




Consumer Behavior

EE311

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Outline

- How are consumer preferences used to determine demand?
- How do consumers allocate income to the purchase of different goods?
- How do consumers with limited income decide what to buy?
- How to derive an individual demand?
- Income and Substitution Effects
- Applications

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Consumer Preferences – Basic Assumptions

1. Preferences are *complete*.
 - Consumers can rank market baskets; i.e., either prefer A to B, B to A, or indifferent
2. Preferences are *transitive*.
 - If prefer A to B, and B to C, then must prefer A to C
3. Consumers *always prefer more* of any good to less.
 - More is better --> rule out “Bads”. This assumption can be relaxed.
4. Variety is preferred to extreme

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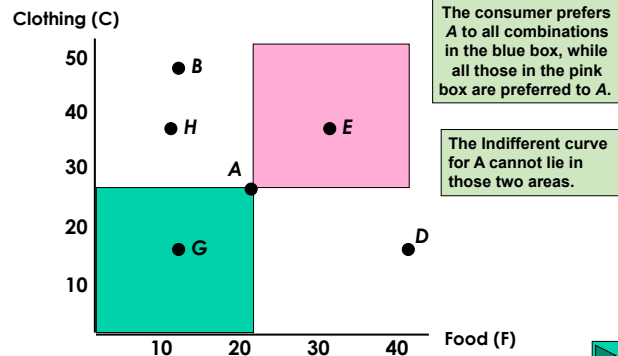


Consumer Preferences

- Consumer preferences can be represented graphically using *indifference curves or ICs*
- Indifference curves represent all combinations of market baskets that the person is *indifferent to*
 - A person will be equally satisfied with either choice or attain the same utility level

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Indifference Curves: An Example



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5

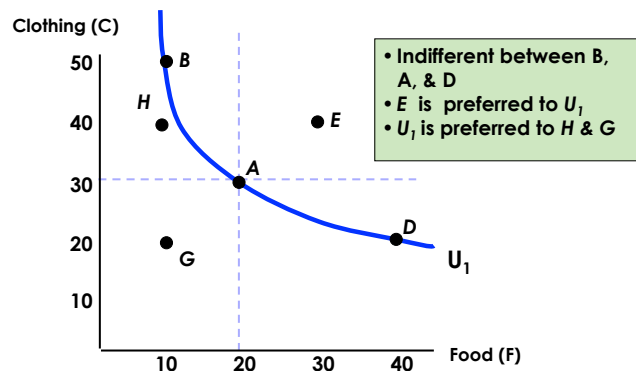
Indifference Curves: An Example

- Points such as B & D have more of one good but less of another compared to A
 - Need more information about consumer ranking
- Consumer may decide they are indifference between B, A and D
 - We can then connect those points with an indifference curve

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6

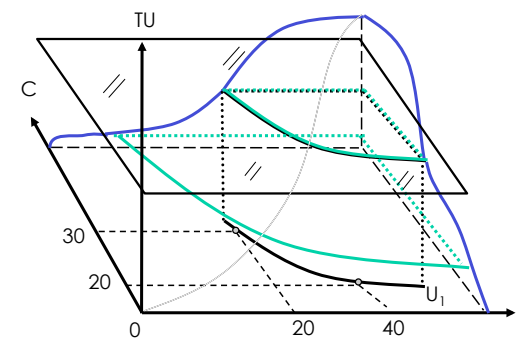
Indifference Curves: An Example



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7

Indifference curves are the contour on the utility hill



8

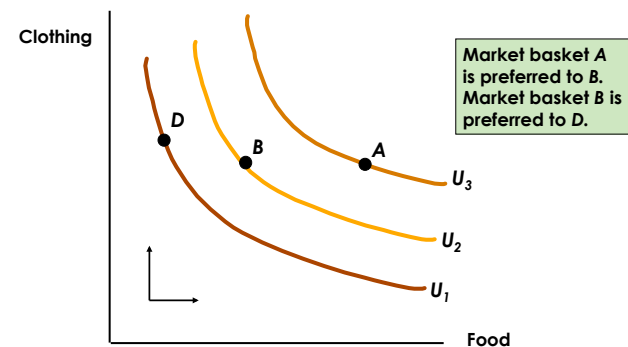
Indifference Curves: Properties

- They slope downward to the right.
 - Goods are substitutable
 - If F rises, C must fall to maintain the same U_1 .
- Any basket lying northeast of an IC is preferred to any on the IC
- Convex to the origin
 - Variety is preferred to extreme
- Indifference curves can not cross
- Continuous: no gaps

