Consumer Behavior

EE311

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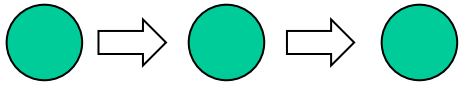
Consumer Preferences – Basic Assumptions

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*.

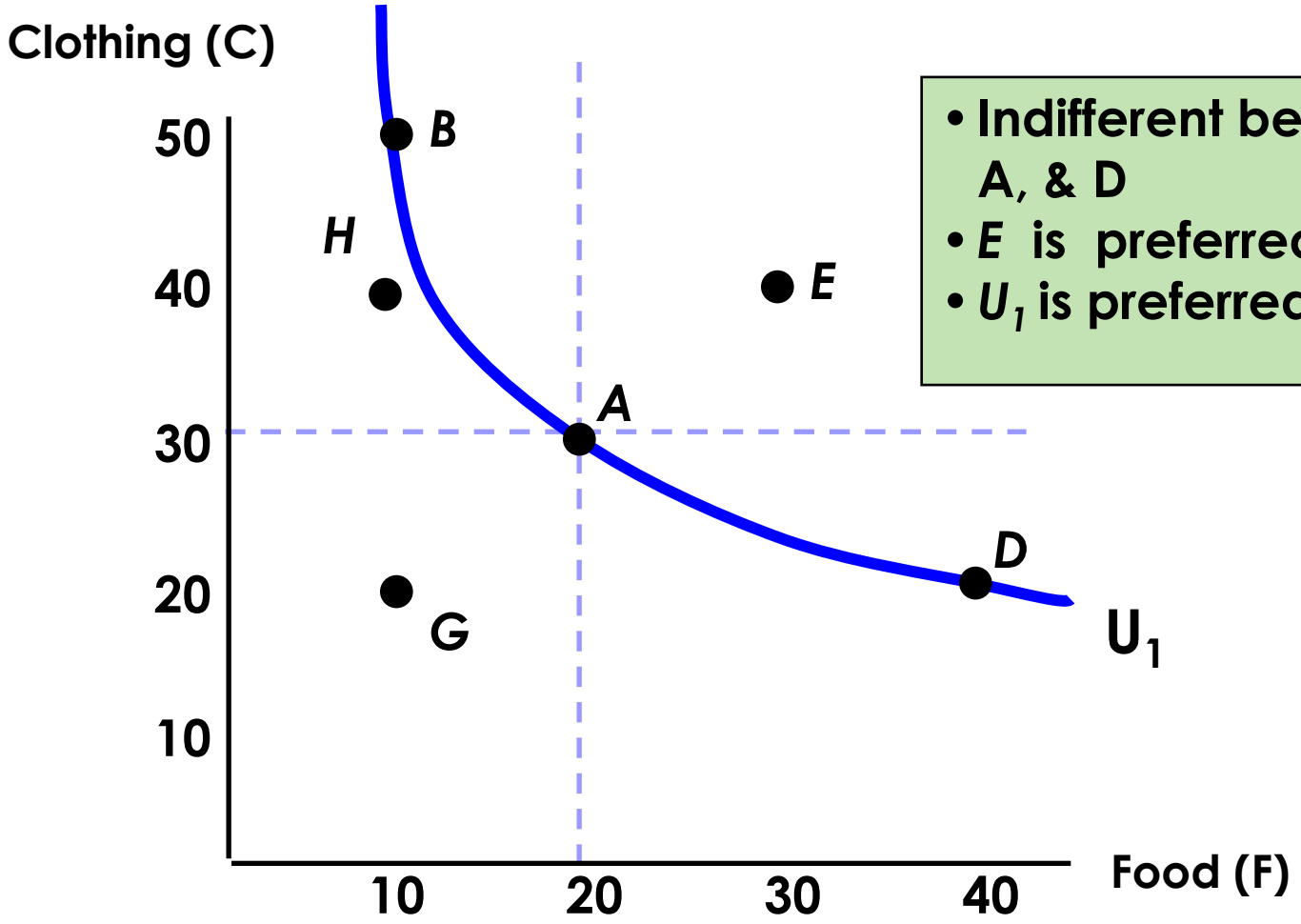


   - If prefer A to B, and B to C, the must prefer A to C
3. Consumers *always prefer more* of any good to less.
   - More is better --> rule out "Bads". This assumption can be relaxed.
4. Variety is preferred to extreme

Consumer Preferences

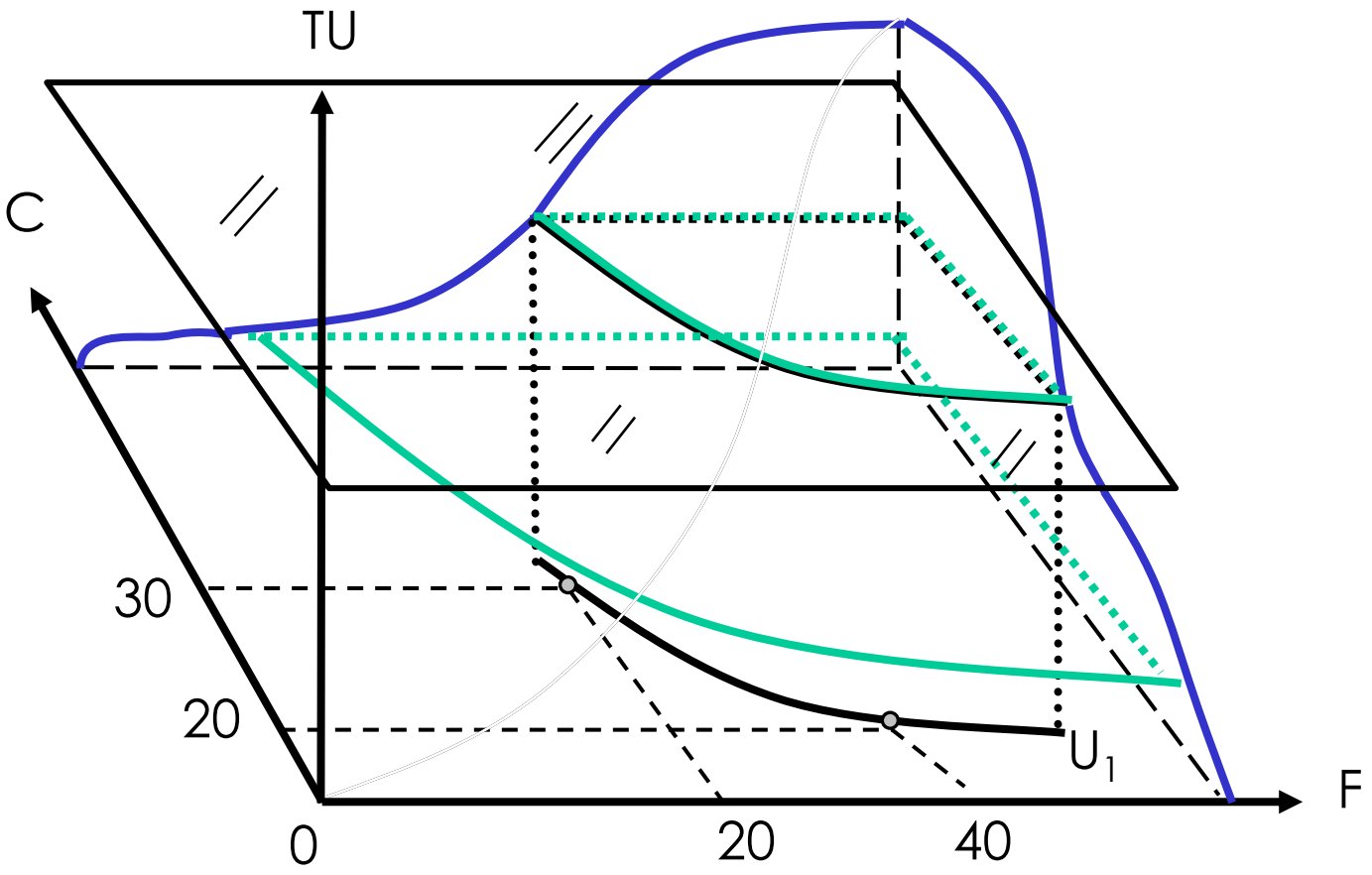
- Consumer preferences can be represented graphically using *indifference curves or ICs*
- Indifference curves represent all combinations of market baskets that the person is *indifferent to*
  - A person will be equally satisfied with either choice or attain the same utility level

Indifference Curves: An Example



- Indifferent between B, A, & D
- *E* is preferred to U_1
- U_1 is preferred to *H* & *G*

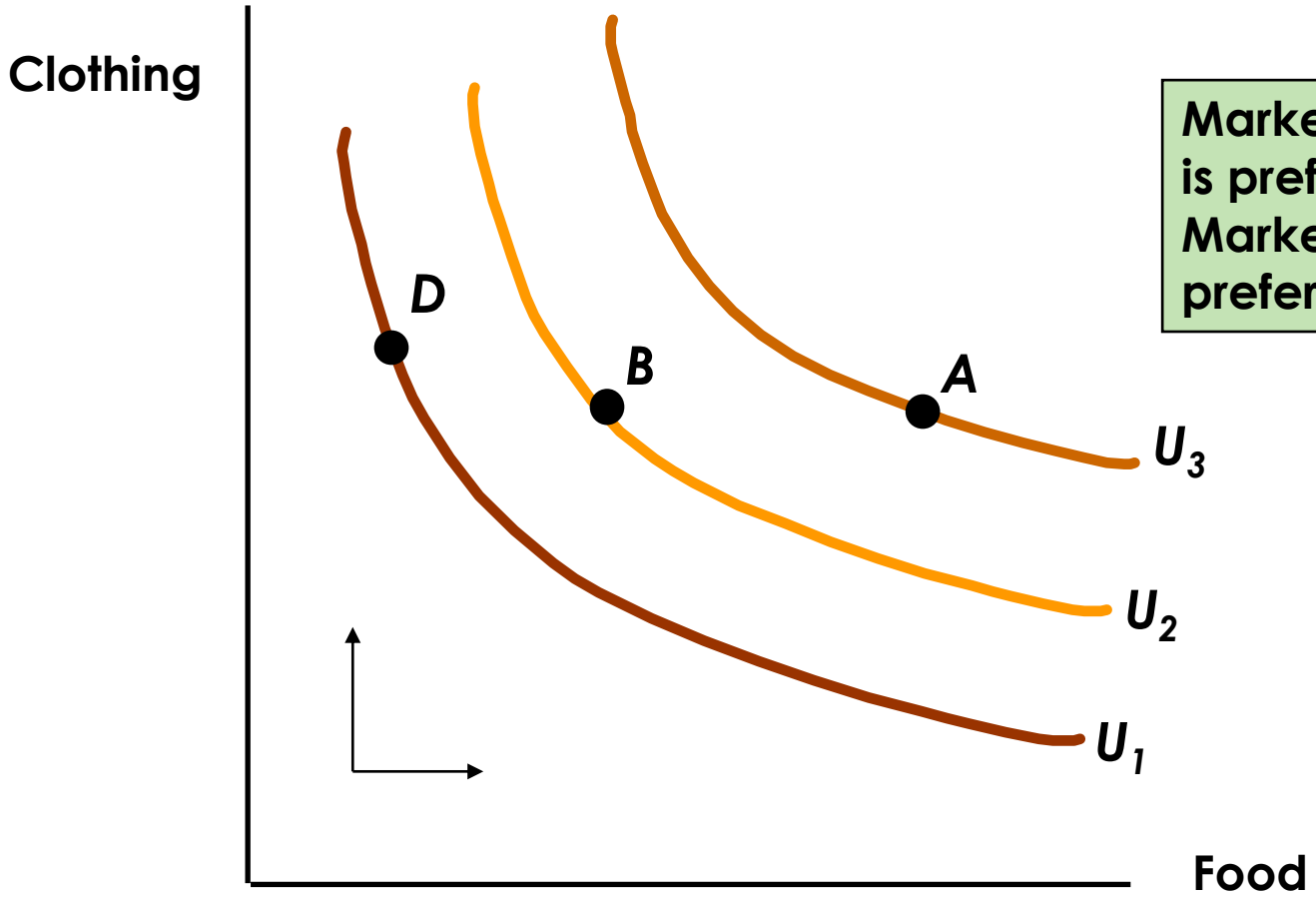
Indifference curves are the contour on the utility hill



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

Indifference Map



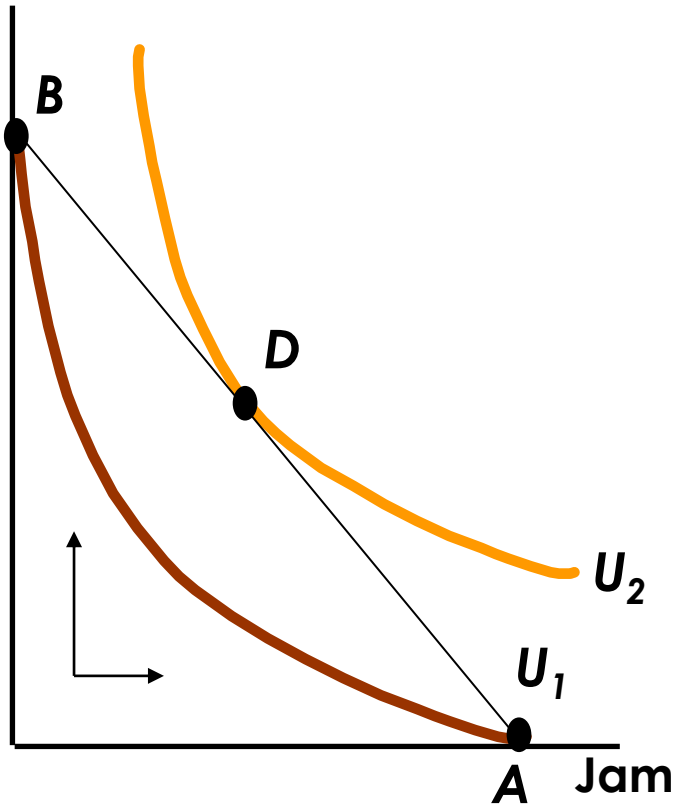
Market basket *A* is preferred to *B*. Market basket *B* is preferred to *D*.

