholesale Price} - (\text{BB Price} - \text{Shipping Cost})) \times \text{Expected Leftover Inventory}$$

- How to choose buy-back price?

$$\text{Buy-back price} = \text{Shipping cost} + \text{Price} - (\text{Price} - \text{Wholesale price}) \times \left(\frac{\text{Price} - \text{Salvage value}}{\text{Price} - \text{Cost}} \right)$$

Practice Problem: Buy-Back Contract

Buy-Back Contract: (Q4-6)

Consider a simple example with a supplier and a retailer. The unit production cost is $35, and the supplier's wholesale price to the retailer is $80. The retailer selling price is $125, while salvage price is $20. The retailer faces demand distributed as normal with mean 100 and standard deviation 100

Q4. Without buy-back contract, what is the retailer's optimal order quantity? What is the retailer's expected profit under this order quantity?

Q5. Suppose the supplier offers to buy unsold units from the retailer at the price of $65. But the retailer also needs to pay for $10 shipping cost per unit. What is the retailer's optimal order quantity? What is the retailer's expected profit under this order quantity?

Practice Problem: Buy-Back Contract

Buy-Back Contract: (Q4-6)

Consider a simple example with a supplier and a retailer. The unit production cost is $35, and the supplier's wholesale price to the retailer is $80. The retailer selling price is $125, while salvage price is $20. The retailer faces demand distributed as normal with mean 100 and standard deviation 100

Q6. Suppose the supplier offers to buy unsold units from the retailer at certain price. But the retailer also needs to pay for $10 shipping cost per unit. What is the best buy-back price to maximize the total profit of the supply chain?