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9

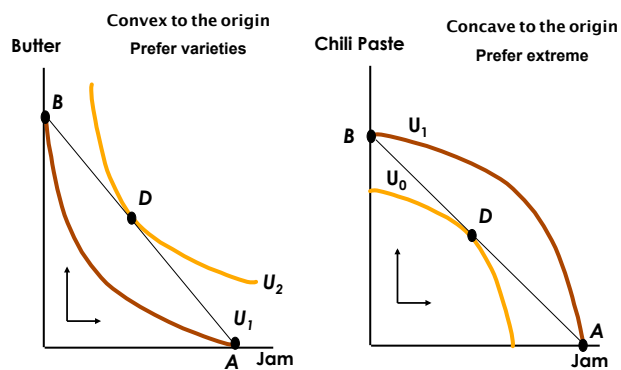
Indifference Map



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10

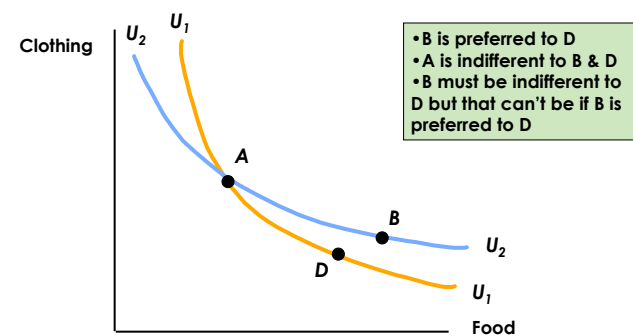
Indifference Map



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11

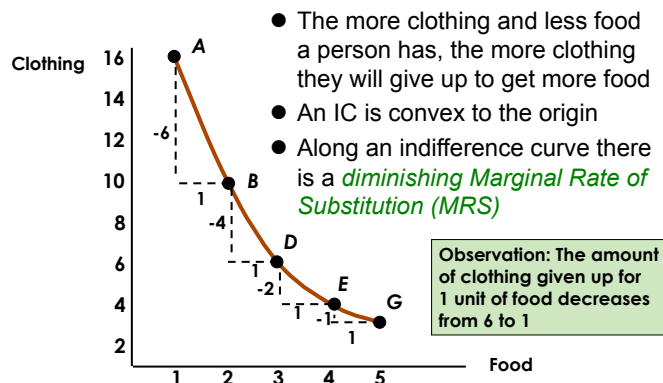
Crossing Indifference Curves



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12

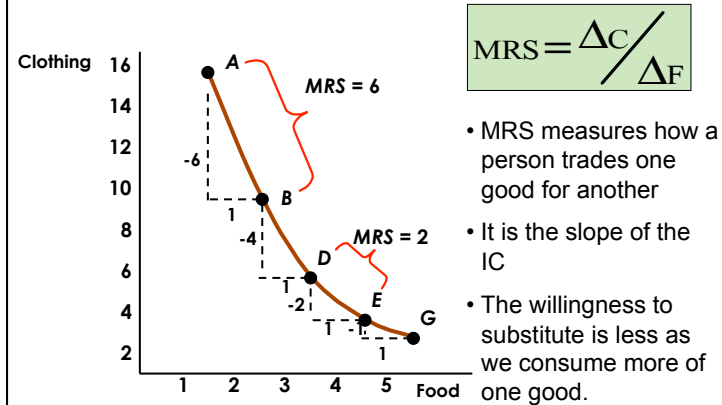
Indifference Curves



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13

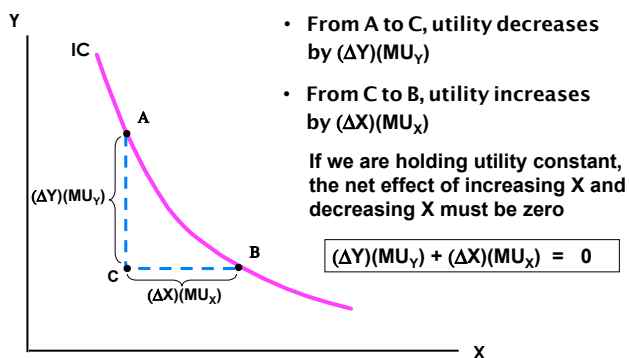
Marginal Rate of Substitution



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14

Marginal Rate of Substitution



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15

Marginal Rate of Substitution

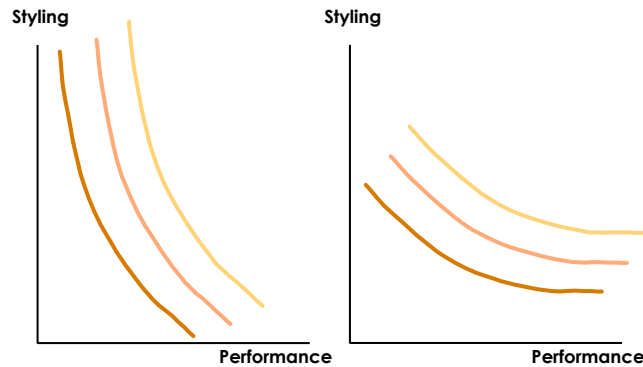
- Rearranging equation, we can see the relationship between MRS and MUs

$$\begin{aligned}
 (\Delta Y)(MU_Y) + (\Delta X)(MU_X) &= 0 \\
 (\Delta Y)(MU_Y) &= -(\Delta X)(MU_X) \\
 \frac{\Delta Y}{\Delta X} &= -\frac{(MU_X)}{(MU_Y)} = MRS
 \end{aligned}$$