Indifference Map

Convex to the origin

Prefer varieties

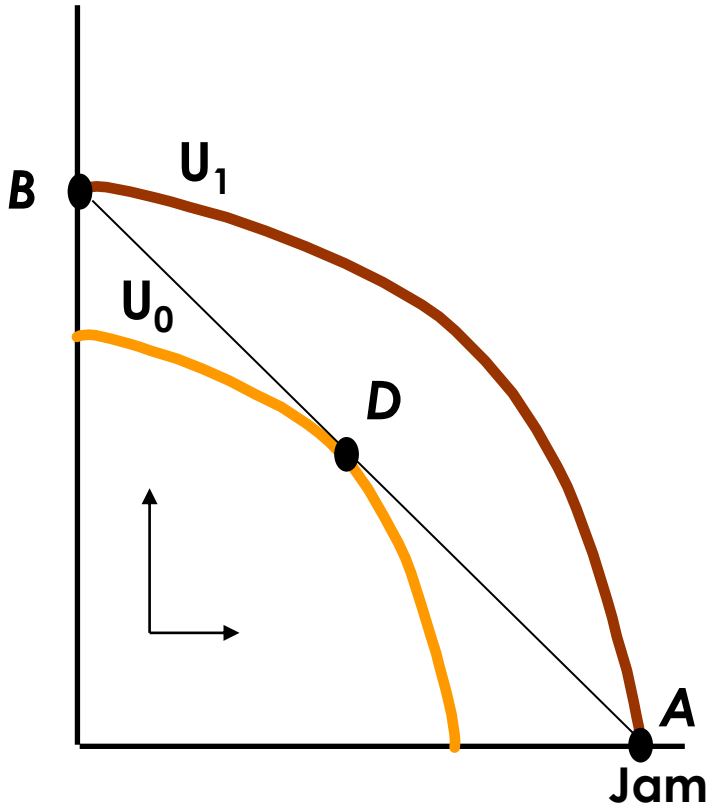
Butter



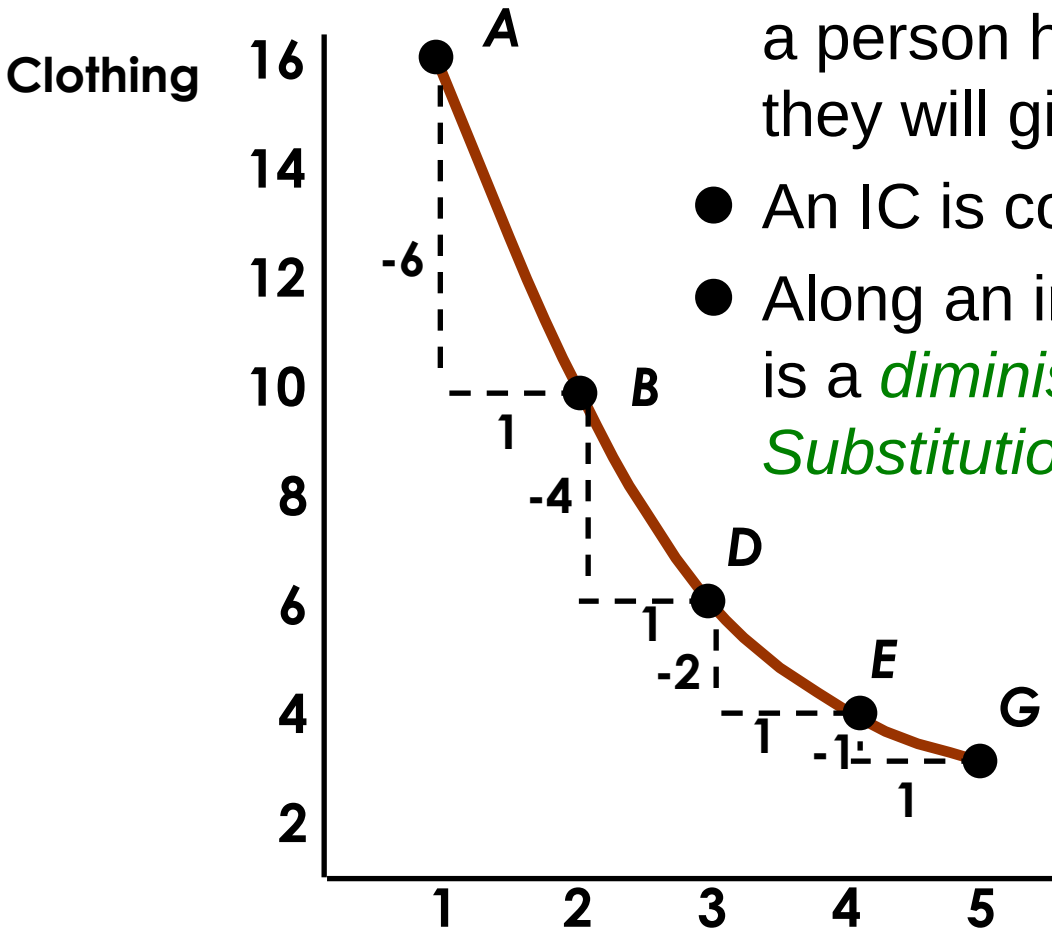
Concave to the origin

Prefer extreme

Chili Paste



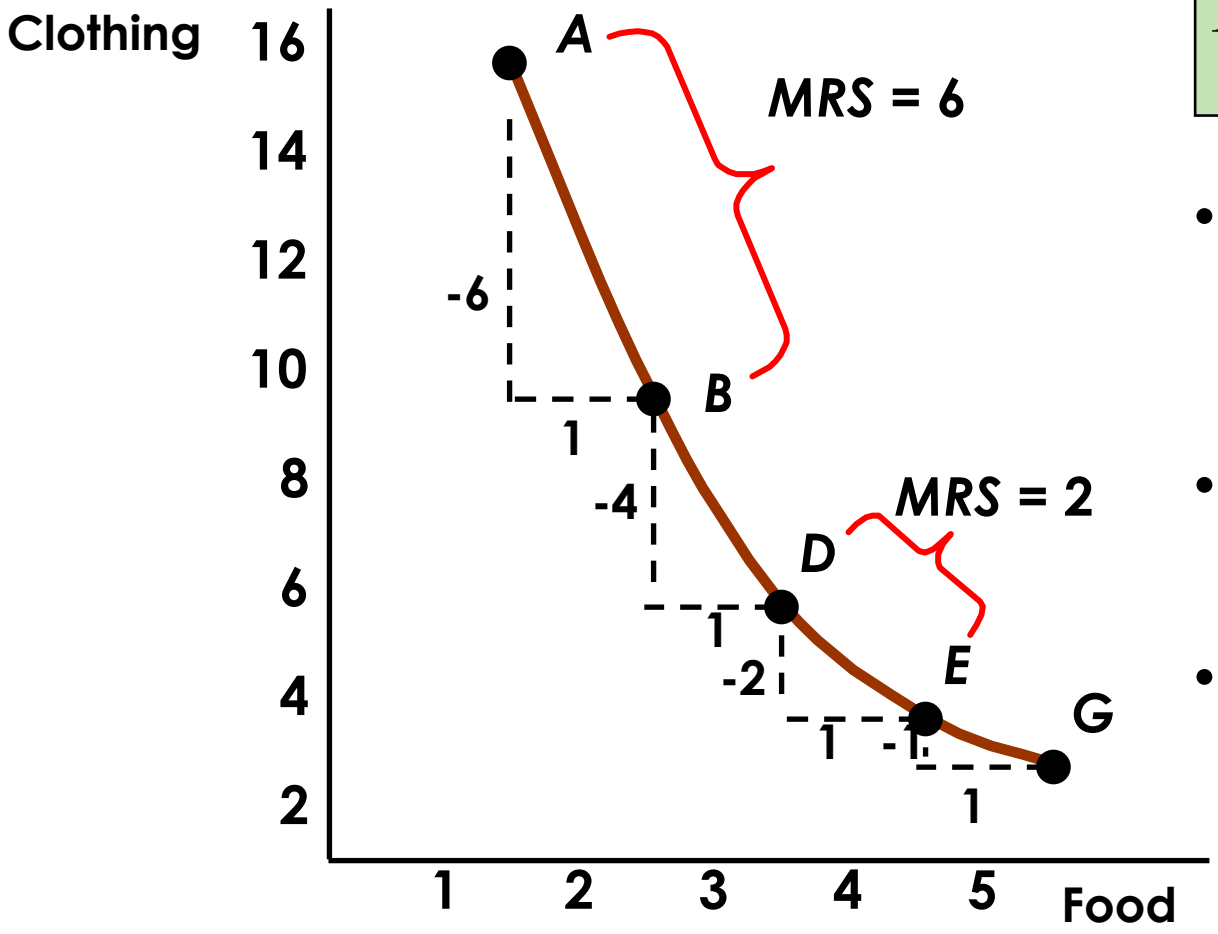
Indifference Curves



- The more clothing and less food a person has, the more clothing they will give up to get more food
- An IC is convex to the origin
- Along an indifference curve there is a *diminishing Marginal Rate of Substitution (MRS)*

Observation: The amount of clothing given up for 1 unit of food decreases from 6 to 1

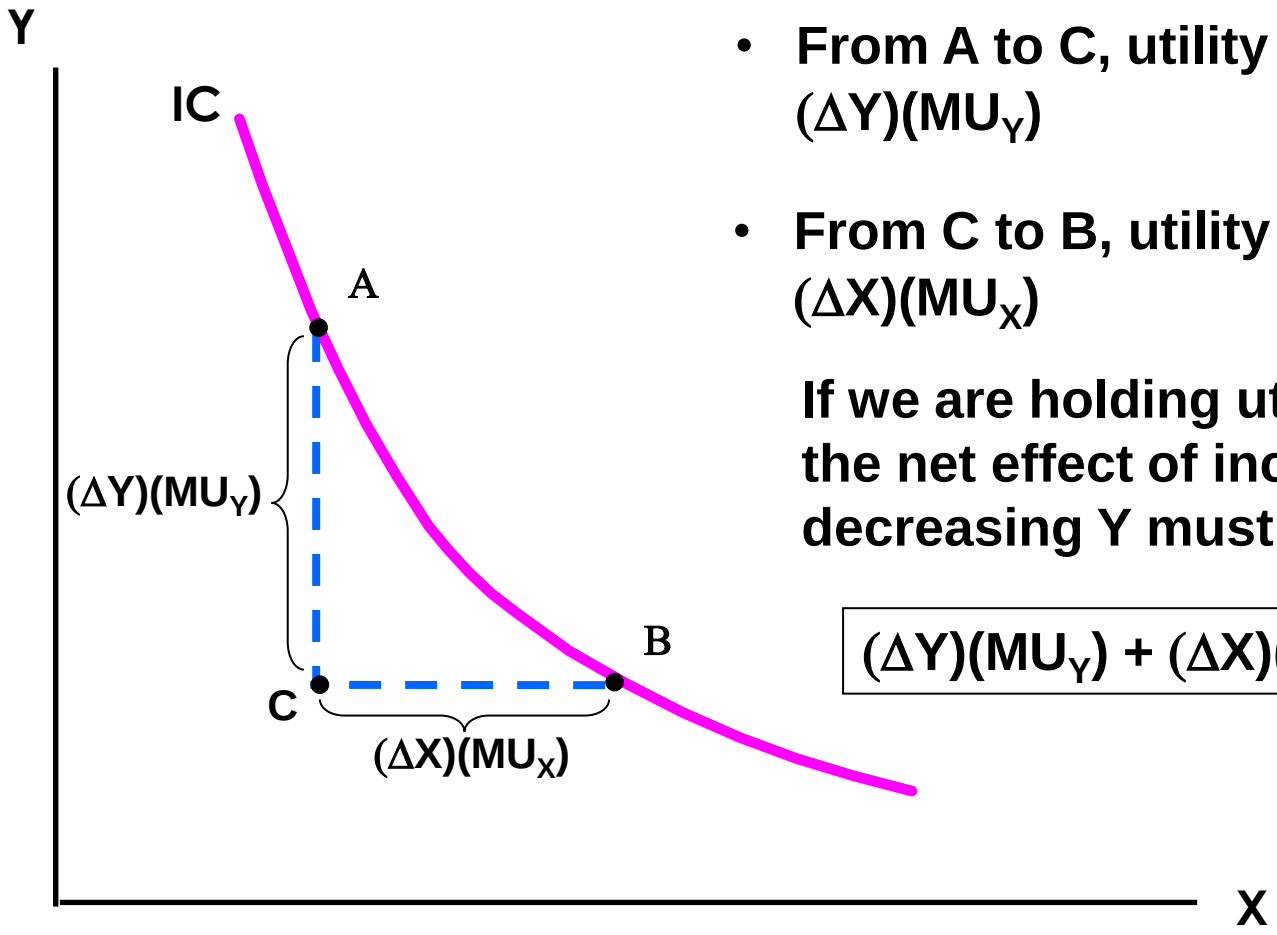
Marginal Rate of Substitution



$$MRS = \frac{\Delta C}{\Delta F}$$

- MRS measures how a person trades one good for another
- It is the slope of the IC
- The willingness to substitute is less as we consume more of one good.

