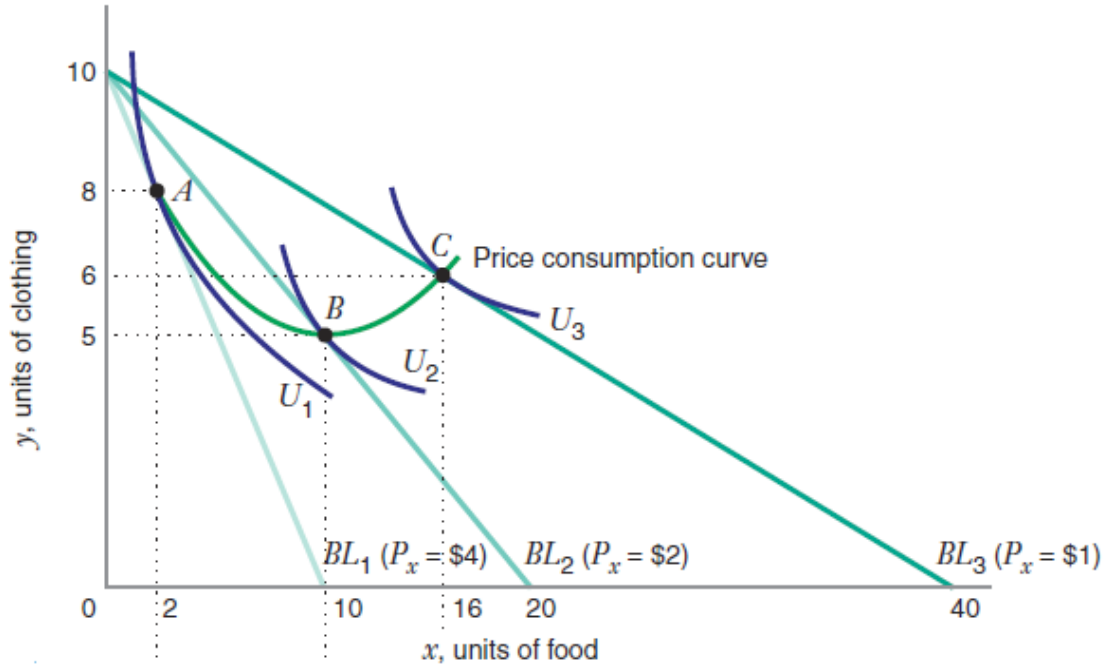
Topic 3
Theory of Demand

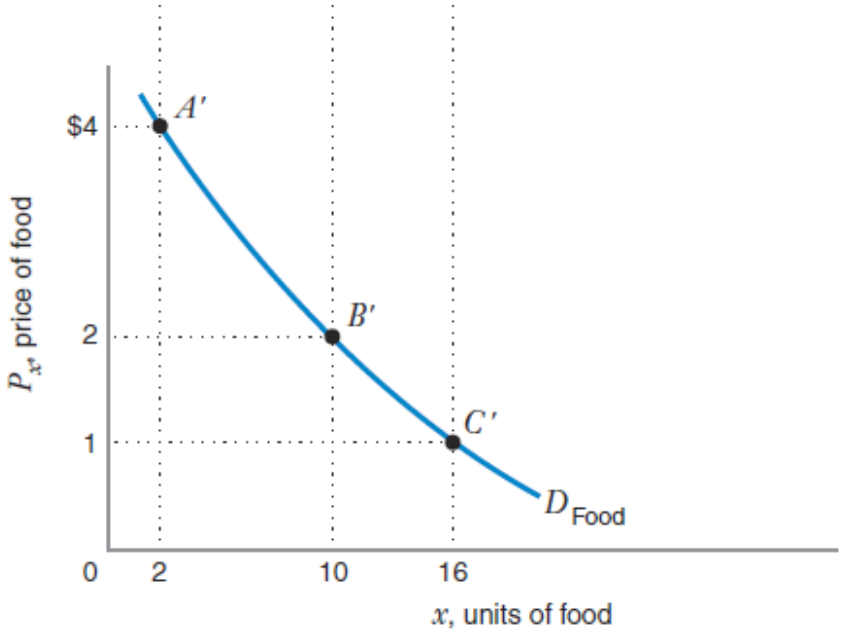
Changes in Consumer Equilibrium

The consumer optimum can change due to the followings:

