

The Monopolist's Demand Curve

$$\frac{P - MC}{P} = -\frac{1}{\eta}$$

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- Want to develop some key propositions about the demand curve
- Many of these center on elasticities
- Then some applications

Marginal Revenue and Elasticity

- Recall our definition of point elasticity

$$\eta = \text{Slope} \frac{P}{Q}$$

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- In the case of a linear demand function

$$Q = a - bP$$

Marginal Revenue and Elasticity

- Recall our definition of point elasticity

$$\eta = \text{Slope} \frac{P}{Q}$$

Slope = -b

- In the case of a linear demand function

$$Q = a - bP$$

Marginal Revenue and Elasticity

- A more general definition

$$\eta = \frac{dQ}{dP} \left(\frac{P}{Q} \right)$$

Restating the Elasticity

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Restating the Elasticity

$$\eta = \frac{dQ}{dP} \left(\frac{P}{Q} \right)$$

$$\frac{1}{\eta} = \left(\frac{1}{\frac{dQ}{dP}} \right) \left(\frac{Q}{P} \right)$$

Restating the Elasticity

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Restating the Elasticity

$$P \frac{1}{\eta} = \left(\frac{1}{\frac{dQ}{dP}} \right) \left(\frac{Q}{P} \right) P$$

$$P \frac{1}{\eta} = \left(\frac{dP}{dQ} \right) Q$$

Marginal Revenue and Elasticity

- The Monopolist cares about MR.
- There is a relation between MR and elasticity.

$$R = PQ$$

$$\frac{dR}{dQ} = \frac{dP}{dQ}Q + P$$

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Marginal Revenue and Elasticity

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$$MR = P \frac{dP}{dQ} \frac{Q}{P} + P$$

Marginal Revenue and Elasticity

$$\frac{dP}{dQ}Q = MR - P$$

$$MR = \frac{dP}{dQ}Q + P$$

$$MR = P \frac{dP}{dQ} \frac{Q}{P} + P$$

$$MR = P \left[\frac{dP}{dQ} \frac{Q}{P} + 1 \right]$$

Marginal Revenue and Elasticity

$$\frac{dP}{dQ}Q = MR - P$$

$$MR = \frac{dP}{dQ}Q + P$$

$$MR = P \frac{dP}{dQ} \frac{Q}{P} + P$$

$$MR = P \left[\frac{dP}{dQ} \frac{Q}{P} + 1 \right]$$

$$MR = P \left(\frac{1}{\eta} + 1 \right) = P \left(1 + \frac{1}{\eta} \right)$$

First Elasticity Relation

$$MR = P \left(1 + \frac{1}{\eta} \right)$$

Second Elasticity Relation

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$$MC = P \left(1 + \frac{1}{\eta} \right)$$

Second Elasticity Relation

$$P \left(1 + \frac{1}{\eta} \right) = MC$$

Second Elasticity Relation

$$P = \left(\frac{MC}{1 + \frac{1}{\eta}} \right)$$

Third Elasticity Relation

$$P\left(1 + \frac{1}{\eta}\right) = MC$$

Third Elasticity Relation

$$P\left(1 + \frac{1}{\eta}\right) = MC$$
$$P + P\left(\frac{1}{\eta}\right) = MC$$

Third Elasticity Relation

$$P + P\left(\frac{1}{\eta}\right) = MC$$
$$P - MC = -P\left(\frac{1}{\eta}\right)$$

Third Elasticity Relation

$$P - MC = -P\left(\frac{1}{\eta}\right)$$
$$\frac{P - MC}{P} = -\frac{1}{\eta}$$

Third Elasticity Relation

$$\frac{P - MC}{P} = -\frac{1}{\eta}$$

A Summary

$$MR = P\left(1 + \frac{1}{\eta}\right) \quad \frac{P - MC}{P} = -\frac{1}{\eta}$$

$$P = \left(\frac{MC}{1 + \frac{1}{\eta}}\right)$$

End

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