Marginal Rate of Substitution



- From A to C, utility decreases by $(\Delta Y)(MU_Y)$
- From C to B, utility increases by $(\Delta X)(MU_X)$

If we are holding utility constant, the net effect of increasing X and decreasing Y must be zero

$$(\Delta Y)(MU_Y) + (\Delta X)(MU_X) = 0$$

Marginal Rate of Substitution

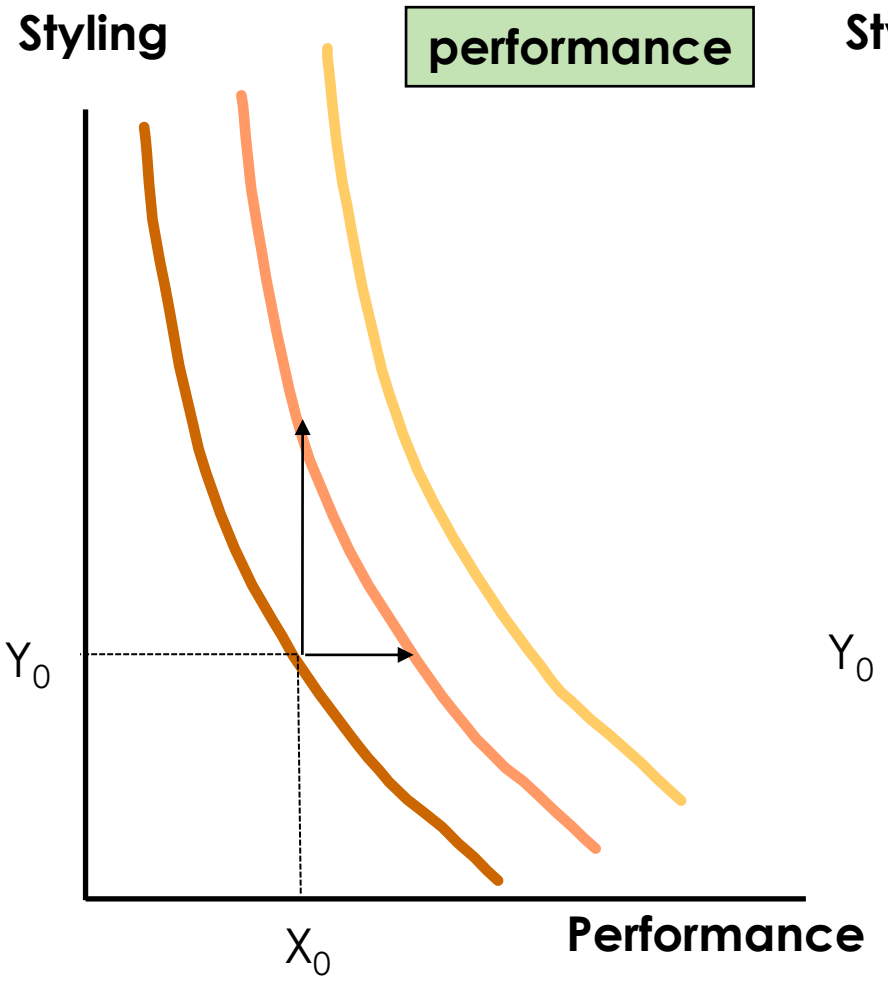
- Rearranging equation, we can see the relationship between MRS and MUs

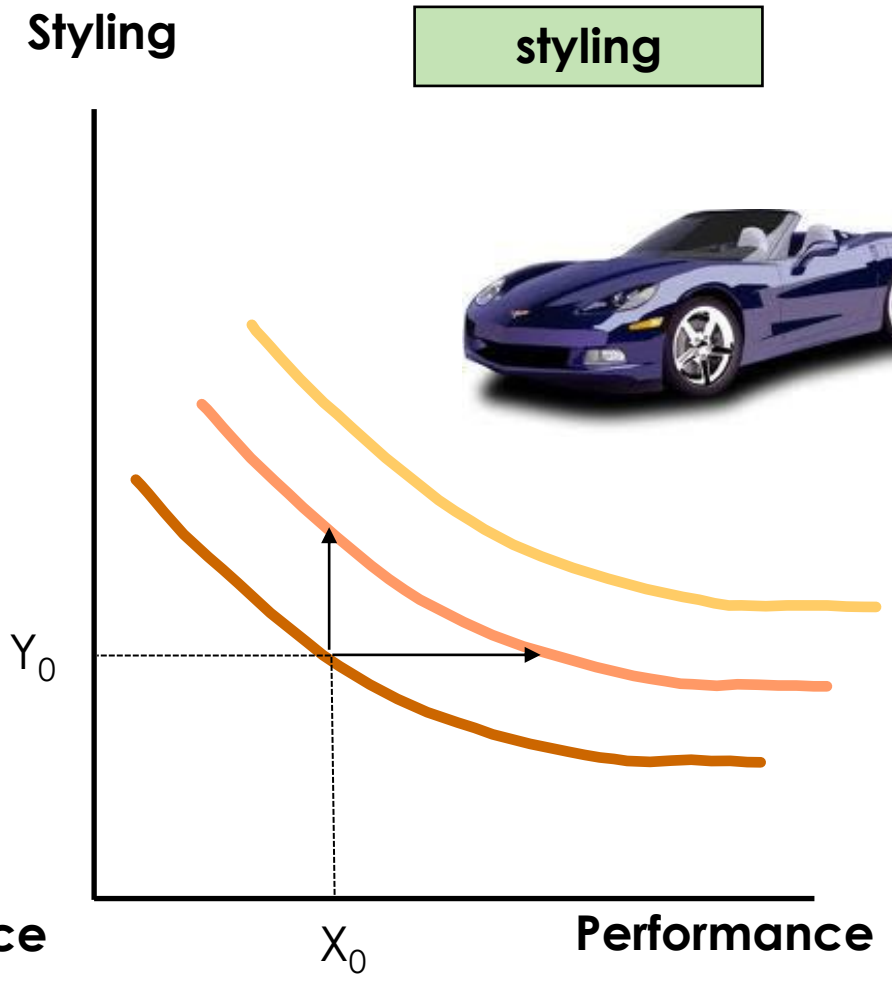
$$(\Delta Y)(MU_Y) + (\Delta X)(MU_X) = 0$$

$$(\Delta Y)(MU_Y) = -(\Delta X)(MU_X)$$

$$\frac{\Delta Y}{\Delta X} = -\frac{(MU_X)}{(MU_Y)} = MRS$$

MRS and Preferences

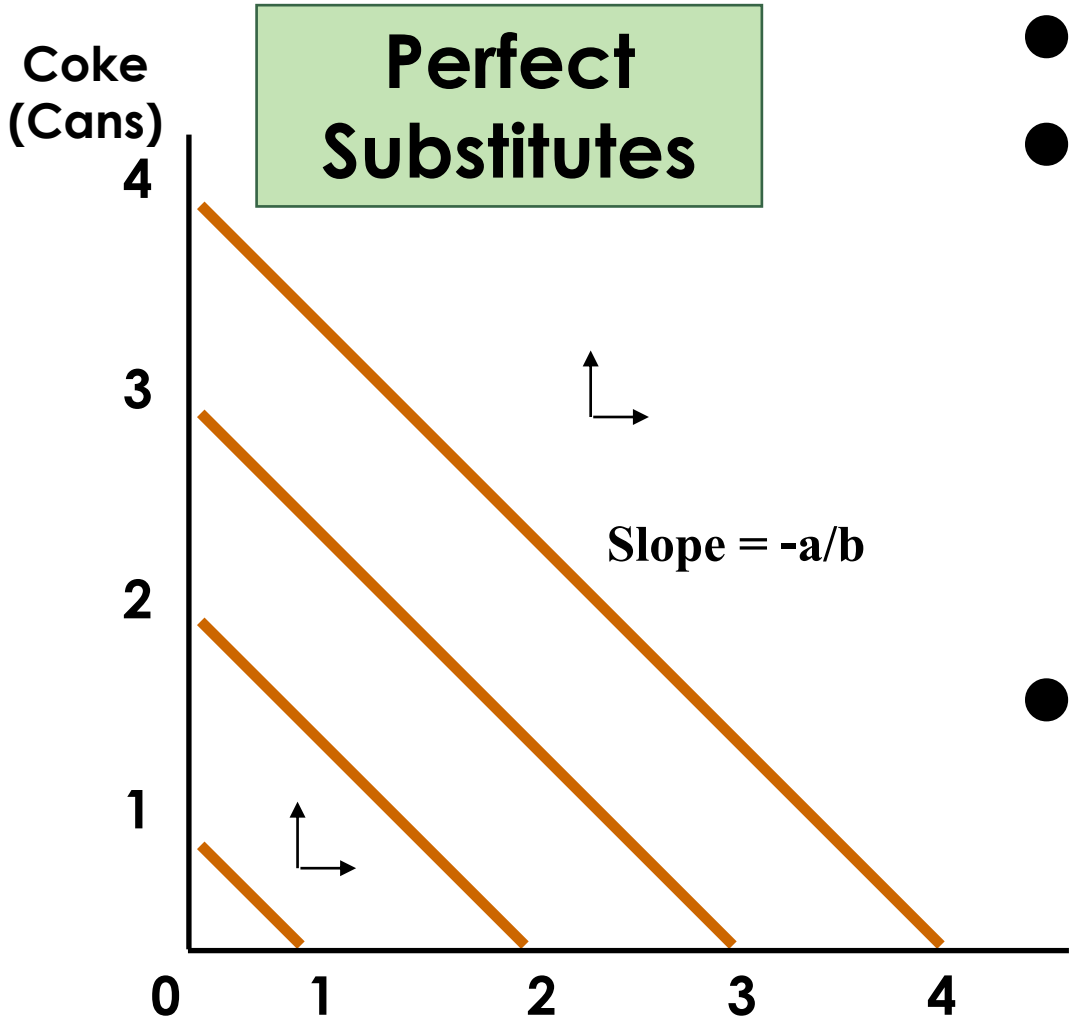




Shapes of the IC and types of goods

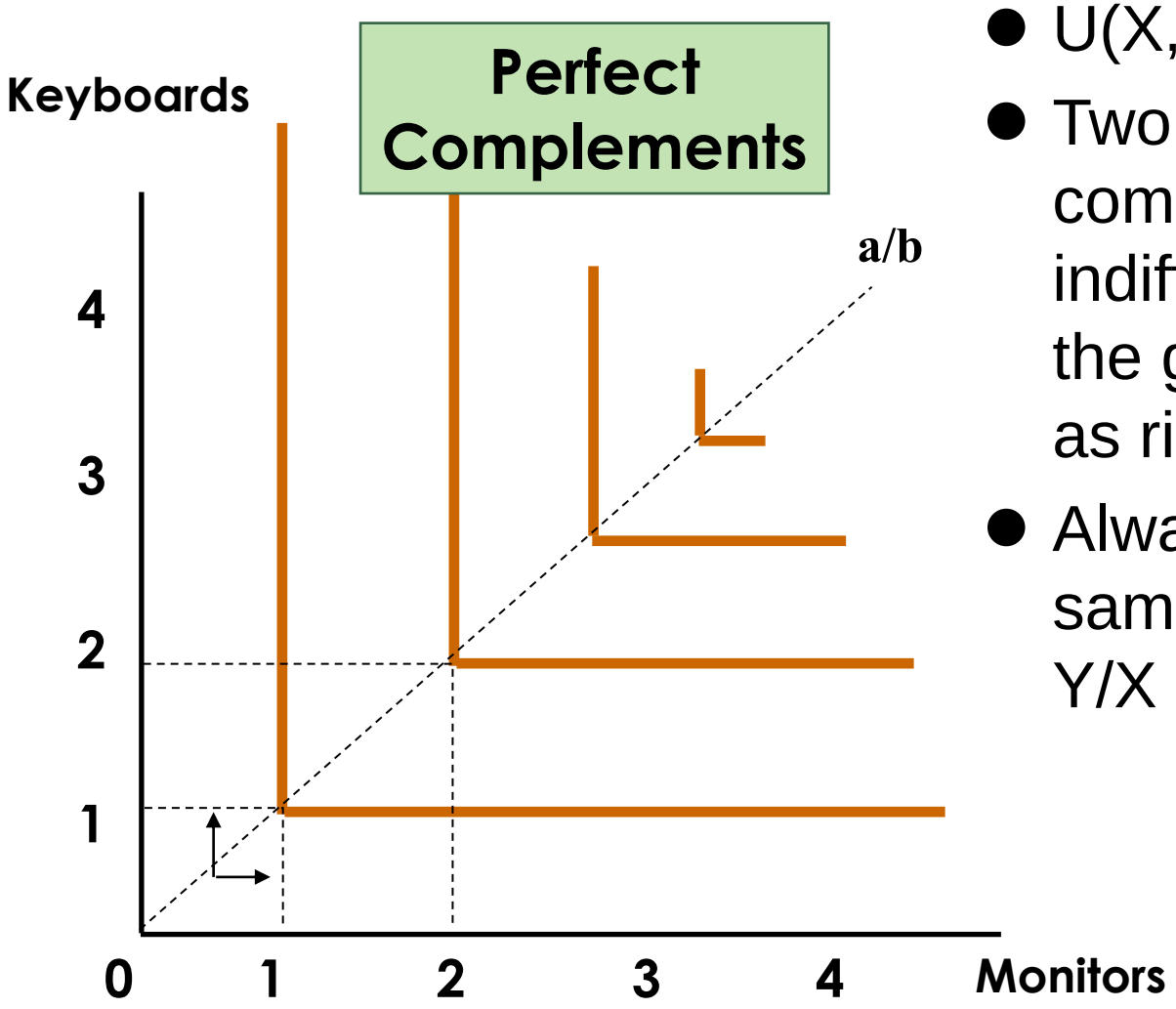
- Indifference curves with different shapes imply a different willingness to substitute
- Two polar cases are of interest
  - Perfect substitutes
  - Perfect complements
- Other types
  - Neuters
  - Bads

