Intermediate Microeconomics (Fall 2023)
Lecture 5
Income and Substitution Effects

Part I

Relative Price

- _____ – _____.

Part II

Income and Substitution Effects

- **Substitution Effect** – The change in _____ of a good due to the change in the _____ of _____ between the two goods. For example, if Good 1 becomes _____, could _____ of _____ to _____, i.e., the market has changed the _____ to "_____" Good 2 for Good 1. It has two definitions:
  - _____ – The change in _____ of a good associated with a change in its _____, with the level of _____ held _____.
  - _____ – The change in _____ of a good when _____ but a consumer's _____ is held _____, so that the _____ remains _____.

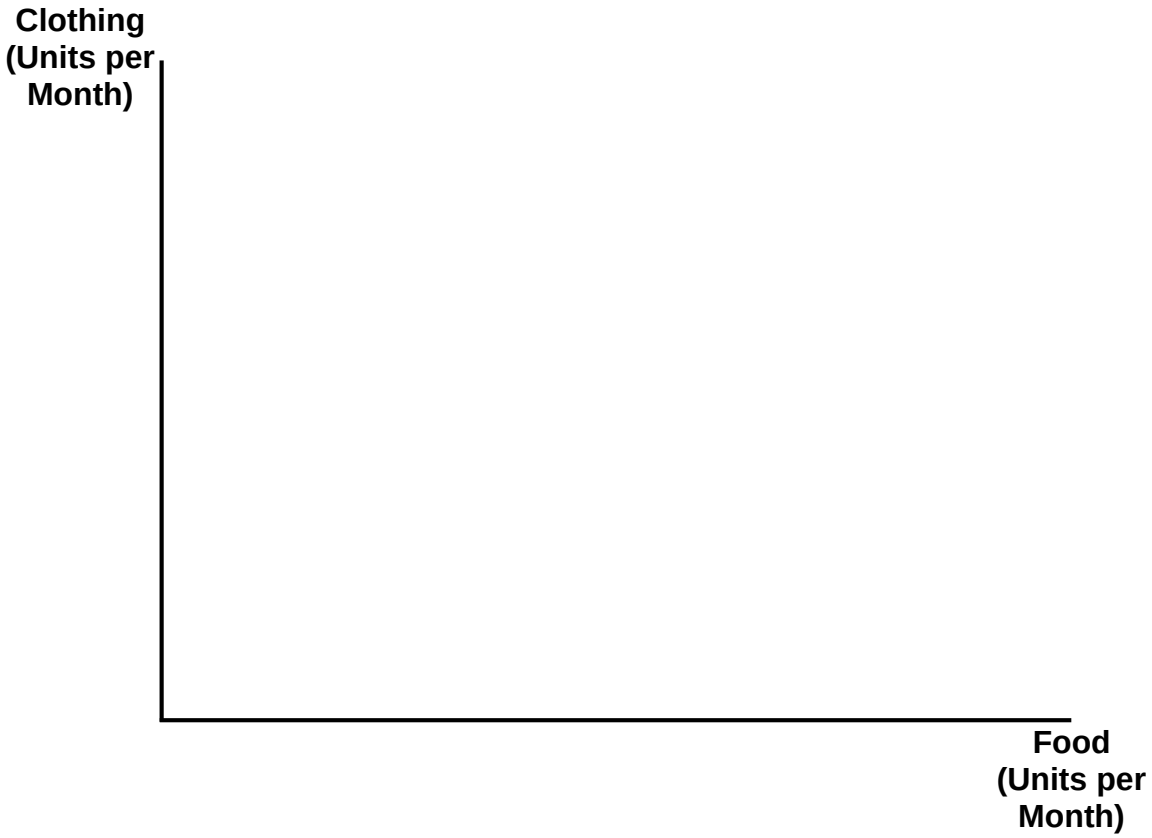
- **Income Effect** – The change in _____ of a good resulting from an _____ in _____, typically with _____ held _____. For example, if Good 1 becomes _____, _____ will buy _____ of Good 1, i.e., the purchasing power of the money has _____.