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16

MRS and Preferences



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17

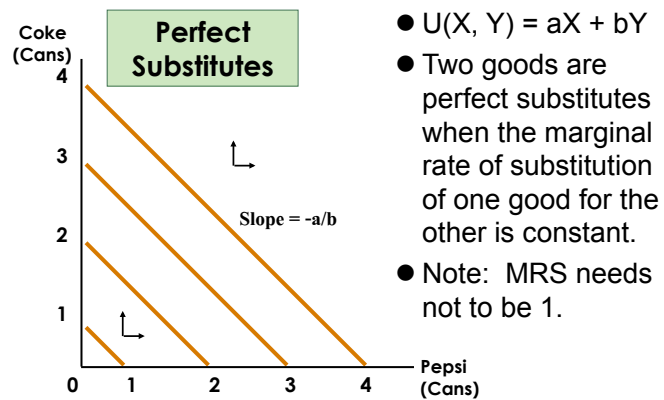
Shapes of the IC and types of goods

- Indifference curves with different shapes imply a different willingness to substitute
- Two polar cases are of interest
 - Perfect substitutes
 - Perfect complements
- Other types
 - Neuters
 - Bads

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18

Consumer Preferences

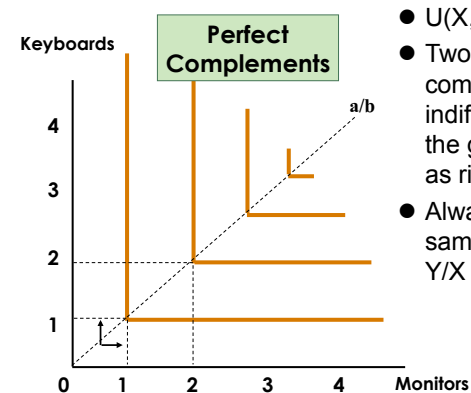


- $U(X, Y) = aX + bY$
- Two goods are perfect substitutes when the marginal rate of substitution of one good for the other is constant.
- Note: MRS needs not to be 1.

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19

Consumer Preferences

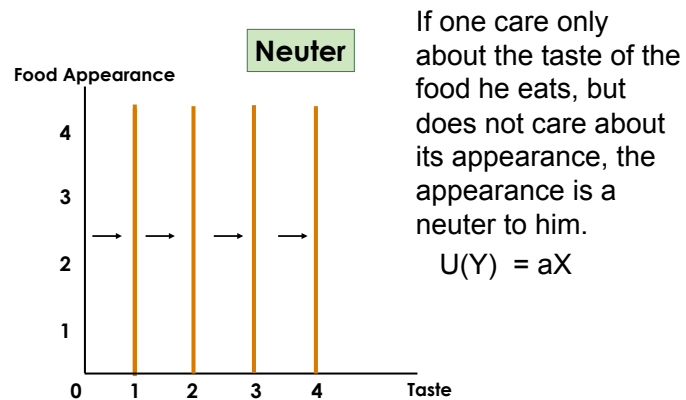


- $U(X, Y) = \min \{aX, bY\}$
- Two goods are perfect complements when the indifference curves for the goods are shaped as right angles.
- Always consume in the same proportion $Y/X = a/b$.

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20

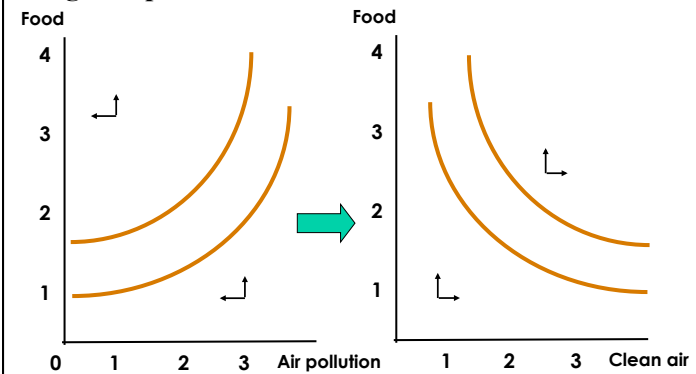
Consumer Preferences



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21

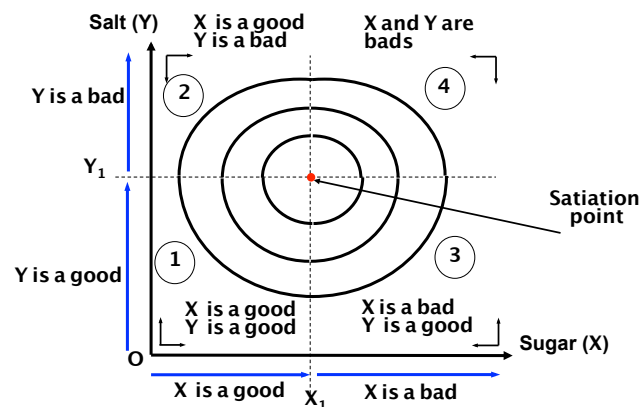
Bads are commodities we don't want more of; e.g., air pollution, stress