- Change in the price, which can be used to draw
  - Price-Consumption Curve (PCC)
  - Demand Curve
- Change in the income, which can be used to draw
  - Income-Consumption Curve (ICC)
  - Engel Curve

Price-Consumption and Demand Curves





Price-Consumption and Demand Curves

Price-Consumption Curve

- Vertical Axis: good Y
- Horizontal Axis: good X

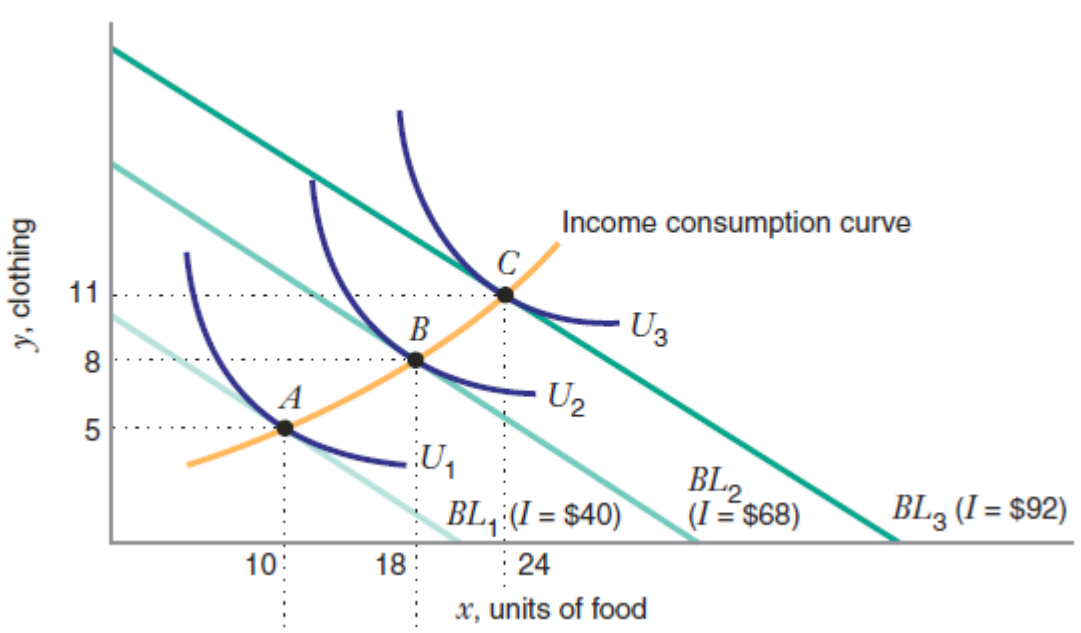
- The curve connects all consumer optimums (X* and Y*) as the price of one good varies (e.g. Px), holding the income constant.

