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

$$Q = a - bp$$

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$$Q = a - bp$$

- But there can be other factors as well

$$Q = a - bp \pm cp_{og}$$

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- 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.

Complements

- 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

$$Q_L = a - bp_L - cp_R$$

- We can go further and write it as

$$Q_L = a - bp_L - bp_R$$

Or

$$Q_L = a - b(p_L + p_R)$$

Shoes

- Our demand function is

$$Q = a - bp + cp_{og}$$

Substitutes

- Our demand function is

$$Q = a - bp + cp_{og}$$

- If we think of Coke and Pepsi

$$Q_{coke} = a - bp_{coke} + cp_{pepsi}$$

Substitutes

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$$Q = a - bp + cp_{og}$$

- If we think of Coke and Pepsi

$$Q_{coke} = a - bp_{coke} + cp_{pepsi}$$

- This demand function is linear. That is, there is a straight line relationship between the quantity demanded and either price.

Coke and Pepsi

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

When $p_{coke} > p_{pepsi}$

$$Q_{coke} = 0$$

Coke and Pepsi

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When $p_{coke} > p_{pepsi}$

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When $p_{coke} = p_{pepsi}$

$$Q_{coke} = (½)(a - bp_{coke}),$$

Coke and Pepsi

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When $p_{coke} > p_{pepsi}$

$$Q_{coke} = 0$$

When $p_{coke} = p_{pepsi}$

$$Q_{coke} = (½)(a - bp_{coke})$$

When $p_{coke} < p_{pepsi}$

$$Q_{coke} = a - bp_{coke},$$

Non-linear demand functions

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

Non-linear demand functions

- This last example suggests an important point. 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

$$Q_L = a - b(p_L + p_R)$$

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