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Satiation or Bliss point



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Cardinal versus Ordinal Preferences

- The theory of consumer behavior does not required assigning a numerical value to the level of satisfaction
- Although ranking of market baskets are good, sometimes numerical value are useful
- Utility: A numerical score representing the satisfaction that a consumer gets from a given market basket.

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24

Utility

- *Utility function*

- Formula that assigns a level of utility to individual market baskets

- If the utility function is

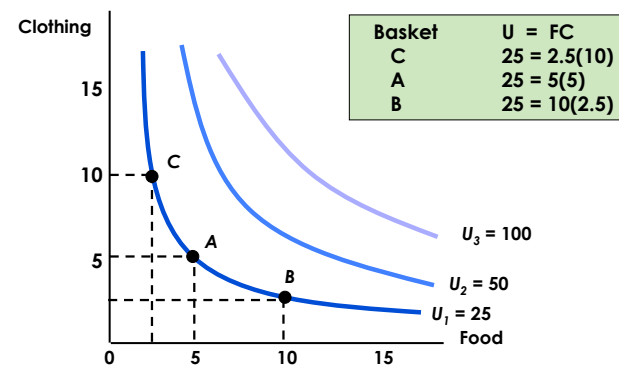
$$U(F, C) = F + 2C$$

A market basket with 8 units of food and 3 units of clothing gives a utility of

$$14 = 8 + 2(3)$$

F and C are perfect substitutes

Utility - Example: Cobb-Douglas



Utility

- Although we numerically rank baskets and indifference curves, numbers are ONLY for ranking
- A utility of 4 is not necessarily twice as good as utility of 2
- The actual unit of measurement for utility is not important.
- An ordinal ranking is sufficient to explain how most individual decisions are made.

Budget Constraints

- *The Budget Line*

- Indicates all combinations of two commodities for which total money spent equals total income.
- We assume only 2 goods are consumed, so we do not consider savings for the time being

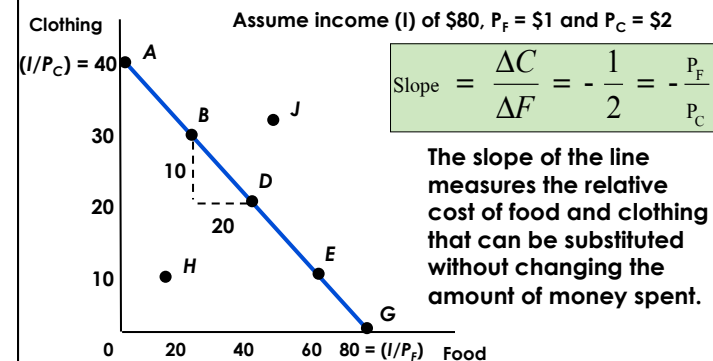
The Budget Line

- A consumer chooses food (F) and Clothing (C)
- Price of food = P_F and price of clothing = P_C
- The budget line then can be written:

$$P_F F + P_C C = I$$

All income is allocated to food (F) and/or clothing (C)