- **Total Effect**

Part III

Hicks Substitution Effect

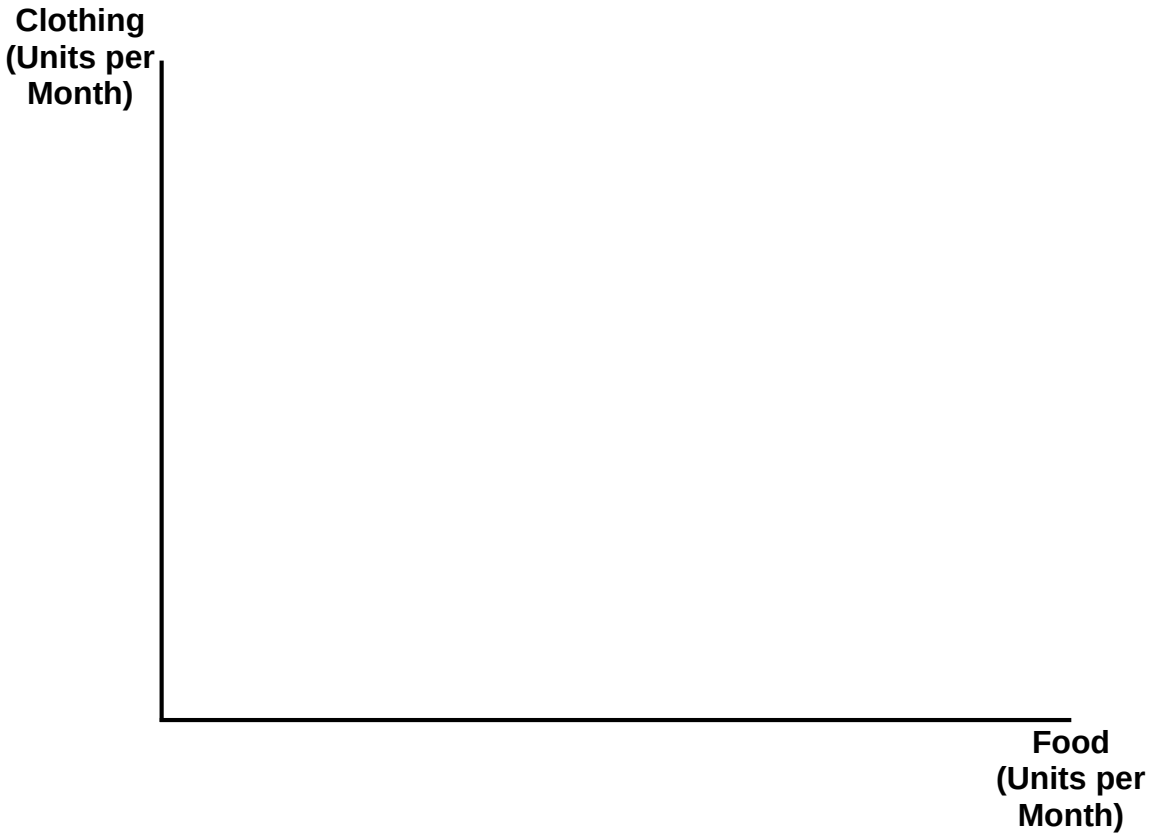
- **Income and Substitution Effects of a Normal Good**
  - Suppose food is a normal good and the price of food decreases



- The consumer is initially at Point _____, on budget line _____.
- When the price of food falls, budget line shifts to _____, consumer choice moves to Point _____, food consumption _____ by _____ (_____).
- The _____ (associated with a move from Point _____ to Point _____): changes in the _____ of food and clothing but keeps _____ (_____) _____.

- The _____ (associated with a move from Point _____ to Point _____): keeps _____ but _____, as _____.
- For a normal good, substitution effect and income effect are in the _____ direction, i.e., substitution effect and income effect work _____.
- For a normal good, substitution effect is in a direction _____ that of the _____.

