

News vendor Model

Project 4

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News vendor Model

- The news vendor model balances the cost of ordering too much against the cost of ordering too little
- Understand demand uncertainty: What is the probability demand will be less than or equal to Q units?

$$F(Q) = \text{Prob} \{ \text{Demand is less than or equal to } Q \}$$

- To find an accurate distribution function, we used the normal distribution function

The Newsvendor Formula

- **C_o** is the overage cost per unit
 - In this case it is 100
 - Lost deposit for every extra room booked
- **C_u** is the underage cost per unit
 - In this case it is 165 per member and 25 per guest
- This gives us **F(Q)** which we can use to get the **z score** using the =normsinv function in Excel
- Assuming demand is normally distributed, calculate X (which is Q) by substituting the z score, mean, and standard deviation of the data in this equation

$$F(Q) = \frac{C_u}{C_o + C_u}$$

$$Z = \frac{X - \mu}{\sigma}$$

Calculating number of single & double rooms

We applied this equation twice

$$\begin{aligned} * \text{ Critical ratio for } \underline{\text{single}} &= \frac{165}{100+165} = 0.6226 \rightarrow z = 0.3123 \\ & \text{from excel formula} \\ 0.3123 &= \frac{X - 223.05}{40.56} \rightarrow X = 235.72 \text{ single rooms} \approx \boxed{236} \end{aligned}$$

$$\begin{aligned} * \text{ Critical ratio for } \underline{\text{double}} &= \frac{190}{100+190} = 0.6552 \rightarrow z = 0.3994 \\ 0.3994 &= \frac{X - 63.65}{35.59} \rightarrow X = 77.86 \text{ double rooms} \approx \boxed{78} \end{aligned}$$