Consumer Preferences



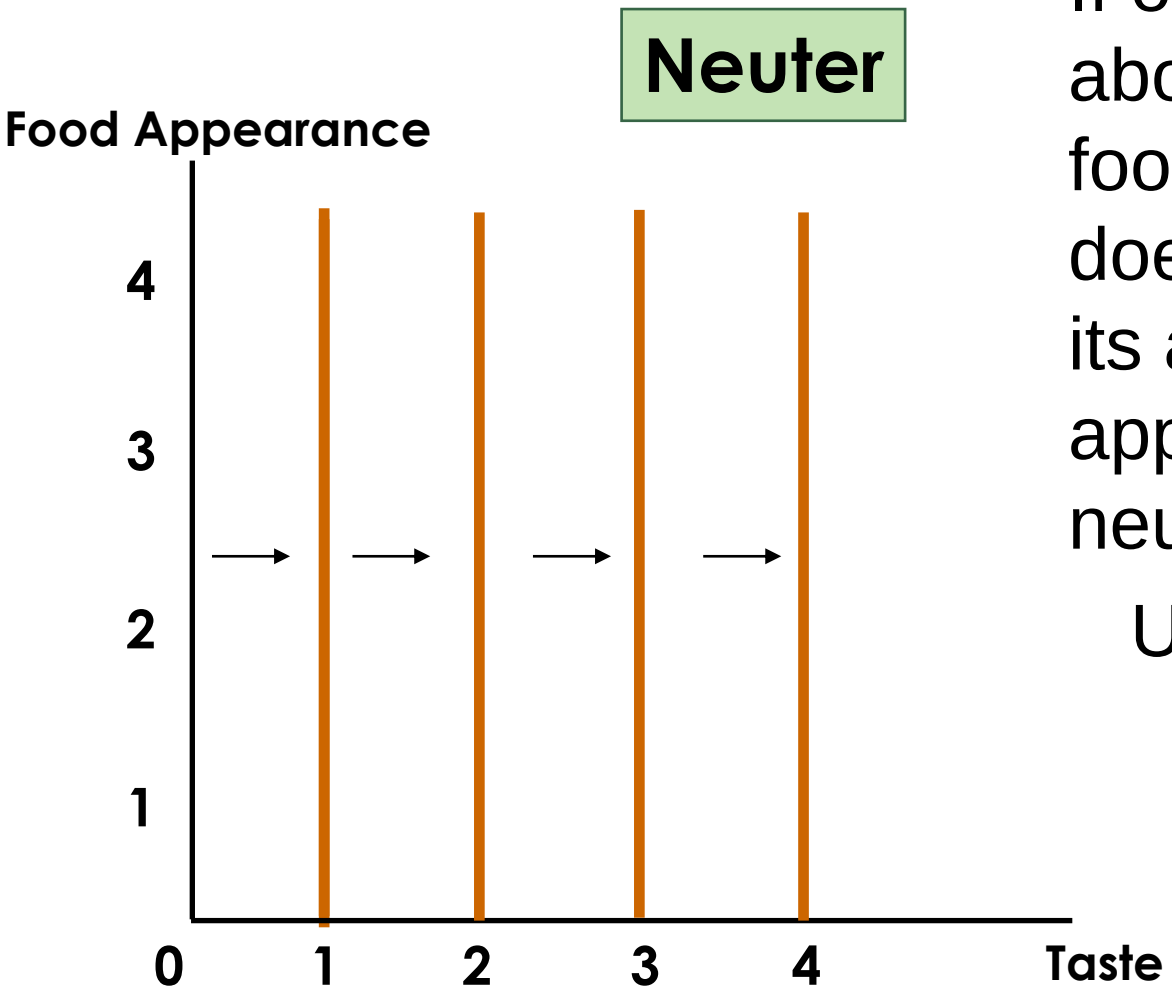
- U(X, Y) = aX + bY
- Two goods are perfect substitutes when the marginal rate of substitution of one good for the other is constant.
- Note: MRS needs not to be 1.

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.

Consumer Preferences

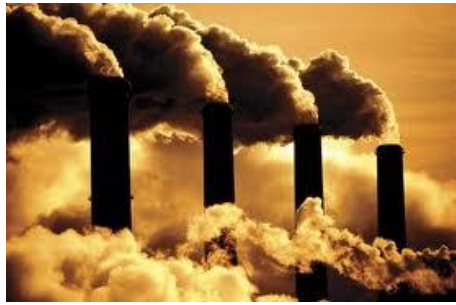


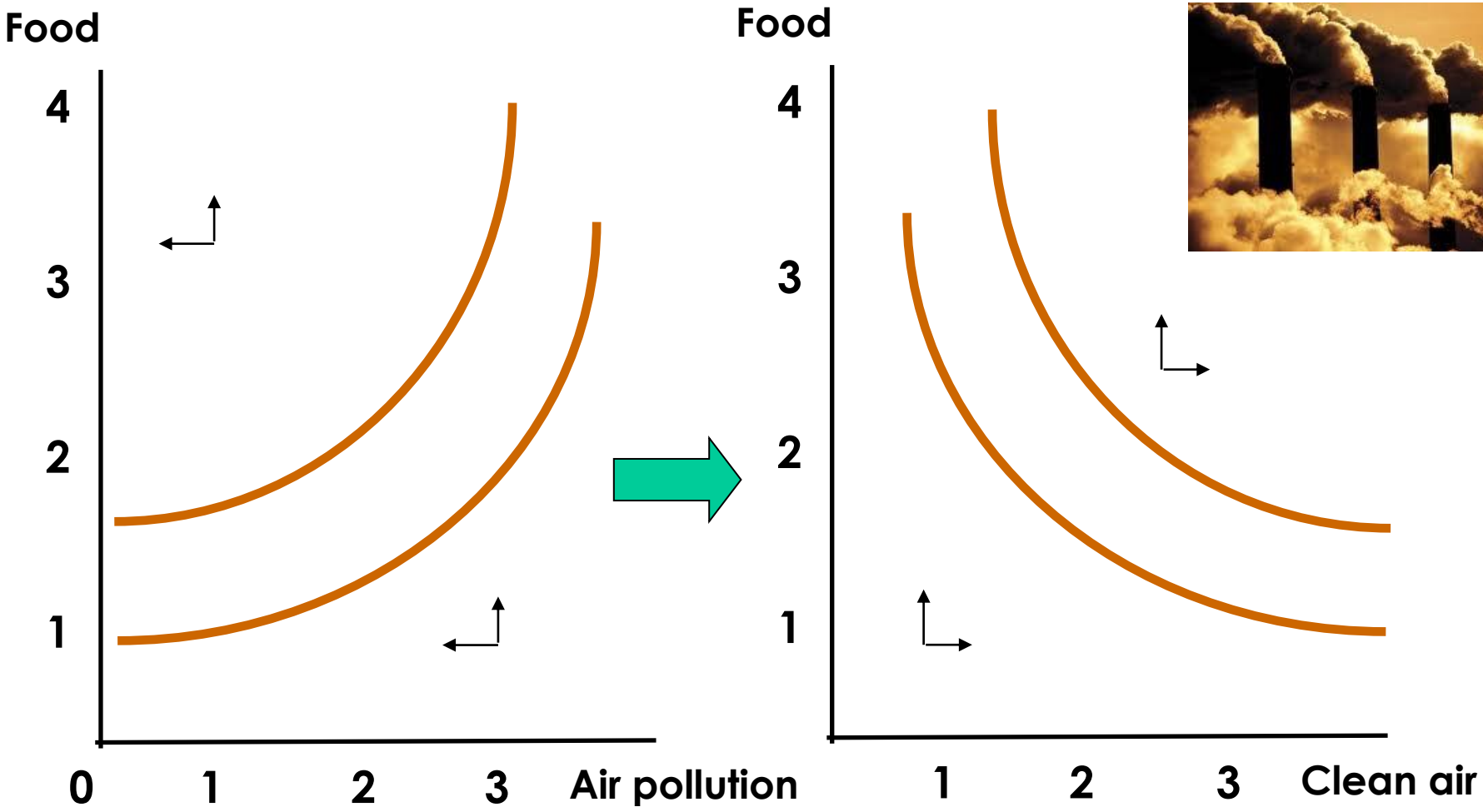
If one care only about the taste of the food he eats, but does not care about its appearance, the appearance is a neuter to him.

$$U(X) = aX$$

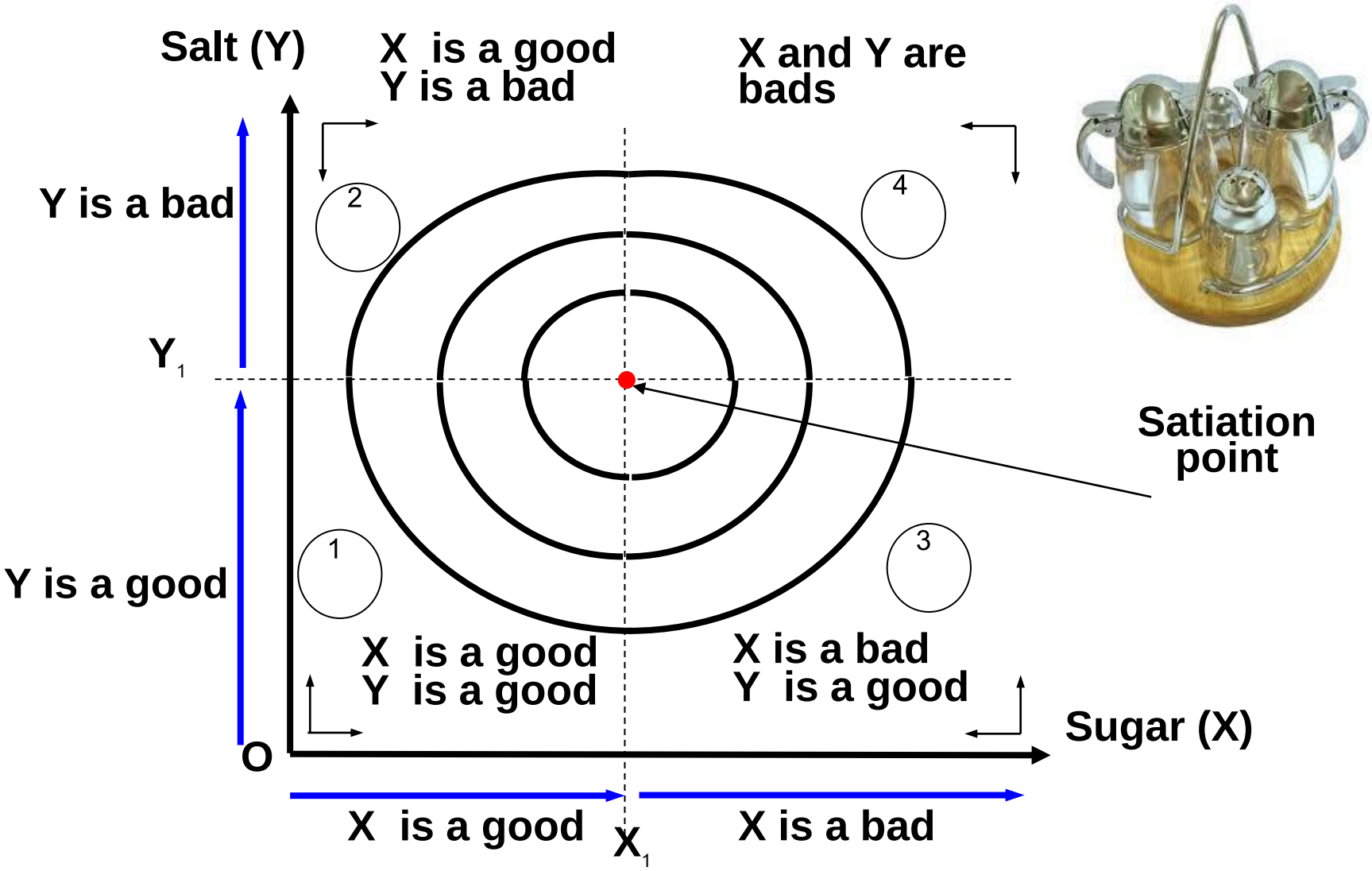
Bads are commodities we don't want more of;

e.g., air pollution, stress





Satiation or Bliss point



Utility

- *Utility function*
  - Formula that assigns a level of utility to individual market baskets
  - If the utility function is

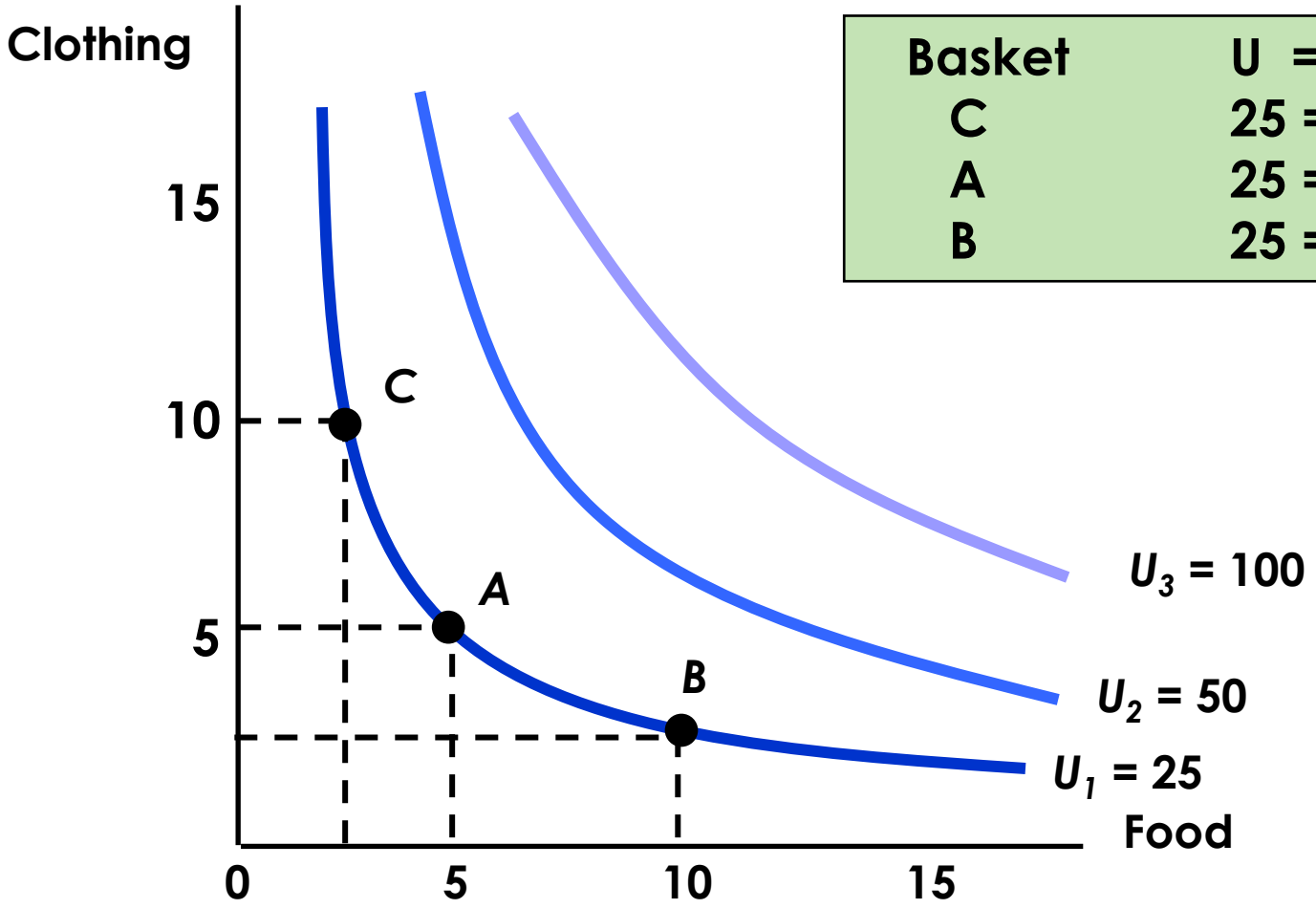
$$U(F,C) = F + 2C$$

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



Basket	U = FC
C	25 = 2.5(10)
A	25 = 5(5)
B	25 = 10(2.5)

