Two Simple Extensions

\[ Q = a - bp - cp^2 \]
\[ Q = a p^b \]
\[ Q = Q(p) \]

Other factors affecting demand

• We have used a simple demand function
  \[ Q = a - bp \]

• But there can be other factors as well
  \[ Q = a - bp \pm cp_{og} \]

  • The sign on the coefficient \( c \) can be positive or negative depending on whether we have a complement or substitute.

Complements

• If two goods are complements, the demand function is
  \[ Q = a - bp - cp_{og} \]
  • We write the coefficient on the “\( c \)” term as negative to indicate that we are talking about a complement.

Other factors affecting demand

• We might think of the demand for left shoes to be
  \[ Q_L = a - bp_L - cp_R \]
Shoes

• We might think of the demand for left shoes to be
  \[ Q_L = a - b p_L - c p_R \]
• We can go further and write it as
  \[ Q_L = a - b p_L - b p_R \]
  Or
  \[ Q_L = a - b(p_L + p_R) \]

Substitutes

• Our demand function is
  \[ Q = a - b p + c p_{og} \]
• If we think of Coke and Pepsi
  \[ Q_{coke} = a - b p_{coke} + c p_{pepsi} \]

Coke and Pepsi

• Given our analysis of perfect
  substitutes, the right way to write the demand function is
  \[ \text{When } p_{coke} > p_{pepsi} \]
  \[ Q_{coke} = 0 \]

• Given our analysis of perfect
  substitutes, the right way to write the demand function is
  \[ \text{When } p_{coke} = p_{pepsi} \]
  \[ Q_{coke} = \frac{1}{2}(a - b p_{coke}) \]
Coke and Pepsi

• Given our analysis of perfect substitutes, the right way to write the demand function is

\[ Q_{\text{coke}} = \begin{cases} \frac{1}{2}(a-bp_{\text{coke}}) & \text{When } p_{\text{coke}} = p_{\text{pepsi}} \\ a - bp_{\text{coke}} & \text{When } p_{\text{coke}} < p_{\text{pepsi}} \end{cases} \]

Non-linear demand functions

• Even when demand functions are represented by an equation, it need not be a straight line.

\[ Q = a - bp - cp^2 \]
\[ Q = a p^{-b} \]
\[ Q = Q(p) \]

Income

• Return to our demand for shoes

\[ Q_L = a - b(p_L + p_R) \]

• We can include income as well

\[ Q_L = a - b(p_L + p_R) + cY \]

And More

• Return to our demand for shoes

\[ Q_L = a - b(p_L + p_R) \]

• We can include income as well

\[ Q_L = a - b(p_L + p_R) + cY \]

• And population

\[ Q_L = [N] [a - b(p_L + p_R) + cY] \]
Breathe Easy

• We generally work with simple straight line demand functions.
• But there is a lot more we can do.

End

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