The Budget Line



The Budget Line

$$I = P_F F + P_C C$$

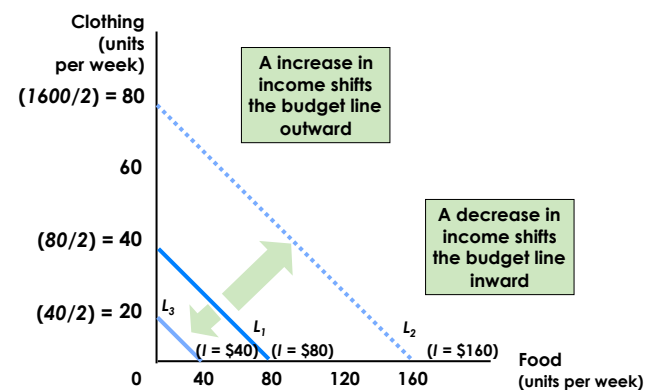
$$P_C C = I - P_F F$$

$$C = \frac{I}{P_C} - \frac{P_F}{P_C} F$$

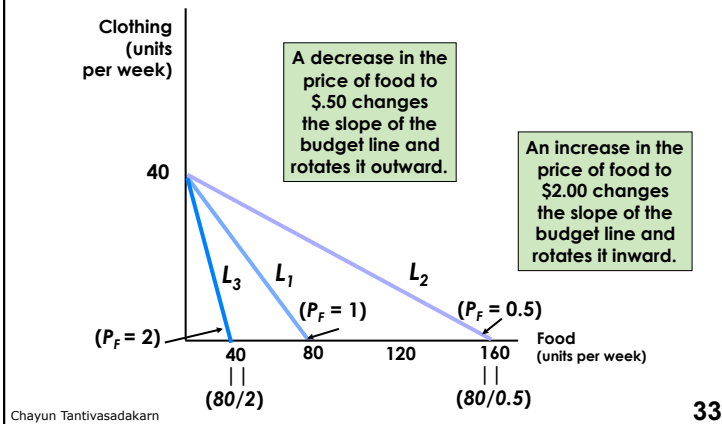
Y intercept

slope

The Budget Line: Changes in income



The Budget Line: Changes in a price



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33

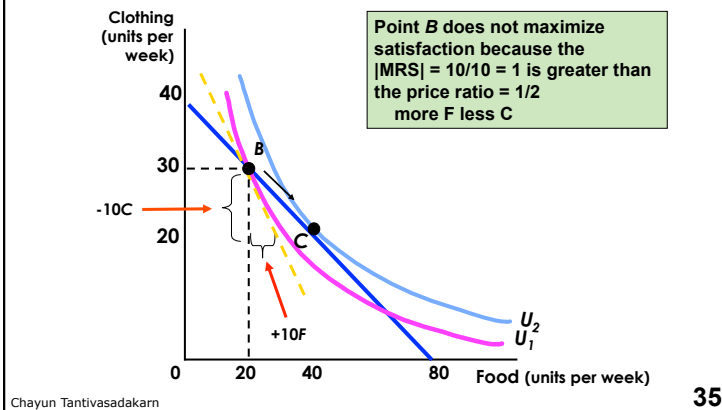
Consumer Choice

- Optimal consumption point is where $MRS =$ the relative prices
- $MRS =$ the rate that the consumer is willing to sacrifice some clothing to get 1 unit of food
- $P_F/P_C =$ cost of additional unit of food in terms of clothing

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34

Consumer Choice



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35

Consumer Choice

- If $|MRS| \neq P_F/P_C$ then individuals can reallocate basket to increase utility
- If $|MRS| > P_F/P_C \rightarrow$ Consumer is willing to give up clothing for food more than what the market requires
 - Will increase food and decrease clothing until $|MRS| = P_F/P_C$
- If $|MRS| < P_F/P_C$
 - Will increase clothing and decrease food until $|MRS| = P_F/P_C$

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36

Optimal condition

Max $U(X,Y)$ such that $I = P_X X + P_Y Y$

Since $I = P_X X + P_Y Y$ implies

$$Y = I/P_Y - X P_X/P_Y.$$

Substituting this gives

$$\text{Max } U(X, I/P_Y - X P_X/P_Y)$$

$$MU_X - MU_Y P_X/P_Y = 0$$

$$MRS = \frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

Optimal condition: Lagrange approach

Max $U(X,Y)$ such that $I = P_X X + P_Y Y$

$$L = U(X,Y) + \lambda(I - P_X X - P_Y Y)$$

$$\left. \begin{aligned} dL/dX = MU_X - \lambda P_X &= 0 \\ dL/dY = MU_Y - \lambda P_Y &= 0 \end{aligned} \right\} \Rightarrow MRS = \frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

$$dL/d\lambda = I - P_X X - P_Y Y = 0$$

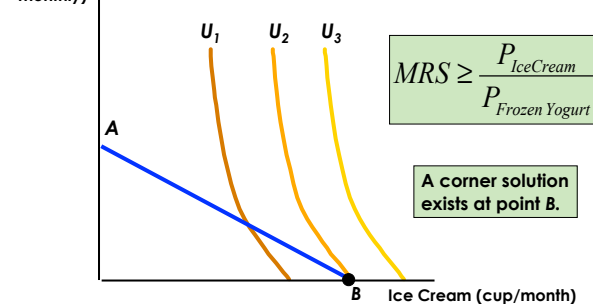
$\lambda = MU_X/P_X = MU_Y/P_Y$ It is the marginal utility per baht. It is also equal to the shadow price of money or the marginal utility of money

Consumer Choice

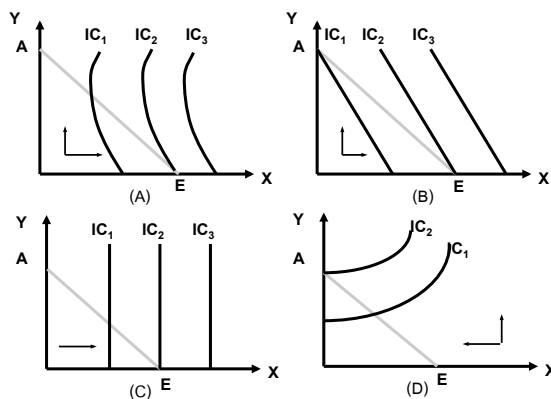
- Normally MRS should equal P_X/P_Y and the equilibrium is called an interior solution
- A **corner solution** exists if a consumer buys in extremes, and buys all of one category of good and none of another.
 - MRS is **not** necessarily equal to P_X/P_Y