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

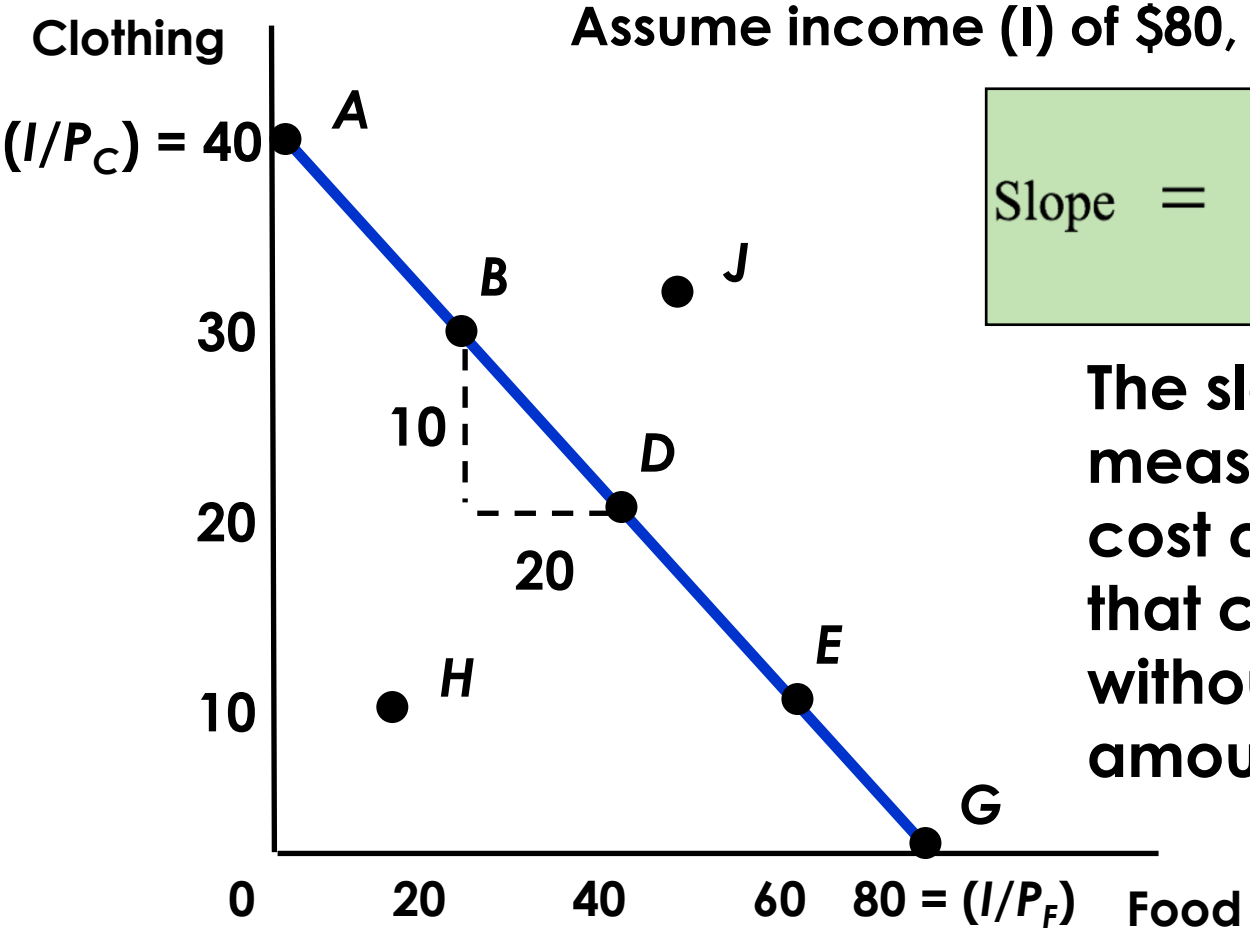
The Budget Line

- A consumer chooses food (F) and Clothing (C)
- Price of food = PF and price of clothing = PC
- 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



Assume income (I) of \$80, P_F = \$1 and P_C = \$2

$$\text{Slope} = \frac{\Delta C}{\Delta F} = -\frac{1}{2} = -\frac{P_F}{P_C}$$

The slope of the line measures the relative cost of food and clothing that can be substituted without changing the amount of money spent.

