ECON 100A - SECTION NOTES
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Quick reminders on the course notions

Slutsky decomposition (I define the notion in words below: this is enough if you understand this). A price change does two conceptually distinct things:

- **Substitution effect (SE):** holding the original purchasing power (utility) fixed, the consumer re-optimizes at the new *relative* prices and slides along the same indifference curve. Graphically: draw a budget line *parallel to the new one* that passes through the *old bundle*; the move from the old choice to this compensated choice is the SE.
- **Income effect (IE):** with the actual (uncompensated) budget, purchasing power changes; the move from the compensated choice to the new Marshallian choice is the IE.

SE captures pure relative-price substitution; IE captures how real income shifts change demand.

Slutsky identity (math: you do not need to get it perfectly right). Let $\boldsymbol{x}(\boldsymbol{p}, m)$ be Marshallian demand and $h(\boldsymbol{p}, \bar{u})$ Hicksian demand. Then, for small changes:

$$\frac{\partial x_i}{\partial p_j} = \underbrace{\frac{\partial h_i}{\partial p_j}}_{\text{substitution (compensated)}} - \underbrace{x_j \frac{\partial x_i}{\partial m}}_{\text{income}}.$$

A good i is *Giffen* at (p, m) if its **Marshallian (ordinary) demand** rises with its own price:

$$\frac{\partial x_i(p,m)}{\partial p_i} > 0.$$

By Slutsky,

$$\frac{\partial x_i}{\partial p_i} = \underbrace{\frac{\partial h_i(p,u)}{\partial p_i}}_{\leq 0} - x_i(p,m) \underbrace{\frac{\partial x_i(p,m)}{\partial m}}_{<0}.$$

Hence Giffen behavior occurs when the (positive) income-effect term $-x_i \frac{\partial x_i}{\partial m}$ dominates the (nonpositive) substitution effect, which requires i to be *inferior* ($\partial x_i / \partial m < 0$). *Note:* Hicksian (compensated) demand still slopes downward; the upward slope is a property of ordinary demand only.

Practice

1. Slutsky decomposition on a diagram

I will draw a budget line and a decision maker's optimal choice x_o from the budget set it bounds.

a) The price of good 1 increases. Add to the diagram an example of how the consumer's new budget line might look, and how the 'hypothetical' budget line would look in a Slutsky decomposition of the effect of the price change. Explain the position of each of the additions to the diagram.
b) For the decision maker's choices to be consistent with the weak axiom of revealed preference, when we perform the Slutsky decomposition, what must be true about the size of the substitution effect? Carefully explain your answer with reference to the diagram.

2. IIA and Rationalizability

Say that there are three alternatives, x, y, and z. You observe a few of a decision maker's (DM's) choices. In each case:
(i) Are the observed choices *consistent or inconsistent* with the IIA assumption?
(ii) Can we say whether or not the DM has a *rational (complete and transitive)* preference relation over $\{x, y, z\}$?
Explain briefly.

a) **Decision maker 1:**

$$c(\{x, y\}) = \{x\}, \quad c(\{x, z\}) = \{z\}, \quad c(\{x, y, z\}) = \{x\}.$$

b) **Decision maker 2:**

$$c(\{x, y\}) = \{x\}, \quad c(\{x, z\}) = \{x\}, \quad c(\{y, z\}) = \{y\}, \quad c(\{x, y, z\}) = \{x\}.$$

c) **Decision maker 3:**

$$c(\{x, y\}) = \{y\}, \quad c(\{x, z\}) = \{x\}, \quad c(\{y, z\}) = \{y\}.$$

3. WARP with Two-Good Budgets

In each of the three situations depicted on the board, you have observed the decision maker face the budget set bounded by line A and choose $c(A)$. If you also observed their choice from the budget set bounded by line B, what choices from that budget would be *consistent with WARP* and what choices would *violate WARP*? Be as specific as possible, and explain your answers.

4. A Reminder on Well Behaved Preferences

There are two types of good, x1 and x2. Steph and Klay each have well-behaved preferences over bundles of goods, and they each face an identical budget set, as pictured below. At the point (4, 4), Steph's marginal rate of substitution is 0.75 and Klay's marginal rate of substitution is 0.4. The bundle (4, 4) is the optimal choice for one of the two people, but not for the other. For which person is (4, 4) optimal? Explain your answer by writing a couple of sentences and by adding something to each diagram that illustrates your reasoning