A Corner Solution

A **corner solution** exists if a consumer buys all of one good and none of another. MRS is not necessarily equal to P_X/P_Y



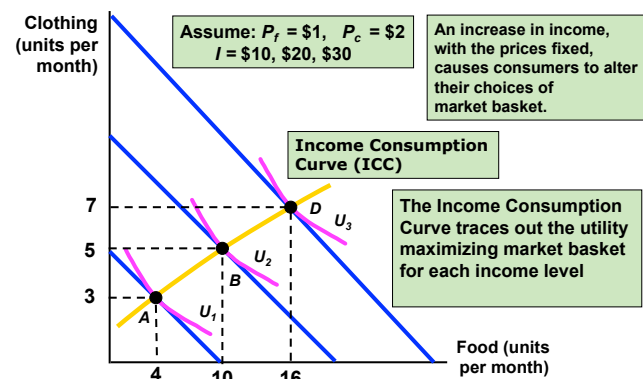
Corner Solutions



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41

Effects of Income Changes



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42

Individual Demand

- Income Changes
 - When the income-consumption curve moves from left to right as income increases:
 - The quantity demanded increases with income.
 - The income elasticity of demand is positive.
 - The good on the X axis is a **normal good**.

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43

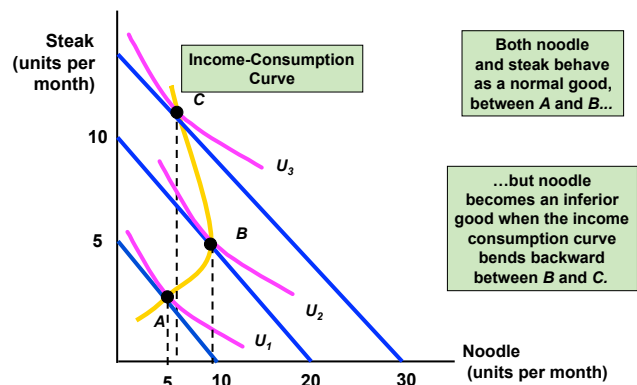
Individual Demand

- Income Changes
 - When the income-consumption curve move from right to left as income increases:
 - The quantity demanded decreases with income.
 - The income elasticity of demand is negative.
 - The good on the X axis is an **inferior good**.

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44

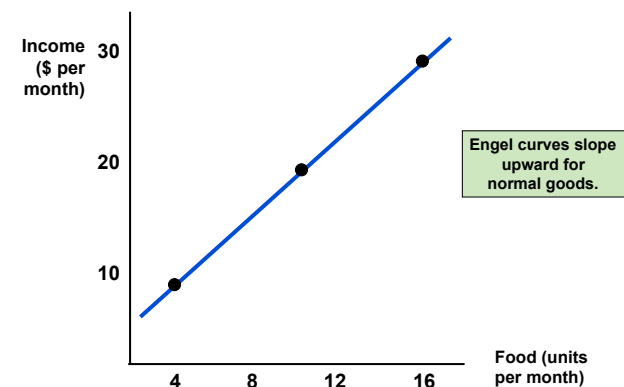
An Inferior Good



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45

Engel Curves



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46

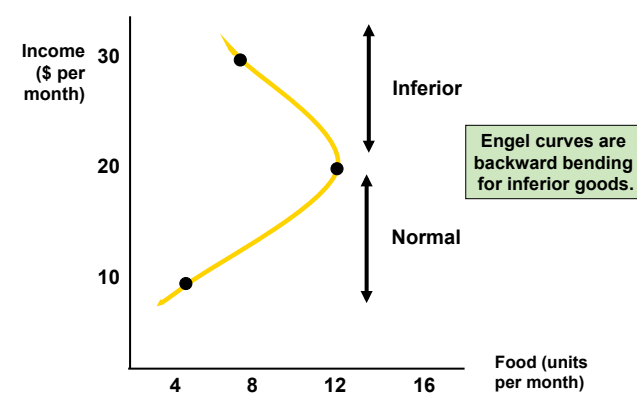
Individual Demand

- Engel Curves
 - Engel curves relate the quantity of good consumed to income.
 - If the good is a normal good, the Engel curve is upward sloping.
 - If the good is an inferior good, the Engel curve is downward sloping.