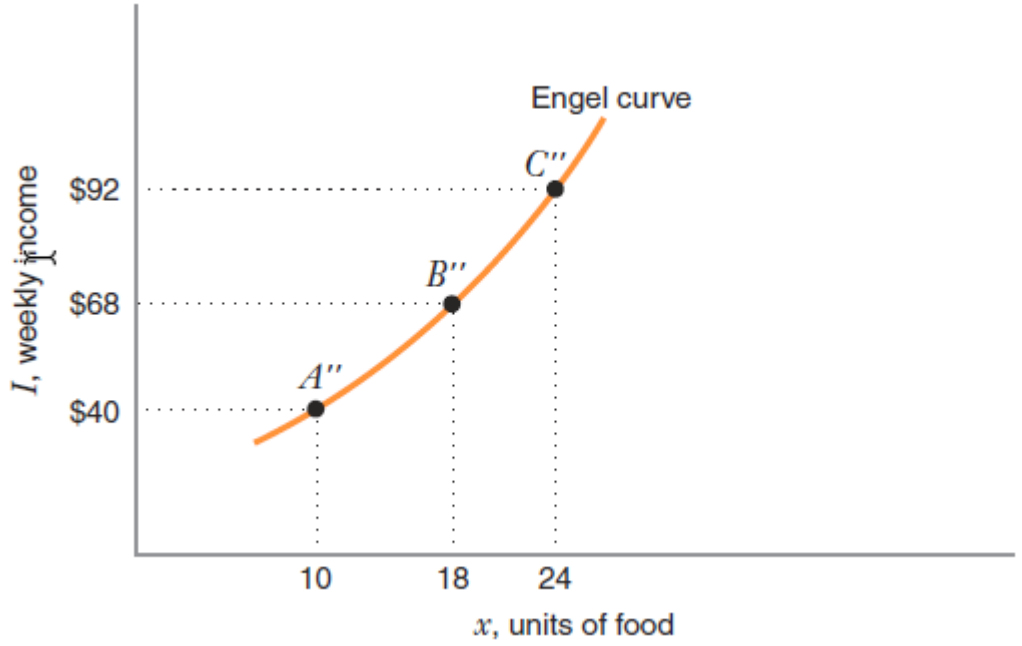
Demand Curve

- Vertical Axis: Px (or Py)
- Horizontal Axis: X (or Y)

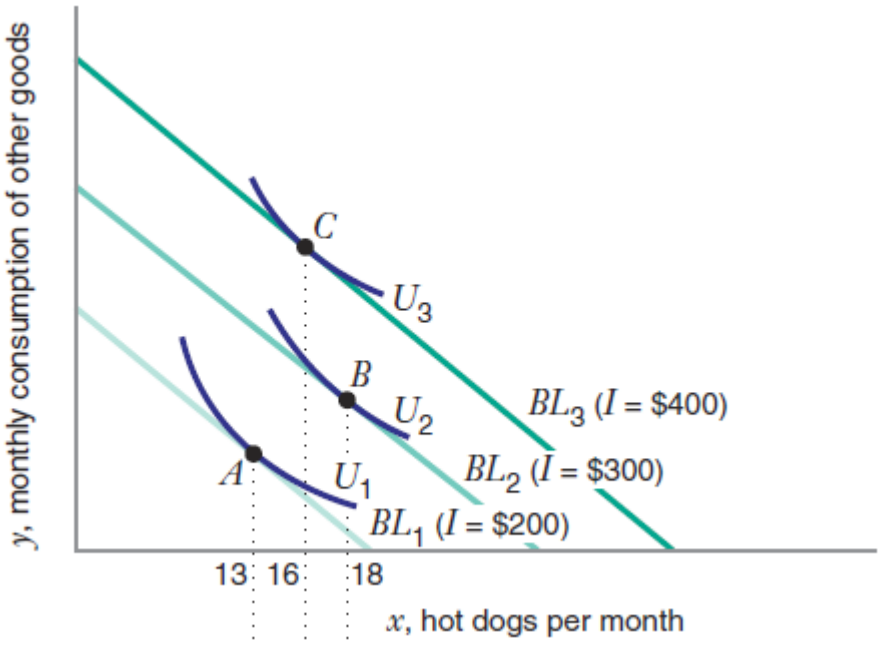
- The curve plots the optimal quantity of one good (e.g. X*) at a given price (e.g. Px).

