Demand and Supply Applications and Elasticity

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3. Elasticity
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Efficiency

Consumer Surplus – the difference between the maximum amount a consumer is willing to pay for a good and the market price.

Producer Surplus – the difference between the current market price and the full cost of production of the good.

Dead-Weight Loss – the net loss of consumer and producer surplus.

Causes of Dead Weight Loss:
1. Monopoly power
2. Taxes and Subsidies
3. Externalities (pollution)
4. Price Ceilings and Floors

Price Ceilings and Floors

Price Ceiling – the maximum price that firms may charge for a good.

Ceilings are usually set by the government below market equilibrium price. This results in a shortage and causes the market price and sales to fall.

Examples: rent controlled apartments, electricity.

Price Floor – the minimum price that firms may charge for a good.

Ceilings are usually set by the government above market equilibrium price. This results in a surplus and causes the market price to increase and sales to fall.

Examples: import fee on oil and automobiles, minimum wages.

Elasticity

Elasticity of Demand – The responsiveness of demand to changes in price.
Calculating Elasticity of Demand

\[ E_d = \frac{\% \Delta Q_d}{\% \Delta P} = \frac{\frac{Q_d - Q_d'}{Q_d'}}{\frac{P - P'}{P'}} = \frac{\frac{\Delta Q_d}{Q_d}}{\frac{\Delta P}{P'}} \]

Elastic – A large change in demand from a change in the price of the product.
\[ E_d \text{ between } -1 \text{ and } -\infty \]

Perfectly Elastic – Demand drops to zero from any change in the price of the product.
\[ E_d = -\infty \]

Inelastic – A small change in demand from a change in the price of the product.
\[ E_d \text{ between } 0 \text{ and } -1 \]

Perfectly Inelastic – No change in demand from a change in the price of the product.
\[ E_d = 0 \]

Unitary Elastic – An equal percentage change in demand as the change in the price of the product.
\[ E_d = -1 \]

Total Revenue – potential money brought in from sales of a product \((P \times Q_d)\)

Elastic Demand: \(\% \Delta Q_d > \% \Delta P\)
\[ \downarrow TR = \uparrow P \times \downarrow Q_d \]

Inelastic Demand: \(\% \Delta Q_d < \% \Delta P\)
\[ \uparrow TR = \uparrow \uparrow P \times \downarrow Q_d \]

Unitary Demand: \(\% \Delta Q_d = \% \Delta P\)
Constant \(TR = \uparrow P \times \downarrow Q_d\)

Determinants of Elasticity of Demand
1. Availability of Substitutes
2. Time
3. Importance of being Unimportant (Proportion of Income)

Availability of Substitutes – the more substitutes, the more choices you have when the price changes. This will cause a larger change in quantity demanded. Therefore, the more substitutes the more elastic demand is.

Time – the more time that an individual has, the more substitutes that can be developed, and therefore the more elastic demand is.

Proportion of Income – when a good is a relatively small proportion of income, then an increase in the price of the product has little impact on demand and is therefore relatively inelastic.

Other Important Elasticities
Income Elasticity of Demand – measures the responsiveness of demand to a change in income. This is used to measure whether a good is a normal or inferior good.
Cross Price Elasticity of Demand – measures the responsiveness of demand of good X to a change in price of good Y. This is used to measure whether goods are substitutes, complements, or unrelated.

Elasticity of Supply – measures the responsiveness of supply to a change in the price.