

# ECO2011 Basic Microeconomics

Mankiw Chapter 21 (The Theory of Consumer Choice)

Pindyck Chapter 3 (Consumer Behavior)

2025

# Agenda

1. Motivation
2. The Budget Constraint
3. Preferences
4. Optimization
5. Revealed Preference

# Motivation

- Zhang San is a freshman who just entered CUHK(SZ).
  - He is at Kuaile Shijian, trying to figure out what he wants to buy for lunch.....

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1. Motivation
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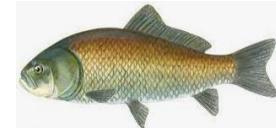
# The Budget Constraint: What the Consumer Can Afford

- Budget constraint: The limit on the consumption bundles that a consumer can afford
- Budget line: All combinations of goods for which the total amount of money spent is equal to income.

$$P_A A + P_B B = I$$

## ■ Example:

- Hurley divides his income between two goods: fish and mangos.
- A “consumption bundle” is a particular combination of the goods, e.g., 40 fish & 300 mangos



Internet photo



Internet photo

# Active Learning

# The Budget Constraint

Hurley's income: \$1200

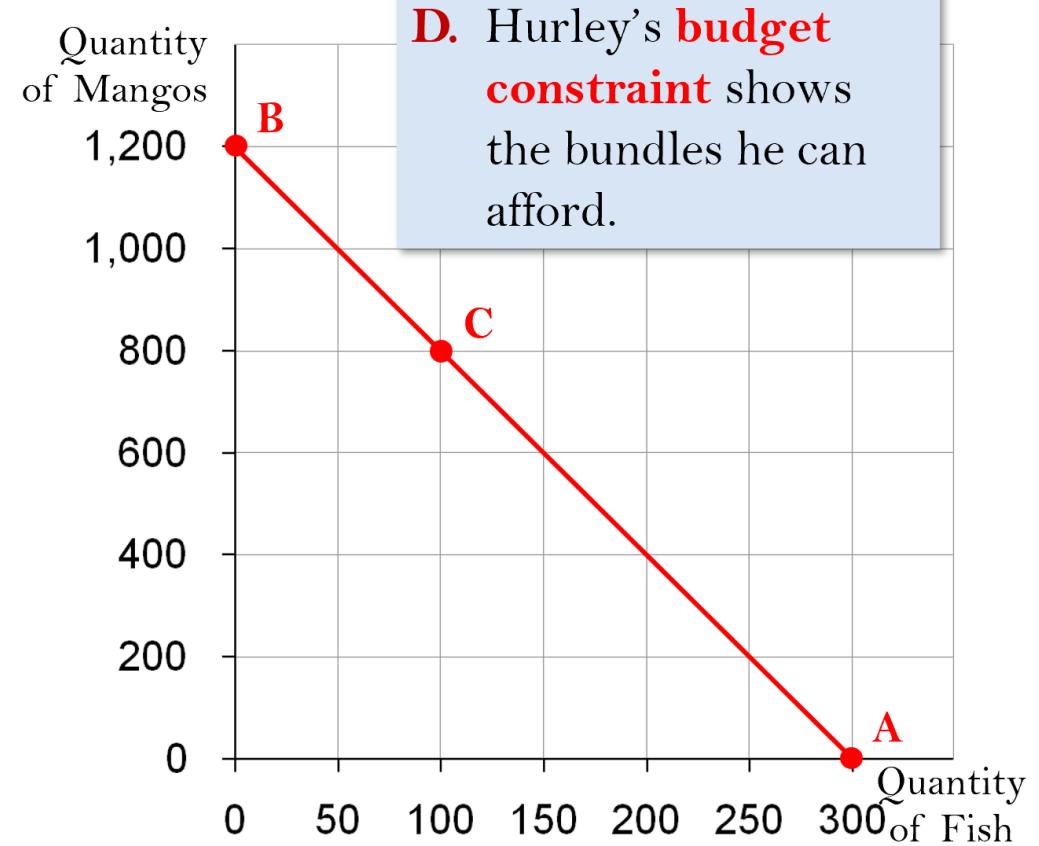
Prices:  $P_F = \$4$  per fish,  $P_M = \$1$  per mango

- A. If Hurley spends all his income on fish, how many fish does he buy?
- B. If Hurley spends all his income on mangos, how many mangos does he buy?
- C. If Hurley buys 100 fish, how many mangos can he buy?
- D. Plot each of the bundles from parts A – C on a graph that measures fish on the horizontal axis and mangos on the vertical; connect the dots.