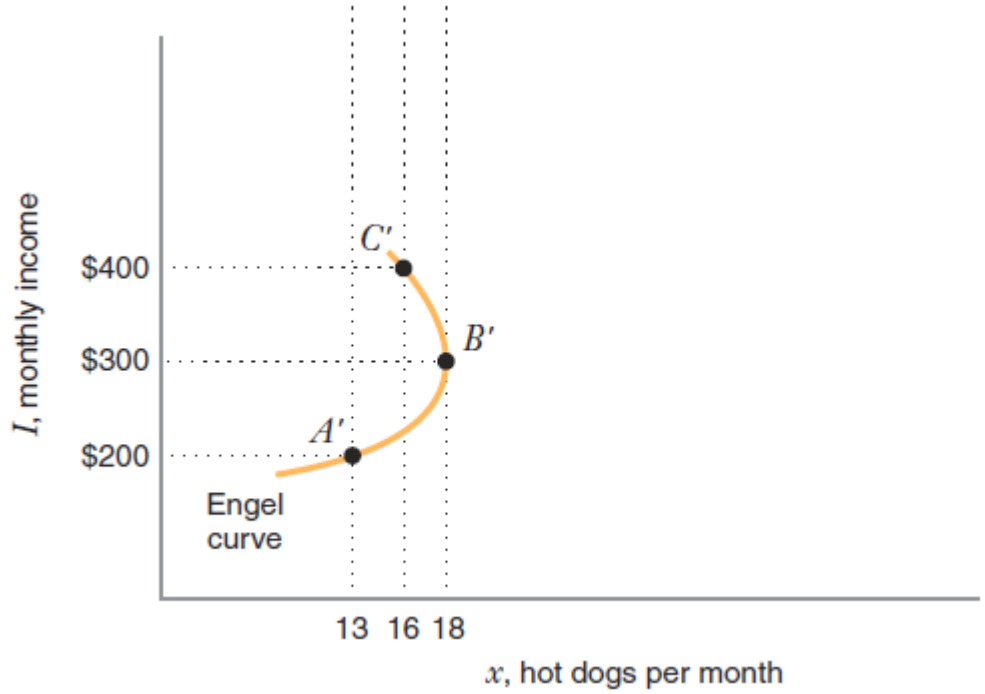
Income-Consumption and Engel Curves





Income-Consumption and Engel Curves





Income-Consumption and Engel Curves

Income-Consumption Curve

- Vertical Axis: good Y
- Horizontal Axis: good X

- The curve connects all consumer optimums (X* and Y*) as the income varies, holding the prices constant.

Engel Curve

- Vertical Axis: income I
- Horizontal Axis: X (or Y)

- The curve plots the optimal quantity of one good (e.g. X*) at a given level of income.

Decomposition of the Price Effect

- When the price of a good changes, its quantity demanded changes.

- Economists believe that this change in demand is due to **the sum of two effects**:
  - **Substitution Effect (SE)**
  - **Income Effect (IE)**

- That is, **Total Effect (TE) = SE + IE**.

Decomposition of the Price Effect

Substitution Effect (SE):

- A change in the price affects the opportunity cost (or relative price), which affects the quantity demanded.

- Suppose Px ↑

>> Opportunity Cost of X ↑

>> X becomes less attractive because more Y needs to be sacrificed

>> X ↓

Decomposition of the Price Effect

Income Effect (IE):

- A change in the price affects the real income (or purchasing power), which affects the quantity demanded.

- Suppose Px ↑

>> the given income can afford fewer units of X

>> real income ↓

>> X ↓ if X is a normal good OR X ↑ if X is an inferior good

Decomposition of the Price Effect

Notation

X_A - **The initial bundle**

- The optimal bundle BEFORE the price change

X_B - **The decomposition bundle** (i.e. it separates SE and IE)

- The optimal bundle AFTER the price change WITHOUT IE

X_C - **The final bundle**

- The optimal bundle AFTER the price change

Decomposition of the Price Effect

CASE 1: Suppose X is a normal good and Px decreases.

- SE and IE work in the same direction.
- **TE: When Px falls, Qx rises a lot.**

Decomposition of the Price Effect

CASE 2: Suppose X is a inferior good and Px decreases.

- SE and IE work in the opposite direction, and SE > IE.
- **TE: When Px falls, Qx rises a little.**

Decomposition of the Price Effect

CASE 3: Suppose X is a Giffen good and Px decreases.

- SE and IE work in the opposite direction, but IE > SE.
- **TE: When Px falls, that Qx falls.**

Identifying the Substitution Effect

We will study two approaches to identify the substitution effect (X_B).

- **Hicksian Method** asks:
  - What is the optimal bundle after…
  - the price has changed, and
  - his income has been compensated so that he can afford the original utility at the new price?

Identifying the Substitution Effect

We will study two approaches to identify the substitution effect (X_B).