The Budget Line

$$I = P_F F + P_C C$$

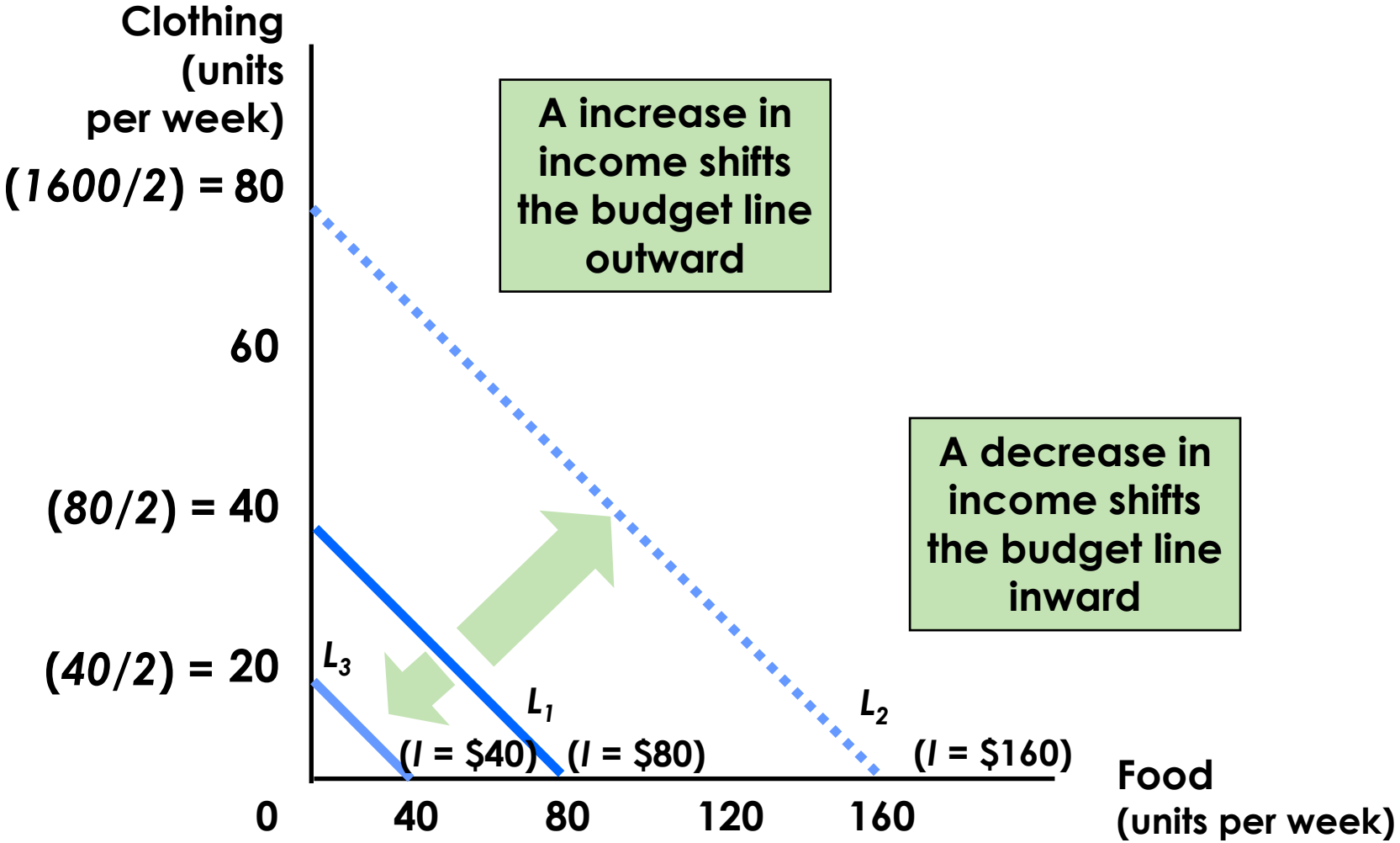
$$P_C C = I - P_F F$$

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

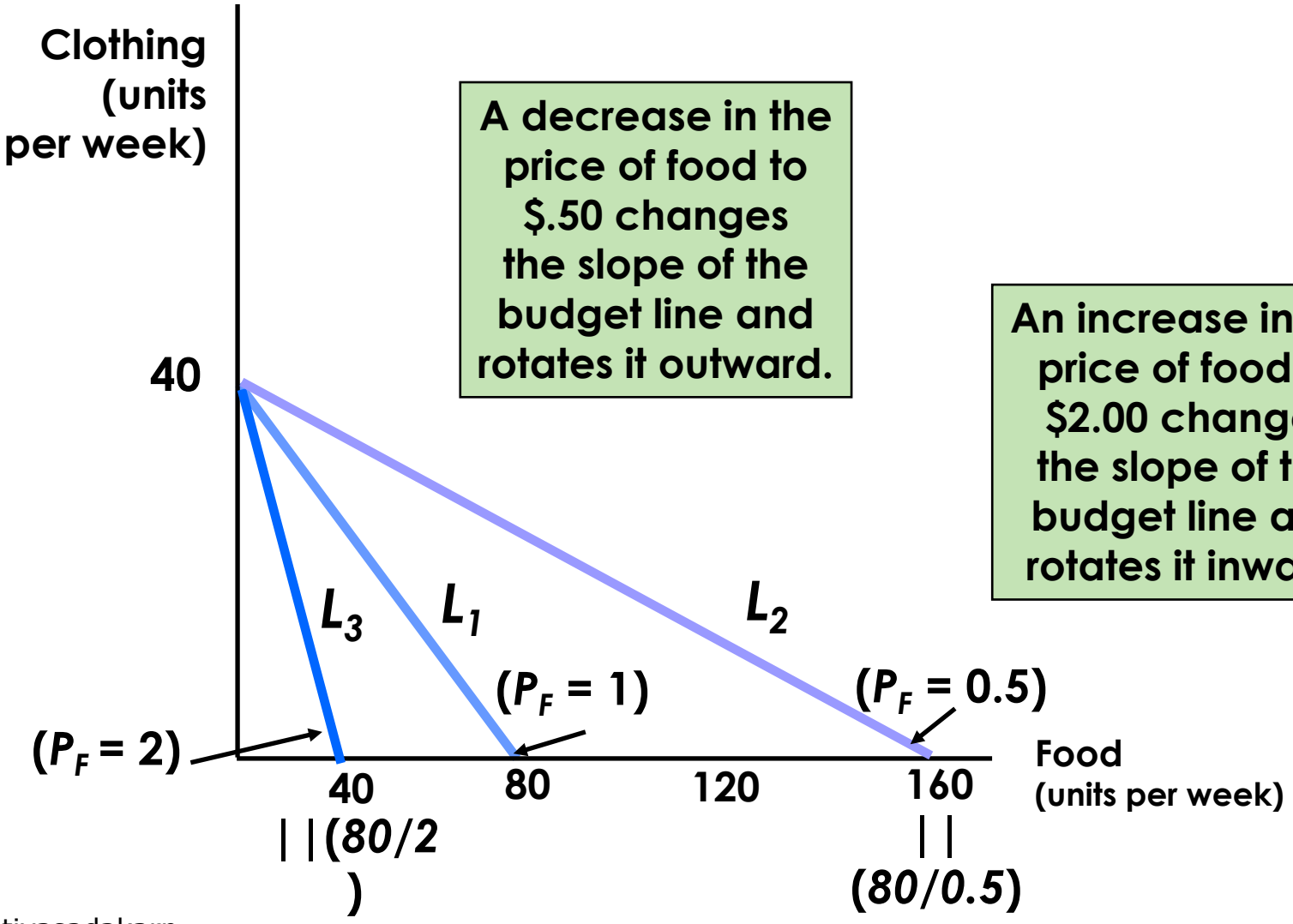
Y intercept

slope

The Budget Line: Changes in income



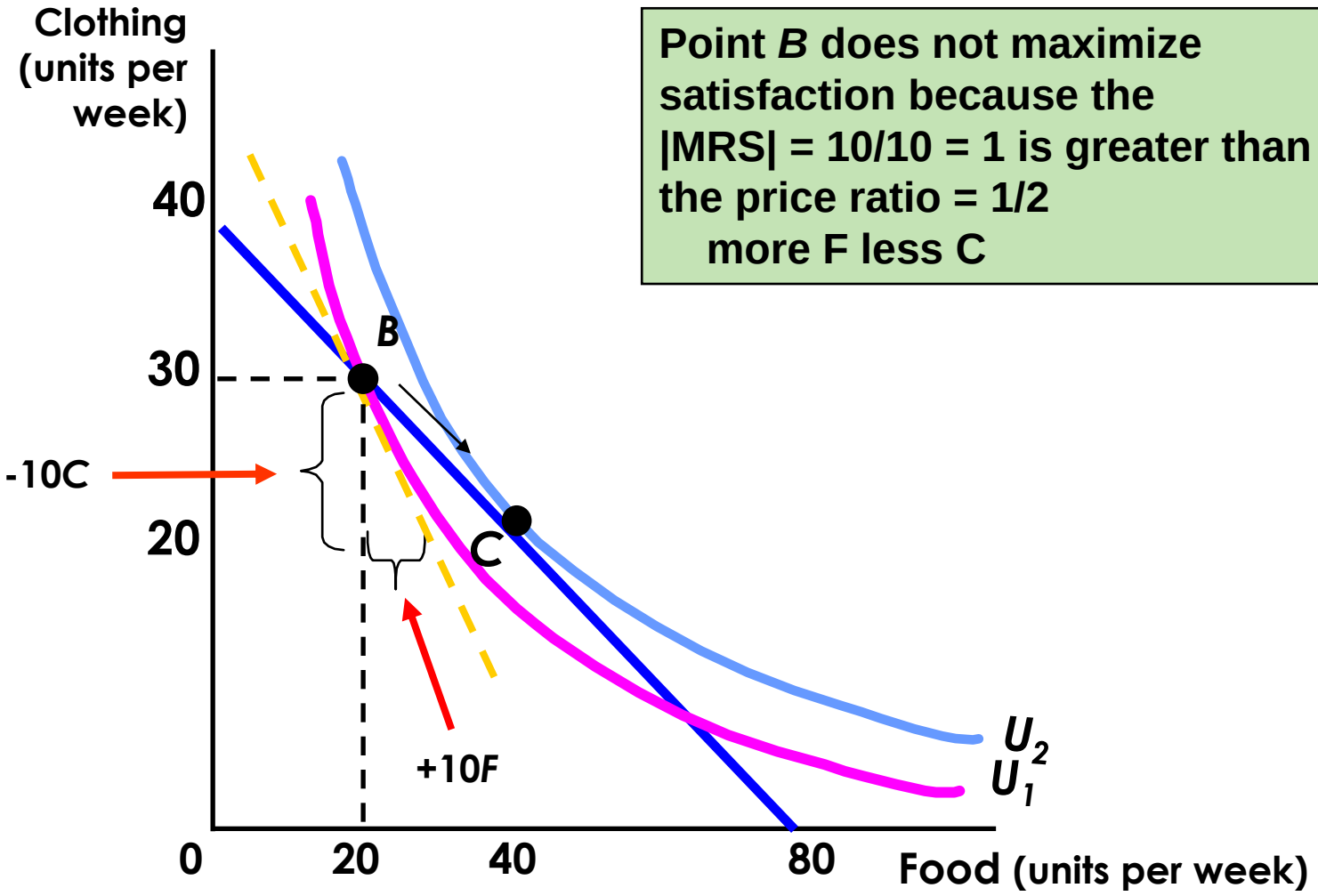
The Budget Line: Changes in a price



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

Consumer Choice



Point *B* does not maximize satisfaction because the |MRS| = 10/10 = 1 is greater than the price ratio = 1/2
more F less C

Consumer Choice

- If $|MRS| \neq P_F/P_C$ then individuals can reallocate basket to increase utility
- If $|MRS| > P_F/P_C$ -> 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 $|MRS| = P_F/P_C$

Optimal condition

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

Since $I = P_X X + P_Y Y$ implies

$Y = I/P_Y - XP_X/P_Y$.

Substituting this gives

Max $U(X, I/P_Y - XP_X/P_Y)$

$MU_X - MU_Y P_X/P_Y = 0$

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

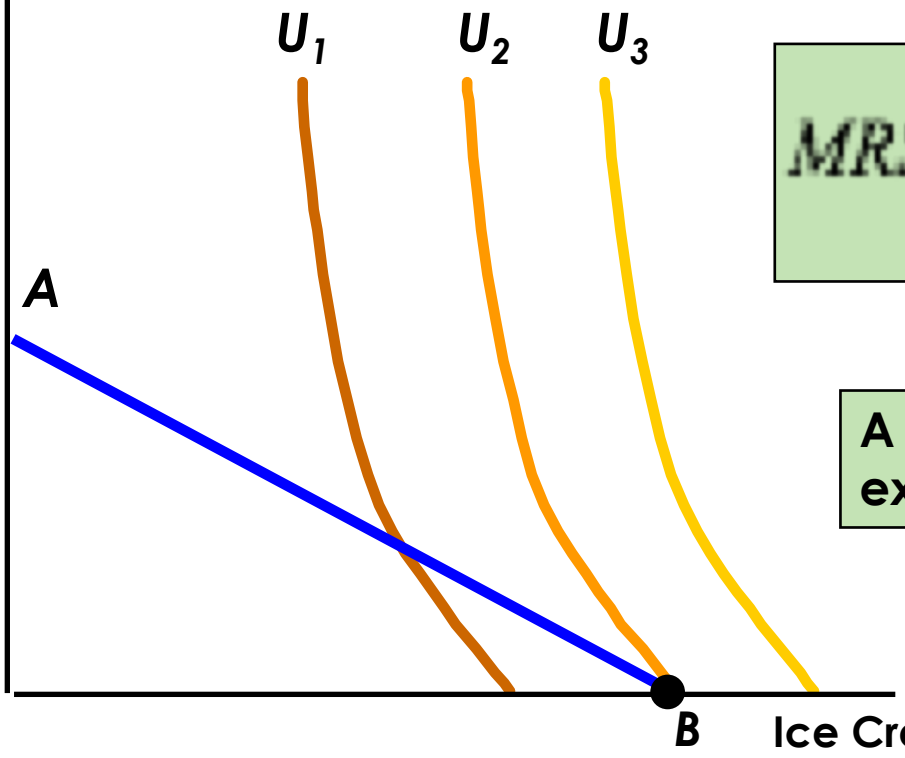
Consumer Choice

- Normally MRS should equal P_X/P_Y and the equilibrium is call 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.

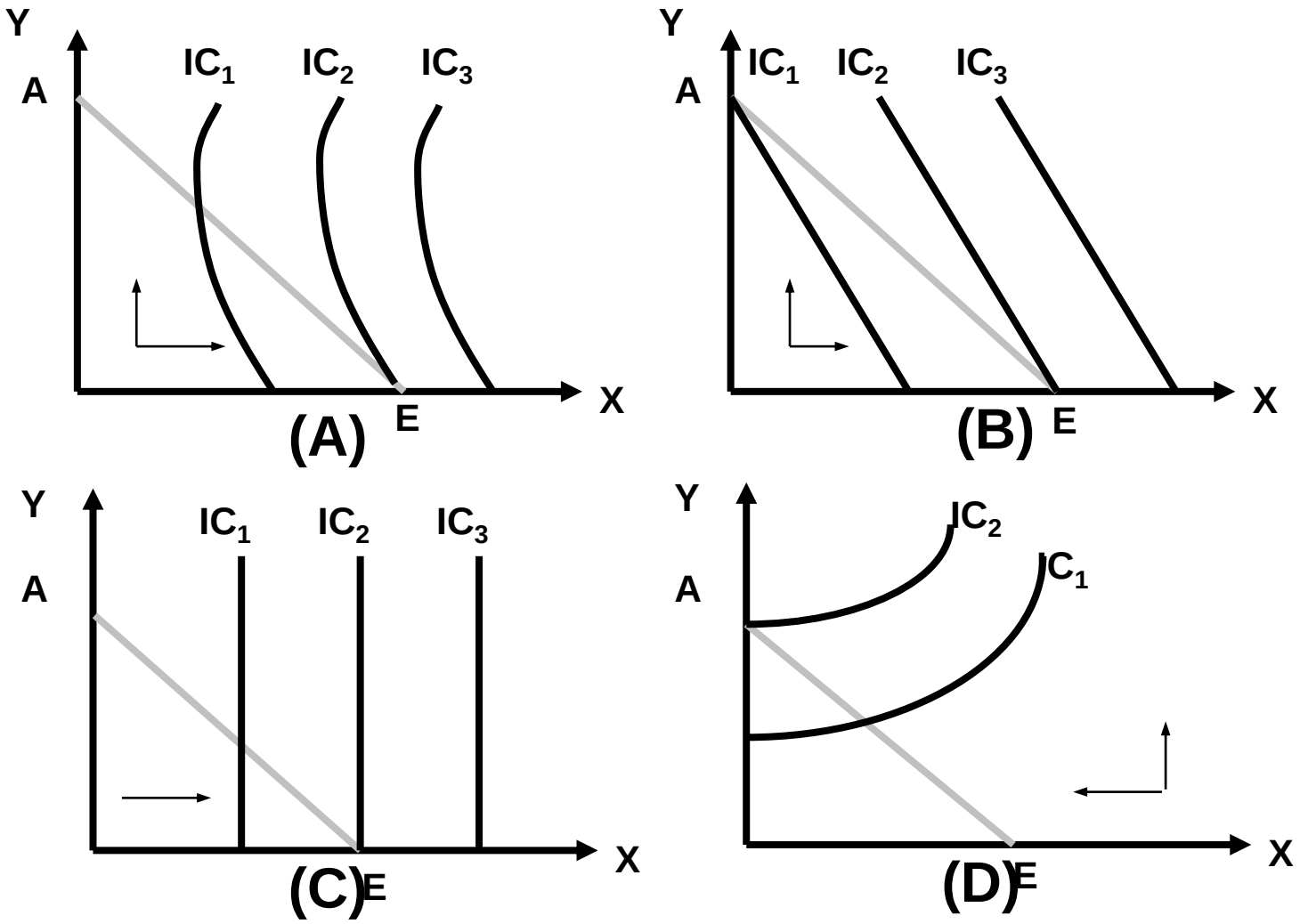
MRS is not necessarily equal to P_X/P_Y



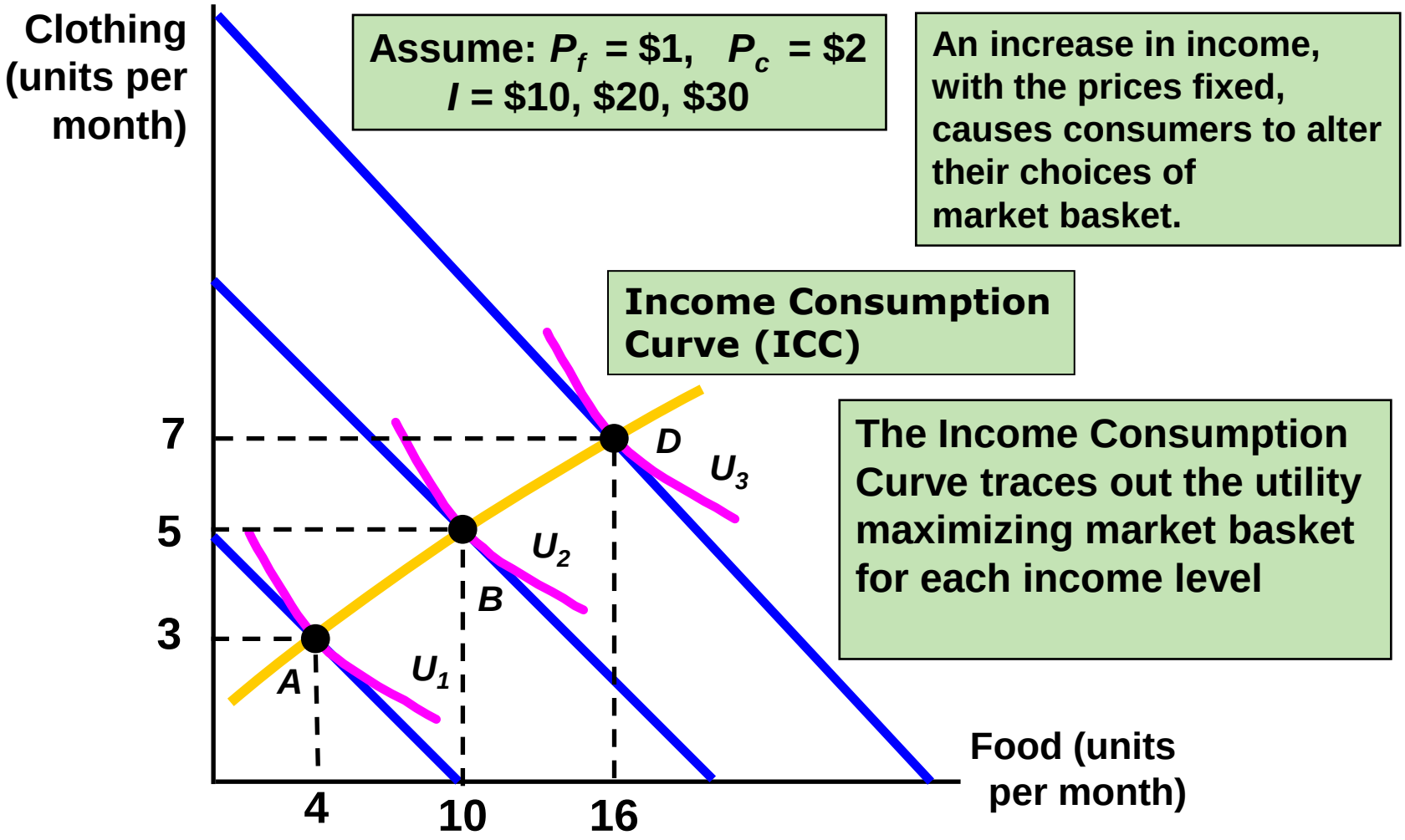
$$MRS \geq \frac{P_{IceCream}}{P_{FrozenYogurt}}$$

A corner solution exists at point *B*.