# Active Learning

- A.  $\$1200/\$4 = 300$  fish
- B.  $\$1200/\$1 = 1200$  mangos
- C. 100 fish cost \$400, \$800 left  
buys 800 mangos

# Answers



# Active Learning Constraint

From **C** to **D**,

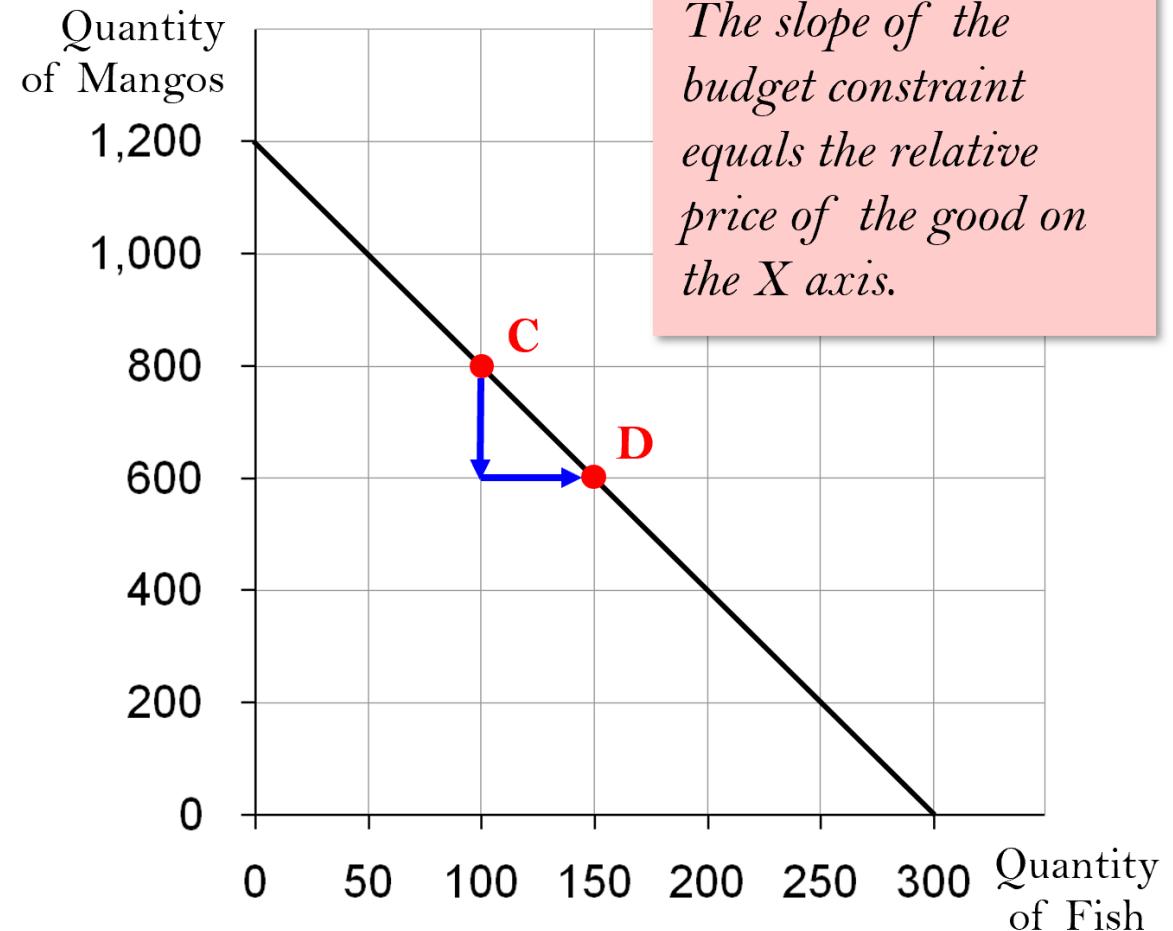
“rise” = **-200 mangos**

“run” = **+50 fish**

Slope = **- 4**

Hurley must give up 4 mangos  
to get one fish.