- **Slutskian Method** asks:
  - What is the optimal bundle after…
  - the price has changed, and
  - his income has been compensated so that he can afford the original bundle at the new price?

Identifying the Substitution Effect

- **Hicksian Method** draws an imaginary budget line
  - reflecting the new relative price, and
  - tangent to the original indifference curve so that the consumer can afford it.

- **Slutskian Method** draws an imaginary budget line
  - reflecting the new relative price, and
  - passing through the original bundle (X_A) so that the consumer can afford it.

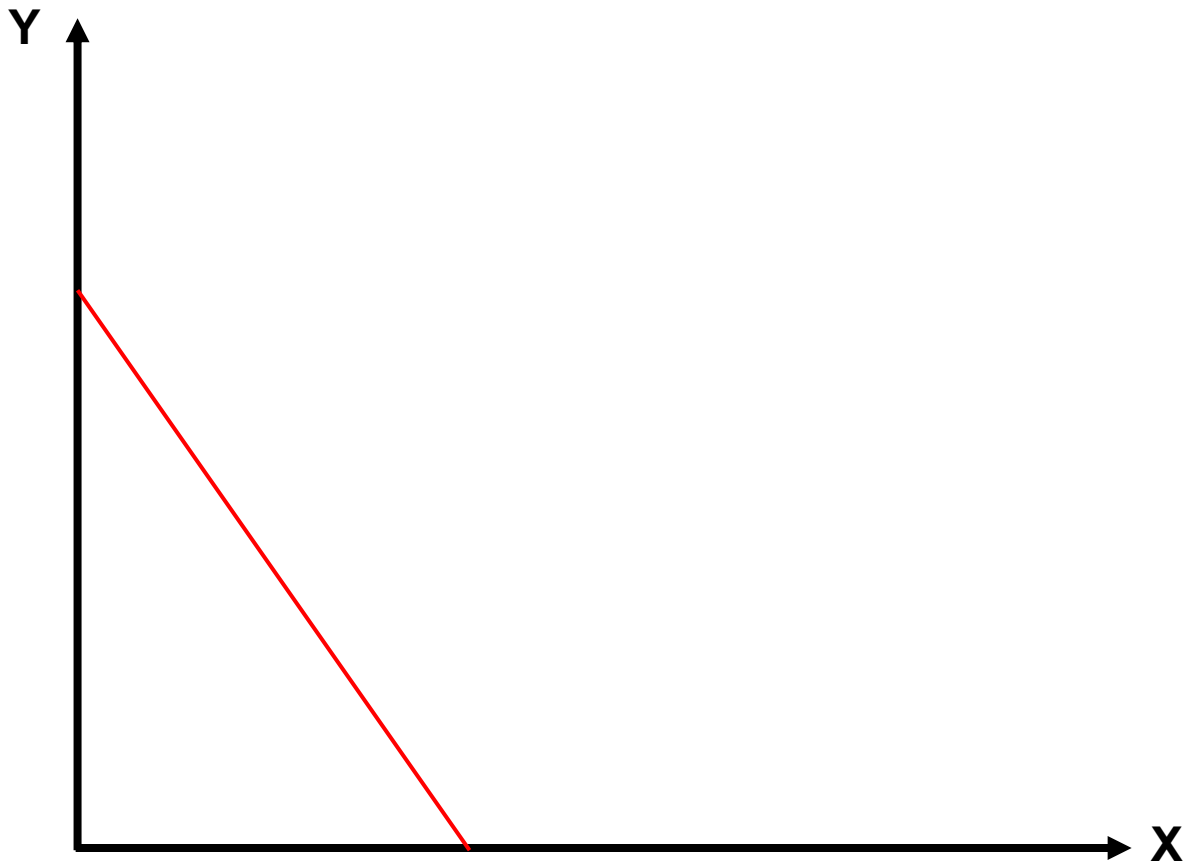
- **X_B is the consumer optimum on the imaginary budget line.**

Hicksian Method to identify the SE

Case 1: Px falls, and X is a normal good.

Hicksian Method to identify the SE

Case 2: Px falls, and X is an inferior good.