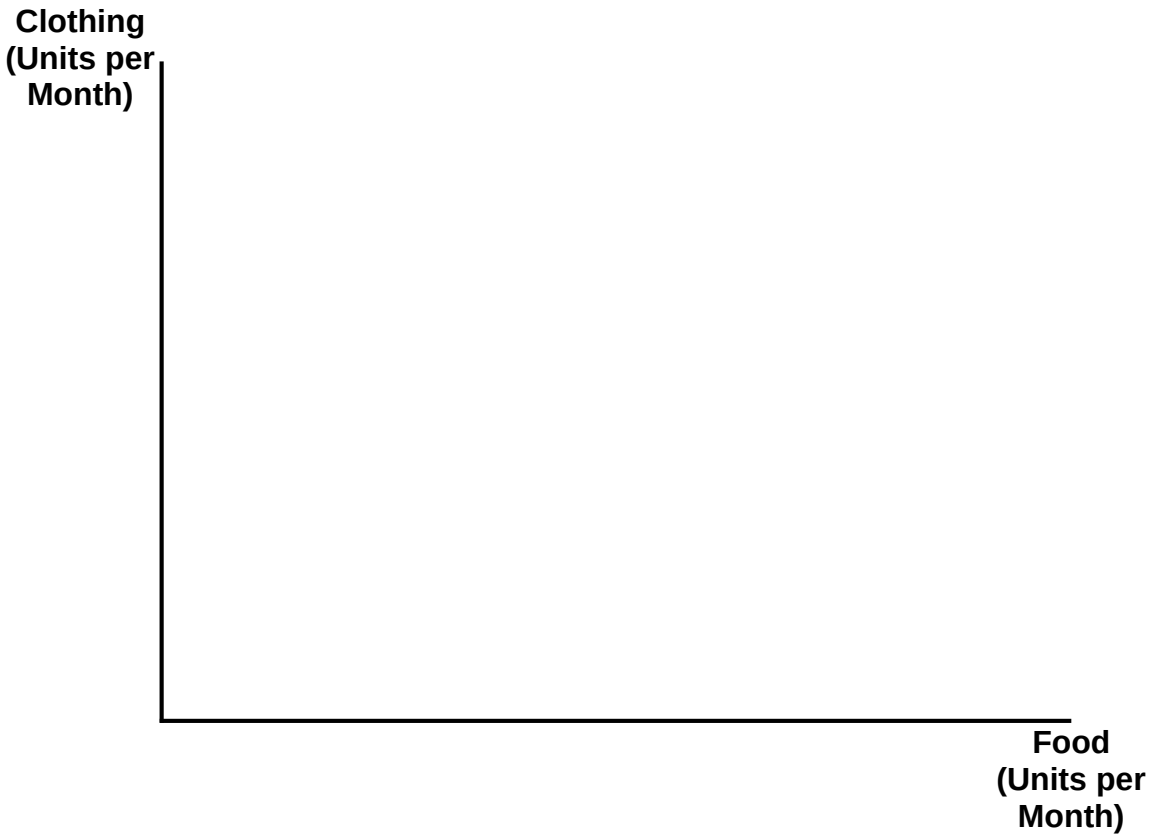
- **Income and Substitution Effects of an Inferior Good**
  - Suppose food is an inferior good and the price of food decreases



- The consumer is initially at Point _____, on budget line _____.
- With a decrease in the price of food, the consumer moves to Point _____.
- The resulting change in food purchased can be broken down into a substitution effect, _____ (associated with a move from Point _____ to Point _____), and an income effect, _____ (associated with a move from Point _____ to Point _____).
- For an inferior good, substitution effect and income effect are in the _____ direction, i.e., substitution effect and income effect work _____.

- However, because the substitution effect _____ the income effect in magnitude, the _____ in the _____ of food leads to an _____ in the _____ of food _____ (_____ is _____).
- For an inferior good, substitution effect is in a direction _____ that of the _____.

- **A Special Case →** _____ – Good whose _____ is _____ enough to _____ its _____, so that its _____.
  - Suppose food is a Giffen good and the price of food decreases



  - The consumer is initially at Point _____, but, after the price of food falls, moves to Point _____ and consumes _____ food.
  - Because the income effect _____ is _____ than the substitution effect _____ in magnitude, the _____ in the _____ of food leads to a _____ of food _____ (_____ is _____).

❖ Giffen goods are pretty peculiar and are primarily a theoretical curiosity.

Part IV

Slutsky Substitution Effect

- Suppose the price of Good 1 has declined

- **Pivot and Shift**

  - JK: _____
  - Point J: _____
  - JL: _____ – the _____ _____, and becomes _____.
  - MN: _____
  - Point A: _____
  - Point B: _____

- "Pivot-shift" operation – Break this movement in the price, budget line, and demand up into two steps:

  ① Pivot – _____ the _____ around the _____.

  - The pivoted line retains the _____ and thus, the _____ as the _____.
  - The pivoted line holds a _____ _____ and thus, a _____ from the _____.
  - The _____ _____ lies _____ the pivoted budget line.

    ⇒ That consumption bundle is just _____.

    ⇒ The _____ of the consumer has _____.

  ② Shift – _____ the _____ out to the _____.