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47

Engel Curves



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48

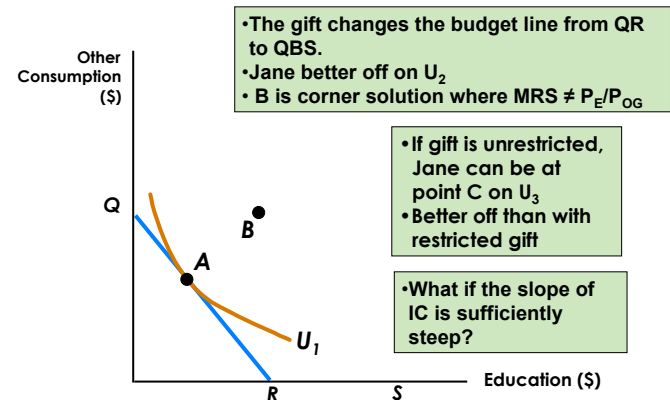
Application: Cash or Gifts

- Suppose Jane Doe's parents set up a trust fund for her college education.
- The money must be used only for education.
- Original budget line, QR, with a market basket, A, of education and other goods
- Trust fund shifts out the budget line as long as trust fund, QB, spent on education
- Jane increases satisfaction moving to higher indifference curve, U_2
- Although a welcome gift, an unrestricted gift might be better since she can get U_3

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49

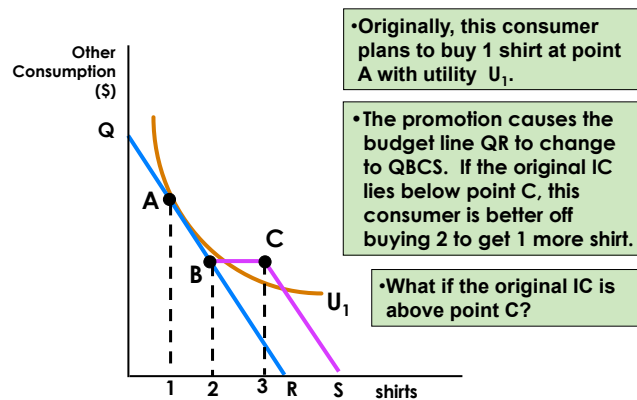
Application: Cash or Gifts



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50

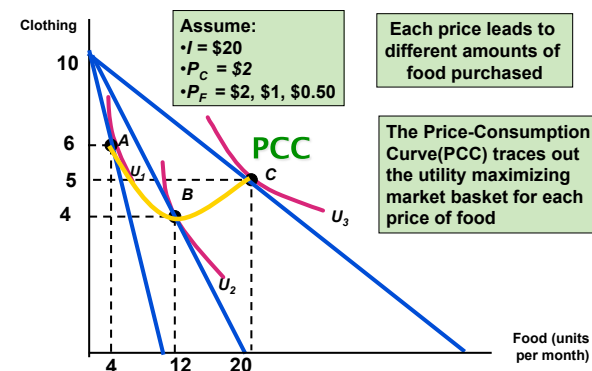
Application: Buy two, get one free



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51

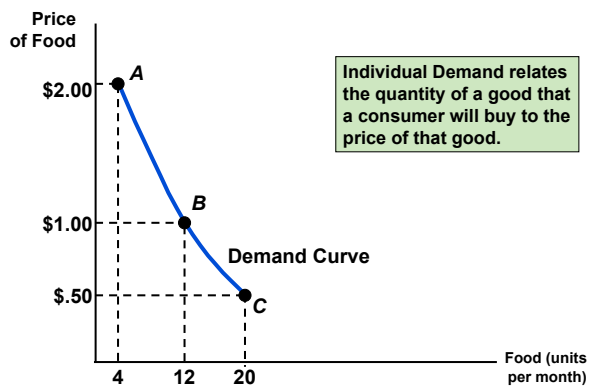
Effect of a Price Change



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52

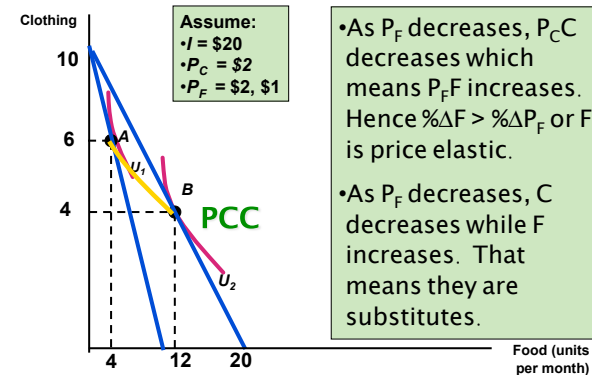
Effect of a Price Change



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53

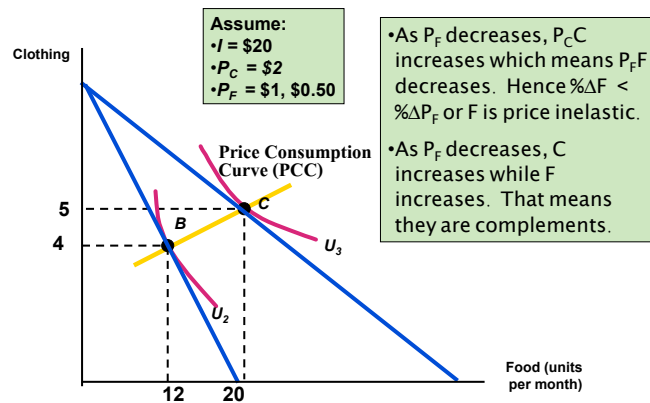
Decreasing PCC



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54

Effect of a Price Change



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Substitutes & Complements

- If the price consumption curve is downward-sloping, the two goods are considered substitutes.
- If the price consumption curve is upward-sloping, the two goods are considered complements.
- They could be both.