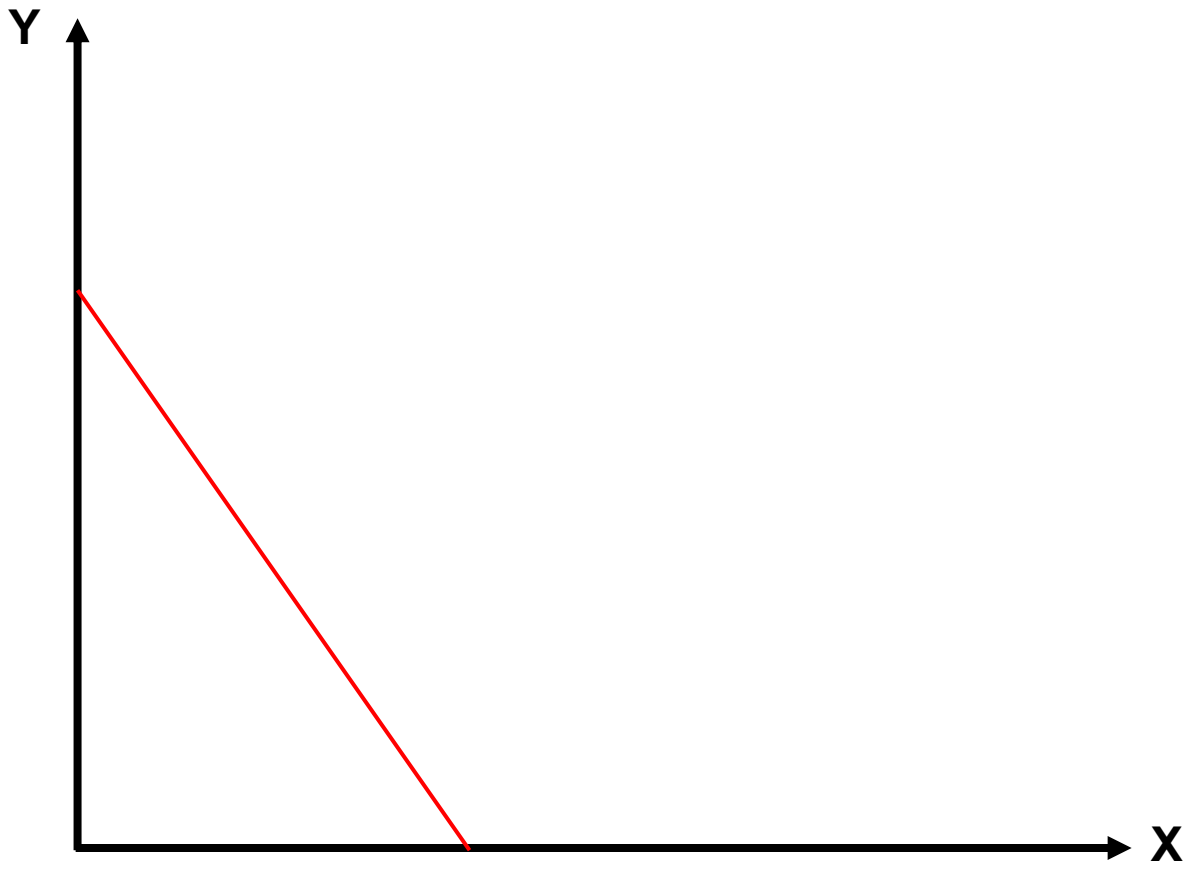


Hicksian Method to identify the SE

Case 3: Px falls, and X is a Giffen good.