  ⇒ The _____ and the _____.

- Money Income to Adjust for Keeping the Old Bundle just Affordable

  Let _____ be the amount of money income that will just make the original consumption bundle affordable, i.e., the amount of money income associated with the _____ budget line.

  _____ is affordable at both _____ and _____

  ⇒
  - _____
  - _____

  ⇒ _____

  ⇒ _____

  ⇒ The change in _____ and the change in _____ will always move in the _____ direction.

- **Substitution Effect and Income Effect**

  - Point J: _____
  - Point M: _____
  - Point A: _____
  - Point B: _____ on the _____ budget line – _____ of goods when the _____ changes and then _____ so as to _____ the _____ bundle of goods just _____.
  - Point C: _____

- The movement from Point _____ to Point _____: _____ _____ (_____) – the change in the _____ for _____ when its _____ changes to _____ and _____ changes to _____.

  ⇒ _____

  - The Slutsky substitution effect always moves _____ to the _____ movement.
  - The Slutsky substitution effect is sometimes called the change in _____ – the consumer is being _____ for a _____ by _____ to him to _____, or if the _____ he is "compensated" by having _____ from him.

- The movement from Point _____ to Point _____: _____ _____ (_____) – the change in the consumer's _____ from _____ to _____, keeping the _____ at _____.

  ⇒ _____

- The movement from Point _____ to Point _____: _____ (_____) – the _____ in _____ (or more precisely, _____, as it is due to the change in _____, holding _____).

  ⇒ _____

  - This change can be broken up into two changes: the substitution effect and the income effect.

    ⇒ _____

    ⇒ _____
    = _____

    ⇒ _____

Exercise 1

Suppose that the consumer has a demand function for milk of the form

$$x = 10 + \frac{m}{10p}$$

Originally his income is \$120 per week and the price of milk is \$3 per gallon. Now the price of milk falls to \$2 per gallon. Calculate the Slutsky substitution effect and the income effect.

Part V

Compensating and Equivalent Variation

- Monetary measures of utility

  ⇒ Measures of the _____ of a _____ on the _____ of a consumer in _____ terms

- **Compensating Variation (CV)** – The _____ in _____ that will _____ the consumer for the _____.

  ⇒ CV measures how much money is needed to _____ the consumer _____ the price change to make him _____ as he was _____ the price change.

- Price of x_1 = _____, then _____ to _____
- Price of x_2 = _____
- _____: Original income of the consumer
- _____: Income needed to compensate the consumer for the price change of x_1
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- Point _____: _____
- Point _____: _____
- Slope of _____ = _____
- Slope of _____ = Slope of _____ = _____
- Point ____: Original choice with relative price of x_1 being ____ and income being ____
- Point ____: Optimal choice with relative price of x_1 being ____ and income being ____
- Point ____: Optimal choice with relative price of x_1 being ____ and income being ____
- CV = _____

  ⇒ The adjustment in _____ that _____ the consumer to the _____ utility _____ a price change has occurred

  ⇒ CV measures how much this _____ the consumer in _____ terms

- **Equivalent Variation (EV)** – The _____ that is _____ to the _____ in terms of the _____ in _____.

  ⇒ EV measures how much money has to be _____ the consumer _____ the price change to leave him _____ as he would be _____ the price change.

- Price of x_1 = _____, then _____ to _____
- Price of x_2 = _____
- _____: Original income of the consumer
- _____: Income needed to make the change in income equivalent to the price change of x_1 for the consumer
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- _____: Budget constraint with relative price of x_1 being ____ and income being ____
- Point _____: _____
- Point _____: _____
- Slope of _____ = Slope of _____ = _____
- Slope of _____ = _____
- Point ____: Original choice with relative price of x_1 being ____ and income being ____
- Point ____: Optimal choice with relative price of x_1 being ____ and income being ____
- Point ____: Optimal choice with relative price of x_1 being ____ and income being ____
- EV = _____

  ⇒ The adjustment in _____ that _____ the consumer's _____ to the level that would occur if the _____

  ⇒ EV measures the _____ of _____ that the consumer is _____ to _____ the _____

Exercise 2

Suppose that a consumer has a utility function

$$u(x_1, x_2) = x_1^{\frac{1}{2}} x_2^{\frac{1}{2}}$$

He originally faces price (1, 1) and has income 100. Then the price of Good 1 increases to 2. What are the compensating and equivalent variations?