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56

Income and Substitution Effects

- Substitution Effect
 - Relative price of a good changes when price changes
 - Consumers will tend to buy more of the good that has become relatively cheaper, and less of the good that is relatively more expensive.
- Income Effect
 - Consumers experience an increase in real purchasing power when the price of one good falls.

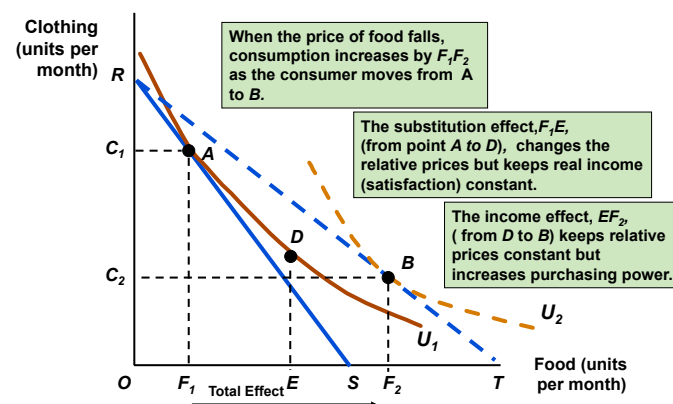
Income and Substitution Effects

- Substitution Effect
 - The substitution effect is the change in an item's consumption associated with a change in the price of the item, with **the level of utility held constant**.
 - When the price of an item declines, the substitution effect always leads to an increase in the quantity demanded of the good.

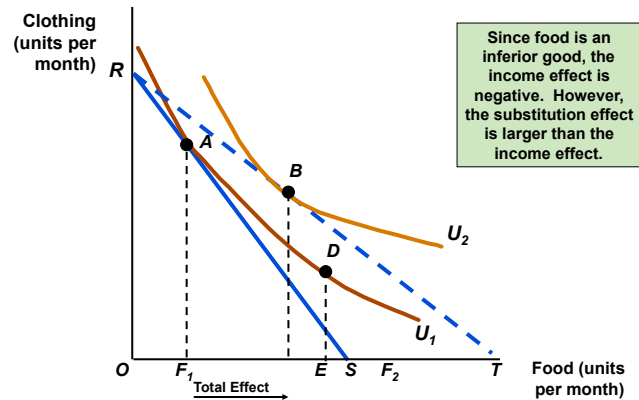
Income and Substitution Effects

- Income Effect
 - The income effect is the change in an item's consumption brought about by the change in purchasing power, with the **price of the item held constant**.
 - When a person's income increases, the quantity demanded for the product may increase or decrease.
 - Even with inferior goods, the income effect is rarely large enough to outweigh the substitution effect.

Income and Substitution Effects: Normal Good



Income and Substitution Effects: Inferior Good



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61

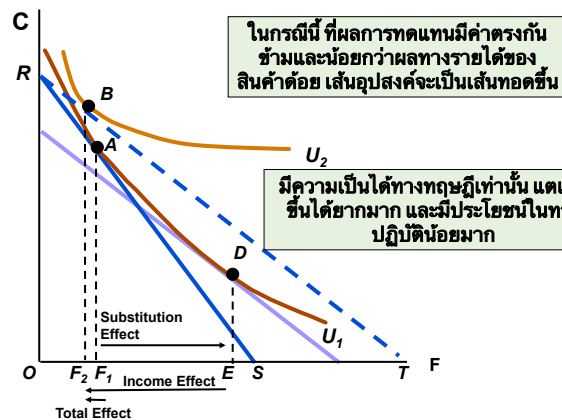
Income and Substitution Effects

- A Special Case--The Giffen Good
 - The income effect may theoretically be large enough to cause the demand curve for a good to slope upward.
 - This rarely occurs and is of little practical interest.

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62

Income and Substitution Effects: Giffen Good



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63

Compensated demand curve

- Ordinary demand or Marshallian demand always has income effect
 - Derive by fixing income.
 - It may slope upward if it is a Giffen good.
- Compensated demand of Hicksian demand excludes income effect or compensated for income
 - Derive by fixing utility
 - It always slopes downward.
 - It is used for calculating welfare change.

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64