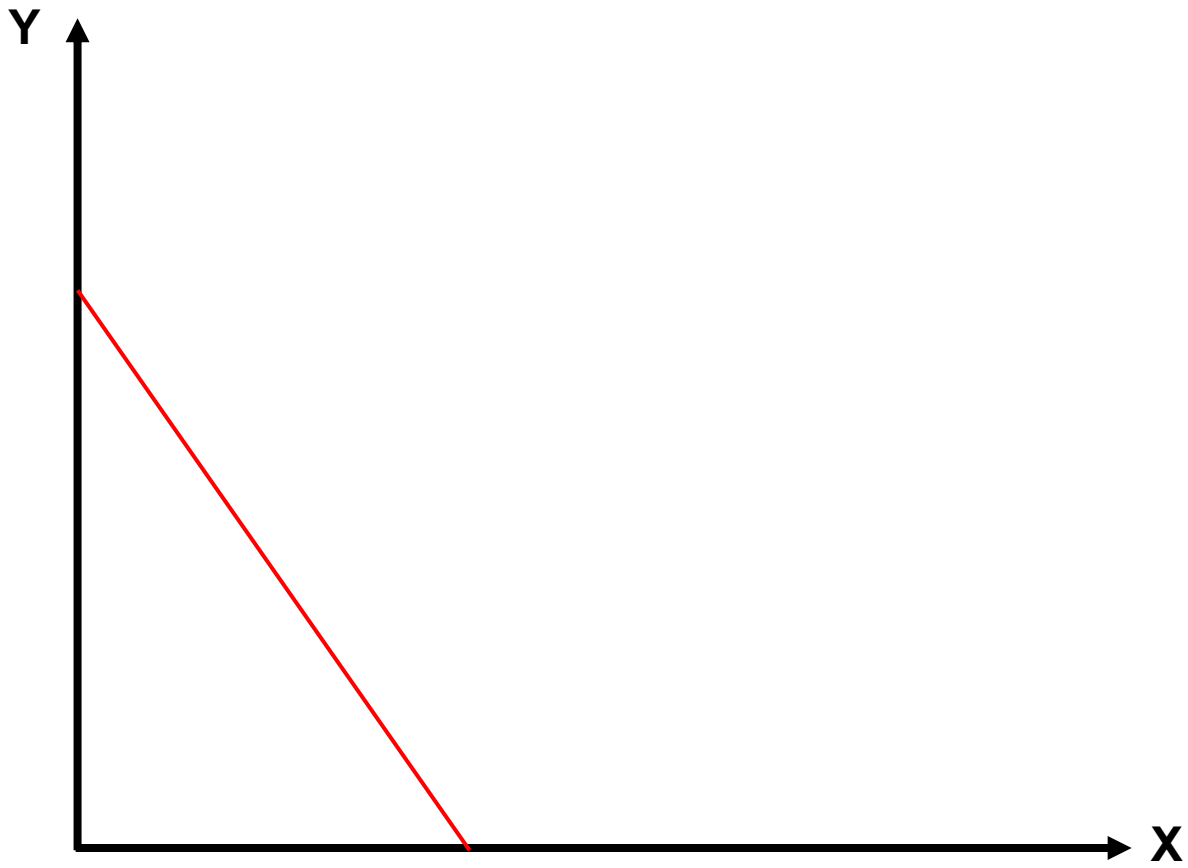
Slutskian Method to identify the SE

Case 1: Px falls, and X is a normal good.



Slutskian Method to identify the SE

Case 2: Px falls, and X is an inferior good.