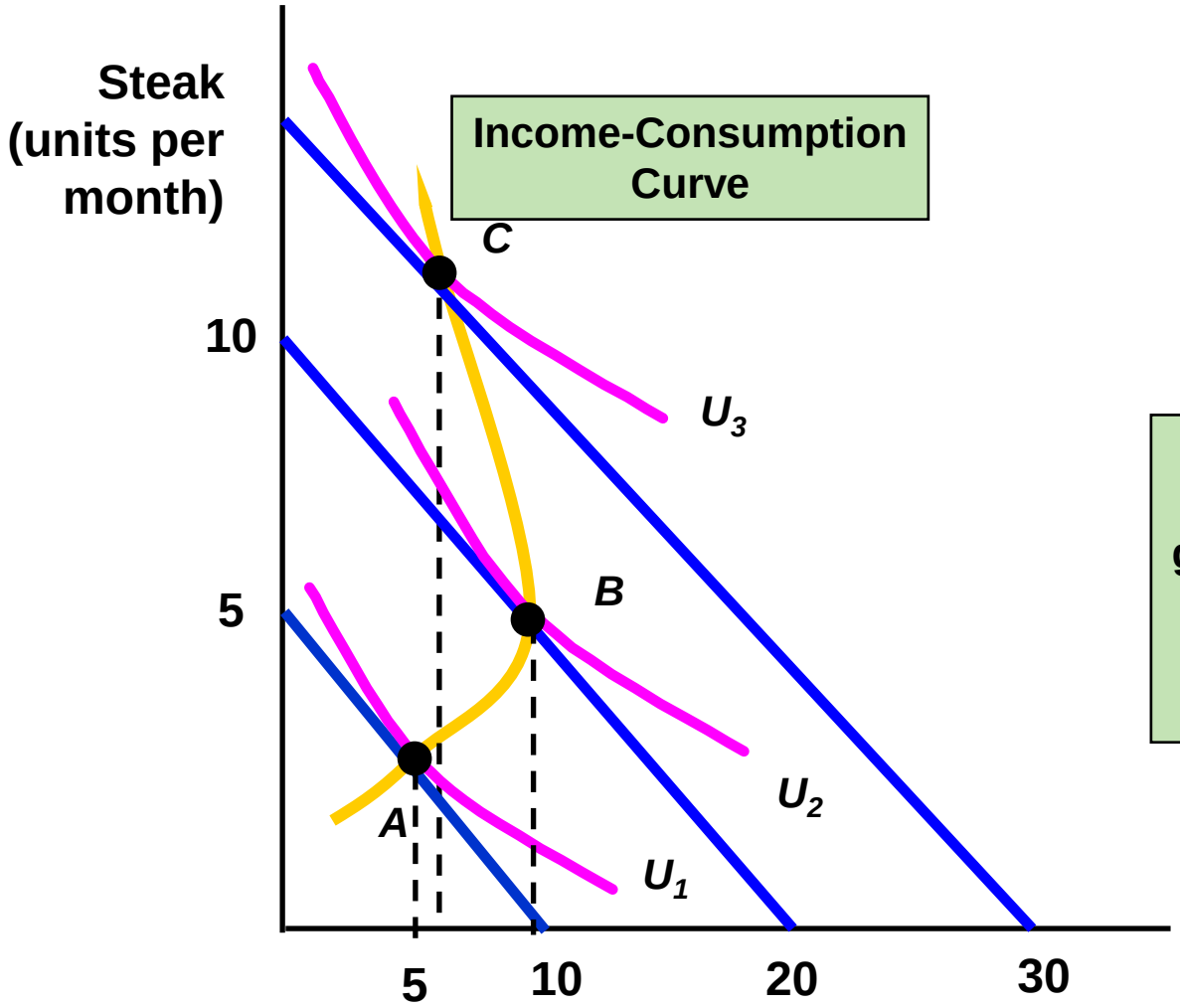
Corner Solutions



Effects of Income Changes



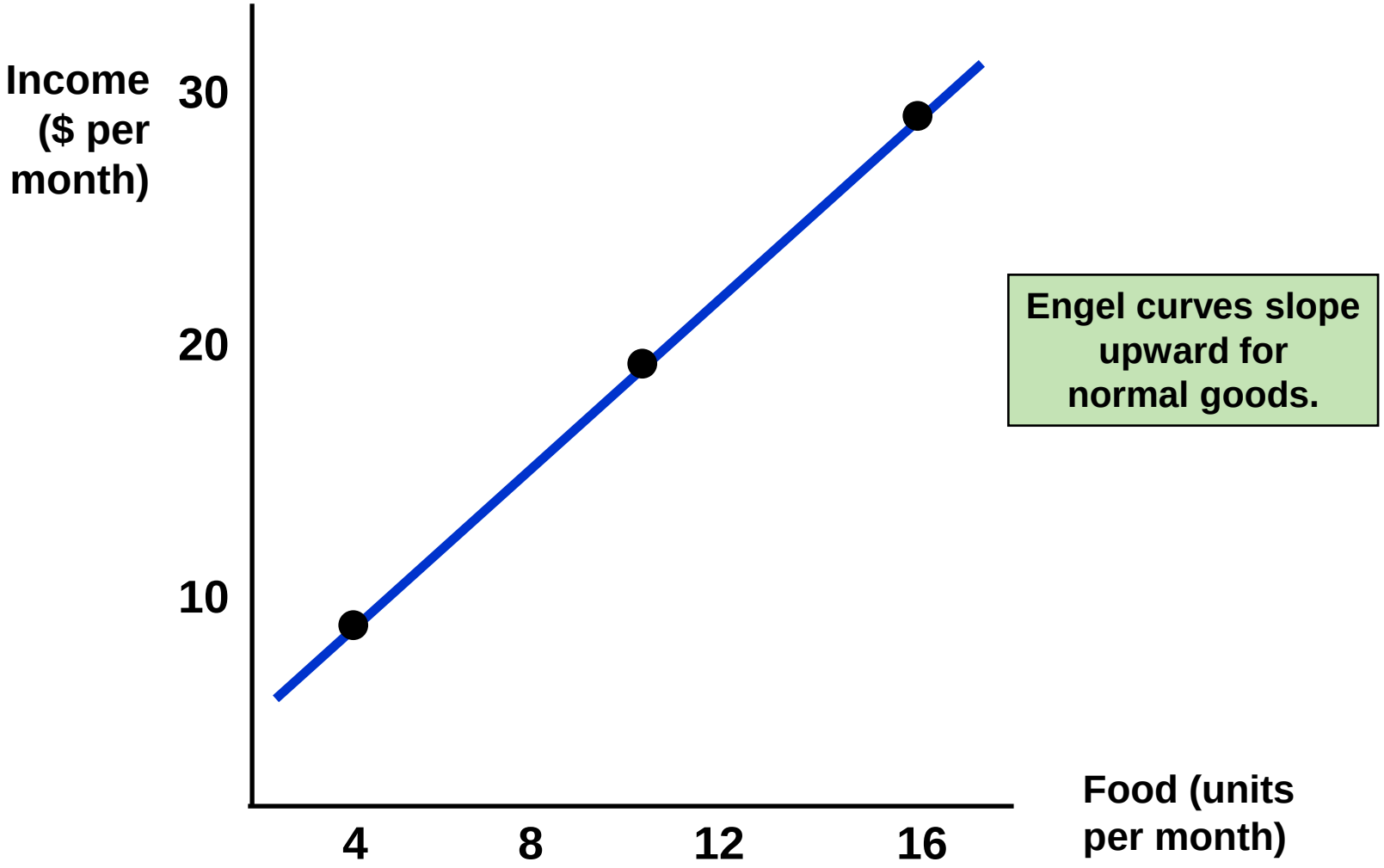
An Inferior Good



Both noodle and steak behave as a normal good, between *A* and *B*...

…but noodle becomes an inferior good when the income consumption curve bends backward between *B* and *C*.

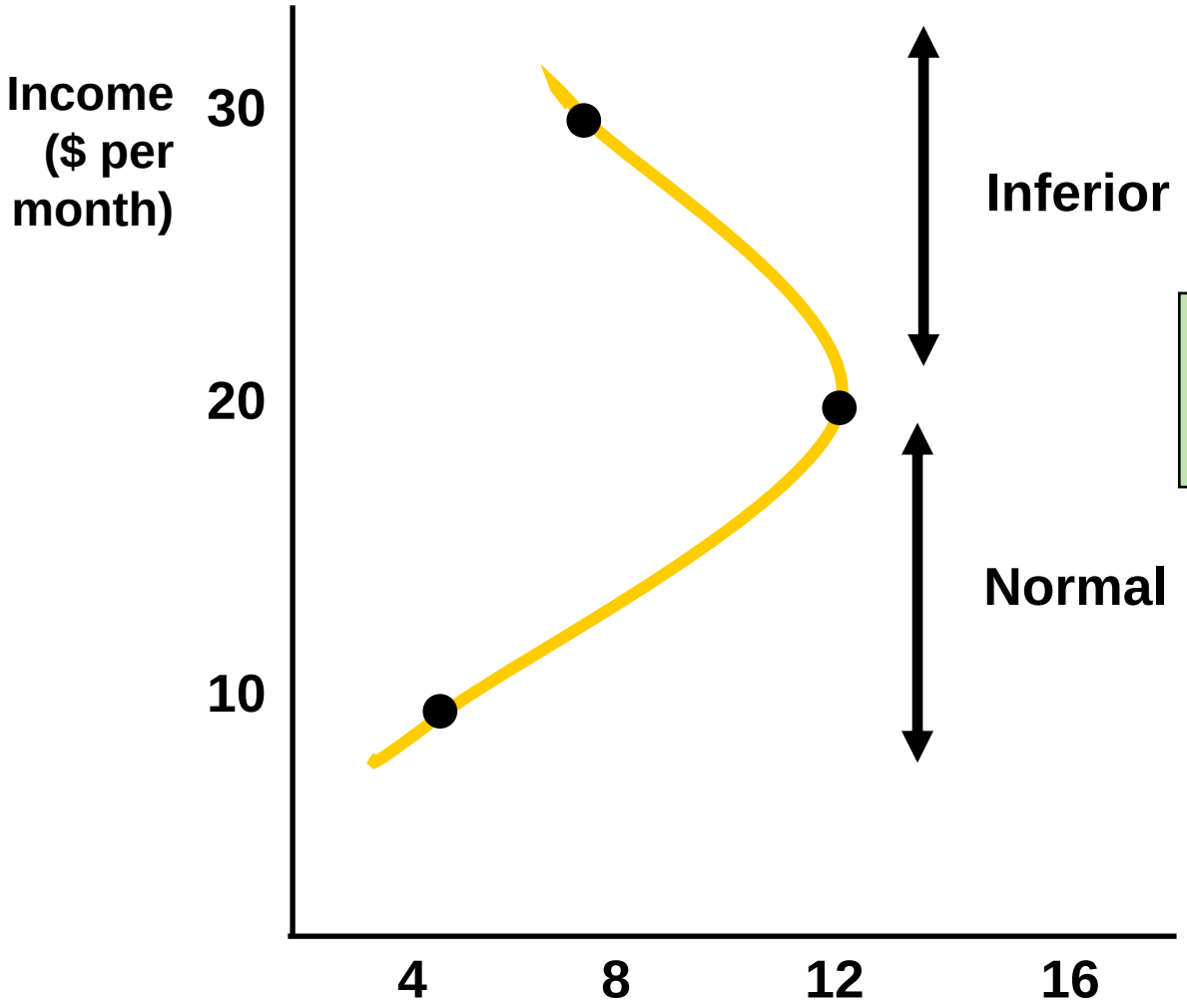
Engel Curves



Individual Demand

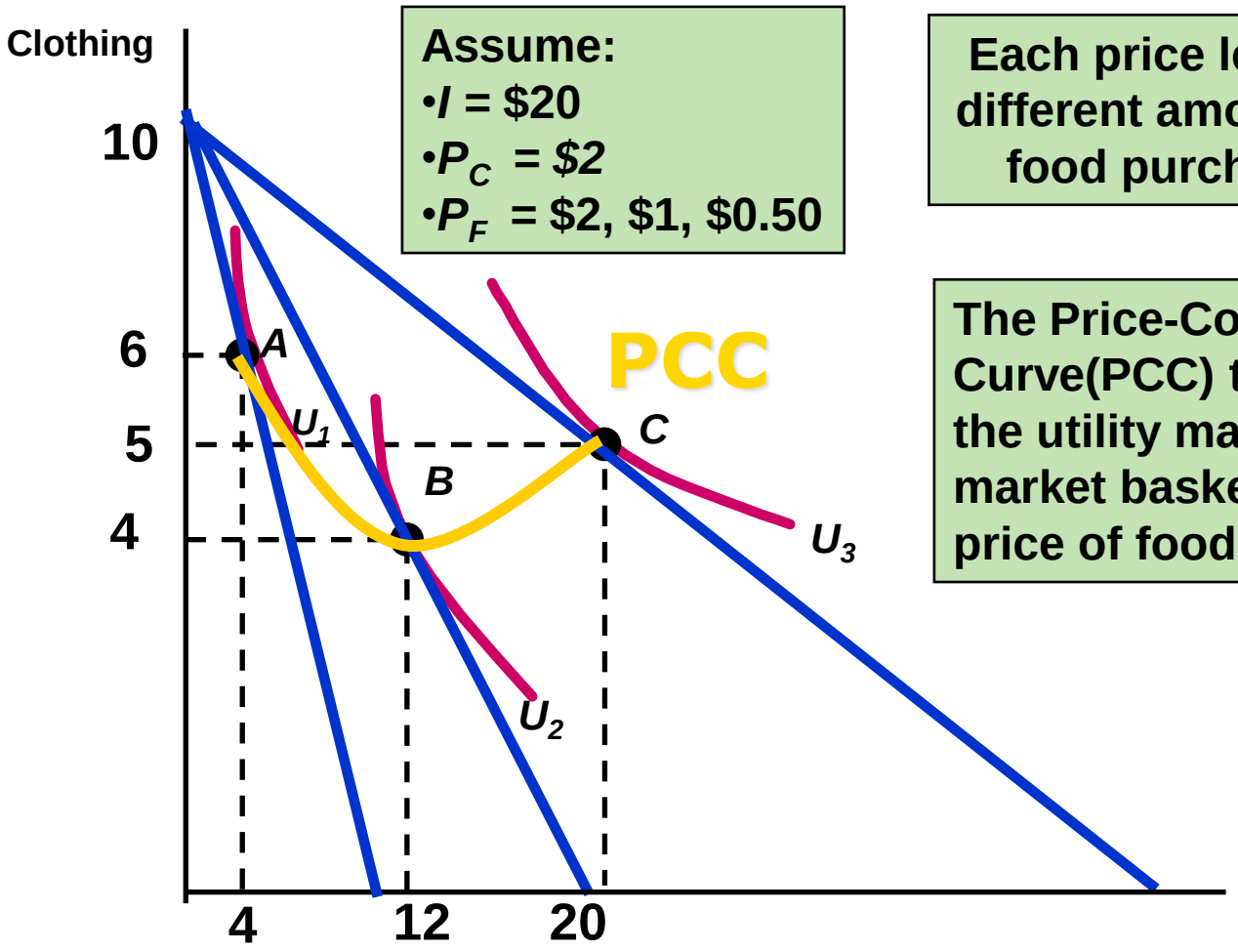
- Engel Curves
  - Engel curves relate the quantity of good consumed to income.
  - If the good is a normal good, the Engel curve is upward sloping.
  - If the good is an inferior good, the Engel curve is downward sloping.

