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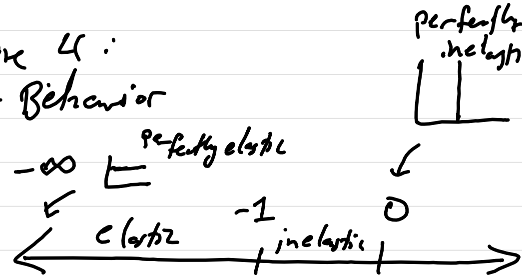
ECON 2316

Lecture 4: Consumer Behavior

More Elasticities

$$PED = \frac{P}{Q_d}\frac{\partial Q_d}{\partial P}$$



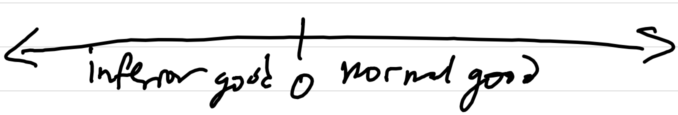
$$PES = \frac{P}{Q_s}\frac{\partial Q_s}{\partial P}$$

Ex. $Q = 20,\ P = 10,\ E_p^D = -3$

$$-3 = \frac{10}{20}\left(\frac{\partial Q}{\partial P}\right) \Rightarrow \frac{\partial Q}{\partial P} = -6$$

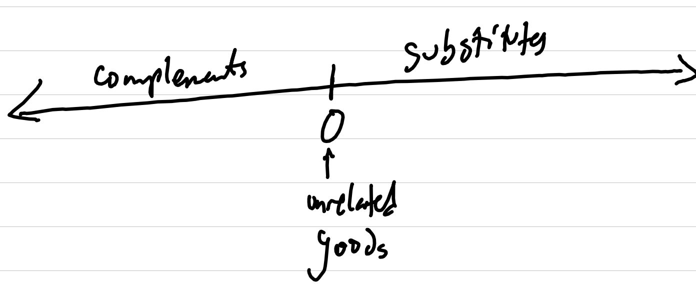
Income elasticity of demand

$$E_I = \frac{\%\Delta Q}{\%\Delta I} = \frac{I}{Q}\frac{\partial Q}{\partial I}$$



Cross Price Elasticity

$$E_{Q_b P_a} = \frac{\%\Delta Q_b}{\%\Delta P_a} = \frac{P_a}{Q_b}\cdot\frac{\partial Q_b}{\partial P_a}$$



Ex

$$Q^D = 10 - P + 2I$$

What is income elasticity when $P=2$, $I=5$?

$$\varepsilon_I = \frac{I}{Q}\,\frac{\partial Q}{\partial I}$$

$$= \frac{5}{18}\cdot 2 = \frac{5}{9}$$

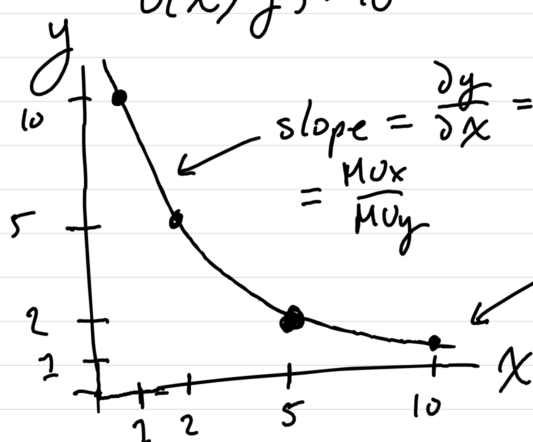
Consumer Preferences + Utility

Math review pt. 3

Illustrating multi-variable functions
- drawing in 3D is hard
- we can keep 1 var constant

ex. $u(x,y) = x\cdot y$

$u(x,y) = 10$



sloping

$$\text{slope} = \frac{\partial y}{\partial x} = \frac{1}{\left(\frac{du}{dy}\right)}\cdot\frac{du}{dx} = \frac{dy}{du}\cdot\frac{du}{dx} = \frac{\text{der. wrt } x}{\text{der. wrt } y}$$

$$= \frac{MU_x}{MU_y}$$

isoutility curve, $u=10$

For us: $$\frac{\partial y}{\partial x} = \frac{1}{\frac{\partial u}{\partial y}}\cdot\frac{\partial u}{\partial x} = \frac{1}{x}\cdot y = \frac{y}{x}$$

Preferences + Utility

↳ consumers maximize utility subject to budget constraints
- utility maximization is about willingness
- budget constraints concern ability

Utility - level of enjoyment from a market basket / bundle

Utility function - formula that assigns utility to individual market baskets (ex. $u(x, y) = xy$)

Preferences do NOT take into account income or prices

Marginal utility - Satisfaction from an additional unit
- Derivative of the utility function

Diminishing marginal utility - less additional utility

Quantifying marginal utility

$$u(x) = \sqrt{x}$$

Suppose I've already eaten 4 snickers bars - what's MU_x?

$$MU_x = \frac{du}{dx} = \frac{1}{2} x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}} = \frac{1}{2\sqrt{4}}$$

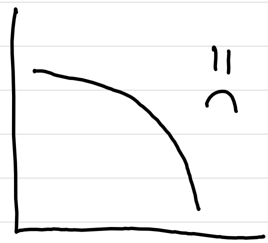
$$= \frac{1}{4}$$

4 Assumptions

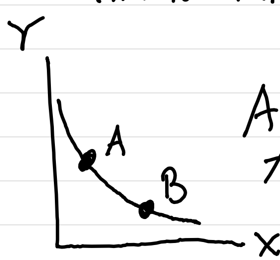
- Completeness
  - all baskets are rankable
- Transitivity
  - $A > B$ and $B > C \Rightarrow A > C$ and vice versa
  - $A \sim B$ and $B \sim C \Rightarrow A \sim C$

- Non-satiation
  - more is better
- Convexity
  - diminishing MRS

VS

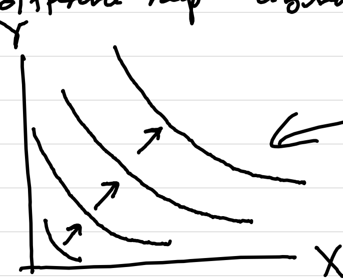


Indifference curves
- Collection of bundles w/ same utility
  - we fix U
- AKA isoutility curves



A consumer is indifferent between A and B

Indifference map - a bunch of ICs



indifference curves are downward sloping (give up y to get x) and NEVER intersect

Practice Question

$$Q^D = 30 - 2P + 0.5I + 0.5P_{pepsi}$$

a) Holding P_{coke} and I constant, an increase in the price of pepsi brings Q^D_{coke} up, so they are substitutes

b) $P = 3,\ I = 10,\ P_{pepsi} = 2,\ E_I$

$$E_I = \frac{I}{Q}\frac{\partial Q}{\partial I}$$

$$= \frac{10}{30}\cdot 0.5 = \frac{5}{30} = \frac{1}{6} \approx 0.167$$