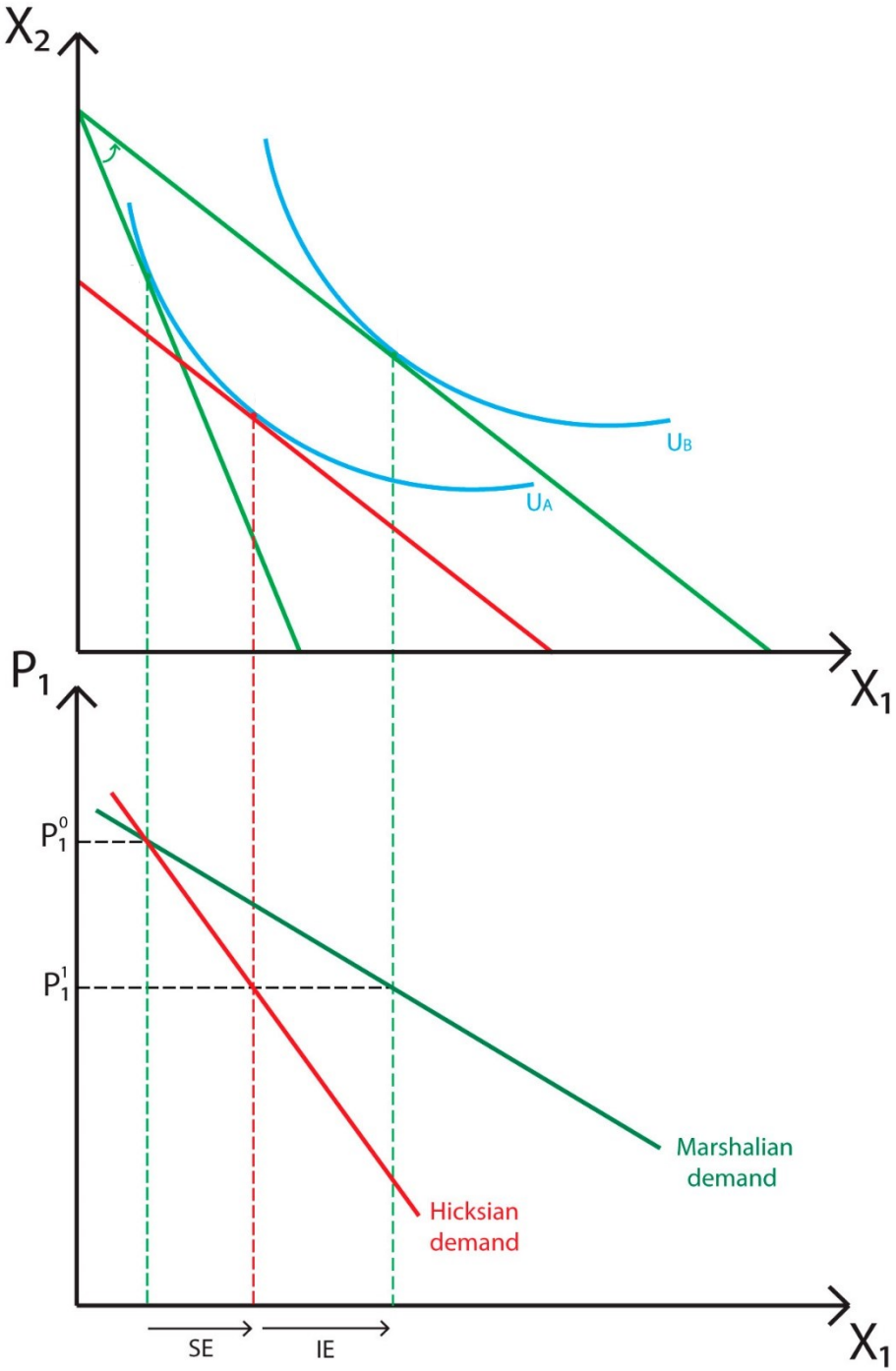


Slutskian Method to identify the SE

Case 3: Px falls, and X is a Giffen good.

Compensated Demand and Uncompensated Demand

- Uncompensated Demand (Marshallian Demand)
  - It shows TE of how X changes as Px changes.
  - It includes SE and IE.
  - It can be upward-sloping for a Giffen good.
- Compensated Demand
  - It shows SE of how X changes as Px changes.
  - It does not include IE.
  - It is always downward-sloping.



Decomposition of the Price Effect

LEARNING-BY-DOING EXERCISE 5.4

Finding Income and Substitution Effects Algebraically

In Learning-By-Doing Exercises 4.2 and 5.2, we met a consumer who purchases two goods, food and clothing. He has the utility function $U(x, y) = xy$, where x denotes the amount of food consumed and y the amount of clothing. His marginal utilities are $MU_x = y$ and $MU_y = x$. Now suppose that he has an income of \$72 per week and that the price of clothing is $P_y = \$1$ per unit. Suppose that the price of food is initially $P_{x_1} = \$9$ per unit and that the price subsequently falls to $P_{x_2} = \$4$ per unit.

Problem Find the numerical values of the income and substitution effects on food consumption, and graph the results.