Engel Curves



Engel curves are backward bending for inferior goods.

Effect of a Price Change

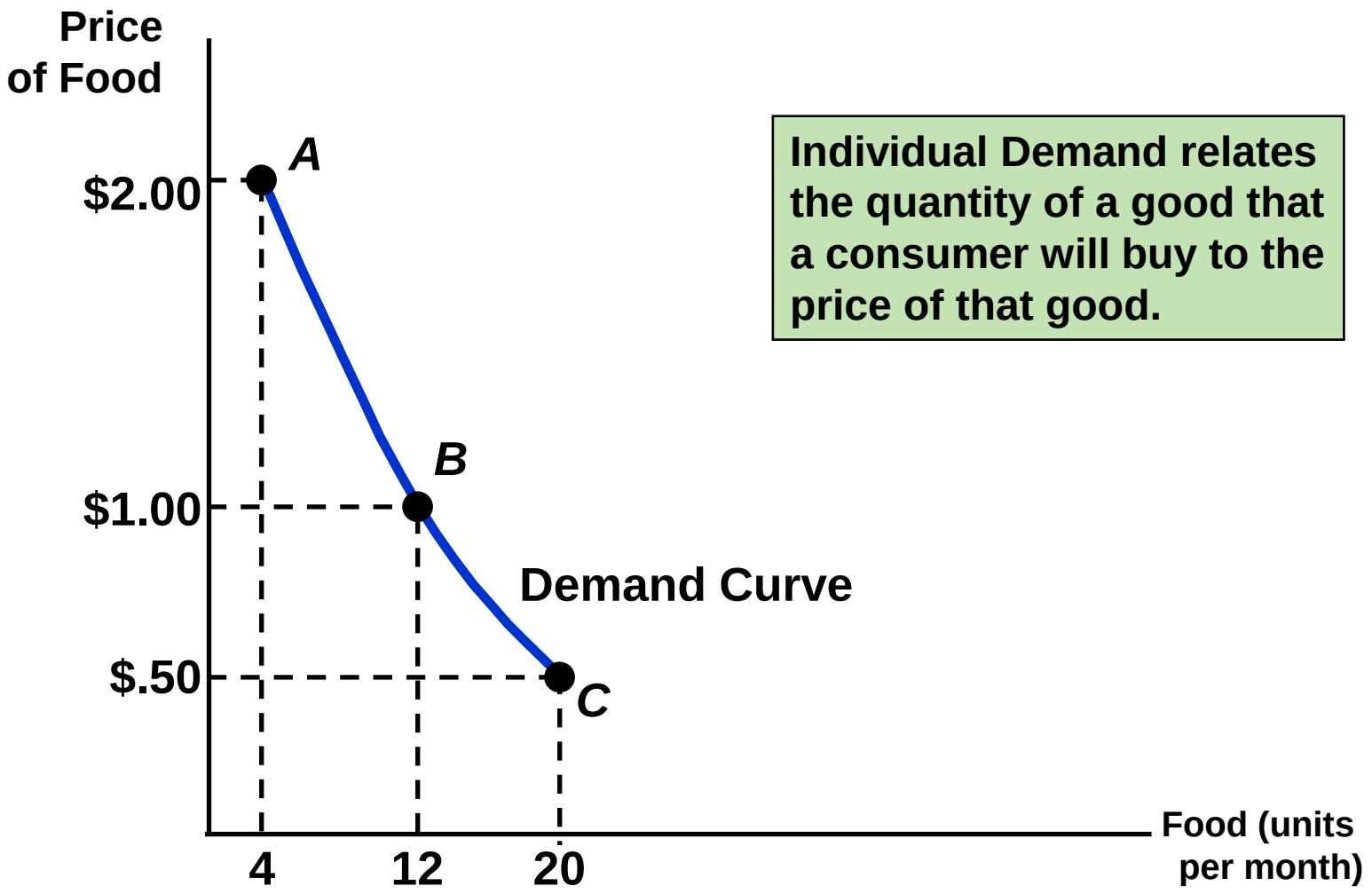


Assume:
- I = \$20
- P_C = \$2
- P_F = \$2, \$1, \$0.50

Each price leads to different amounts of food purchased

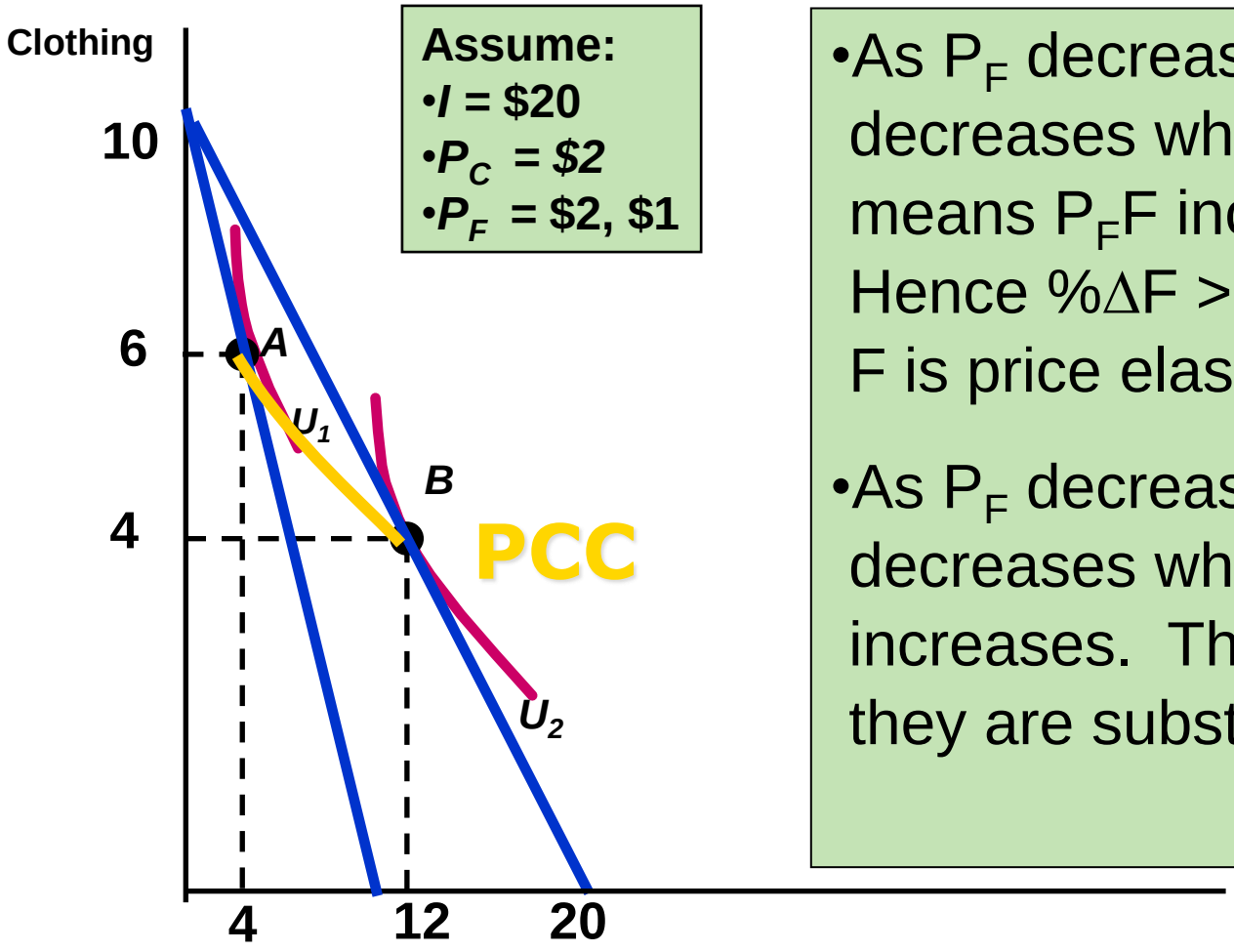
The Price-Consumption Curve(PCC) traces out the utility maximizing market basket for each price of food

Effect of a Price Change



Individual Demand relates the quantity of a good that a consumer will buy to the price of that good.

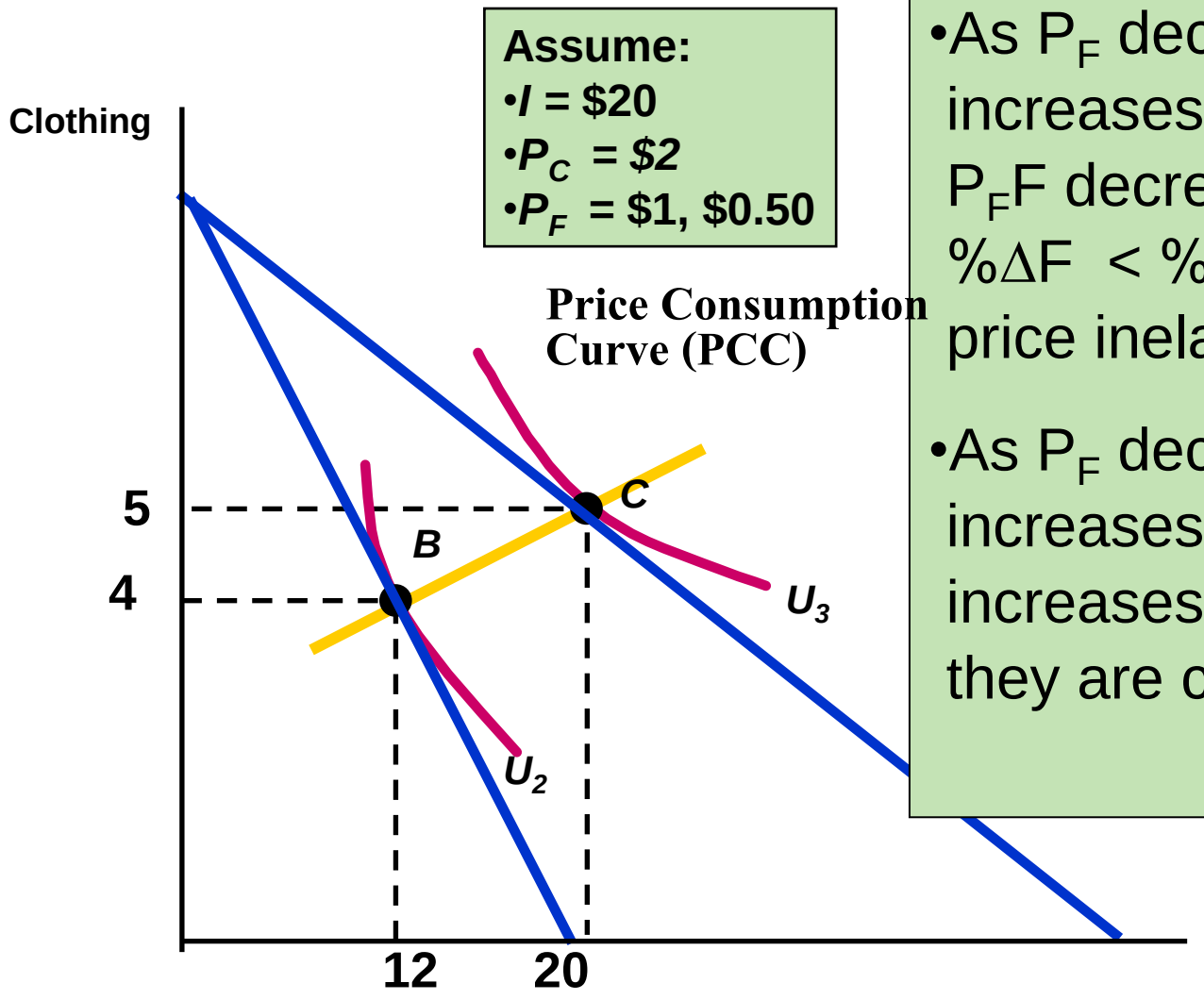
Decreasing PCC



Assume:
- ***I* = $20**
- **P_C = $2**
- **P_F = $2, $1**

- As P_F decreases, P_CC decreases which means P_FF increases. Hence $\%\Delta F > \%\Delta P_F$ or F is price elastic.
- As P_F decreases, C decreases while F increases. That means they are substitutes.

Effect of a Price Change



- As P_F decreases, $P_C C$ increases which means $P_F F$ decreases. Hence $\%\Delta F < \%\Delta P_F$ or F is price inelastic.
- As P_F decreases, C increases while F increases. That means they are complements.