## The Slope of the Budget



# Active Learning Continued

## The Budget Constraint

Initial problem:

Hurley's income: \$1200

Prices:  $P_F = \$4$  per fish,  $P_M = \$1$  per mango

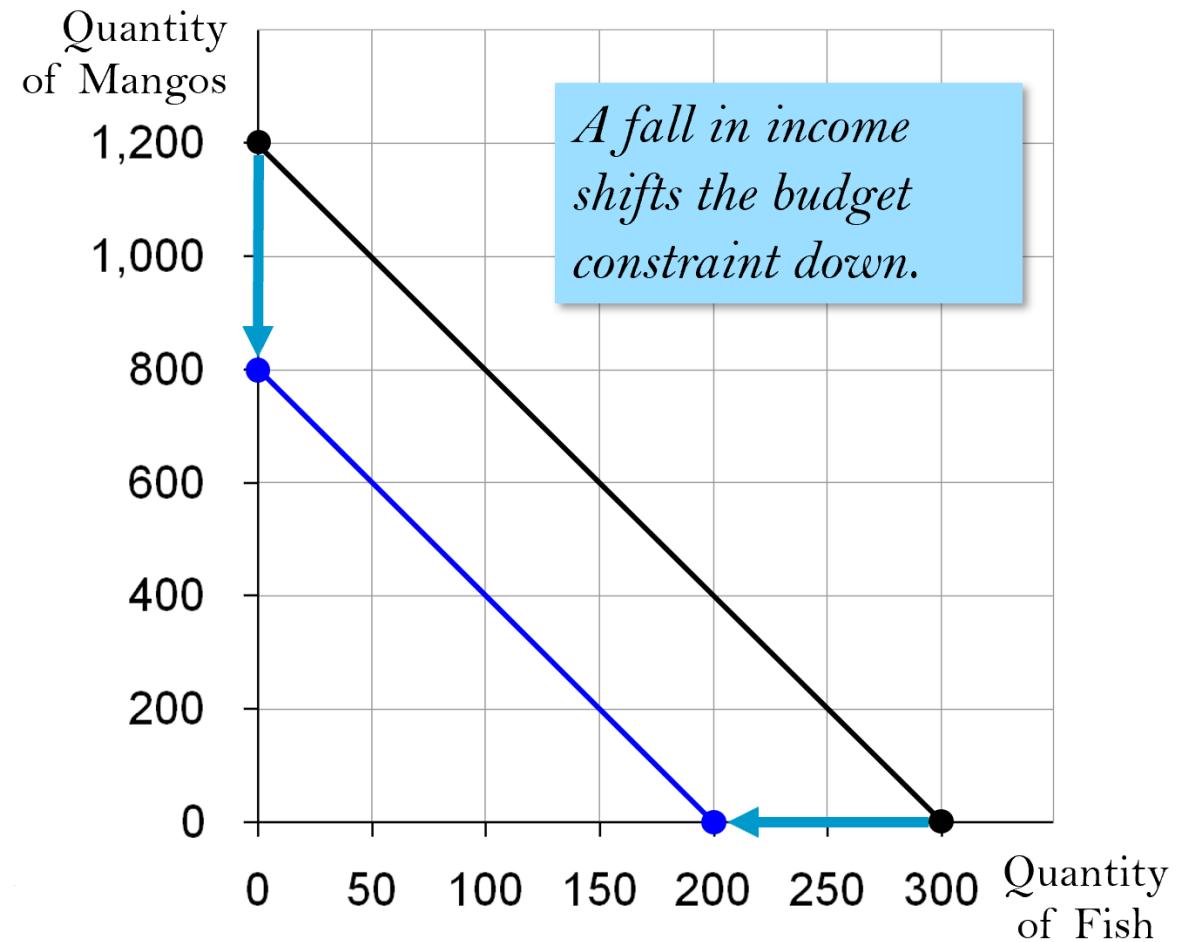
Show what happens to Hurley's budget constraint if:

- A. His income falls to \$800.
- B. The price of mangos rises to  $P_M = \$2$  per mango

# Active Learning

## Answers, Part A

Now, Hurley can buy  $\$800/\$4 = 200$  fish or  $\$800/\$1 = 800$  mangos or any combination in between.



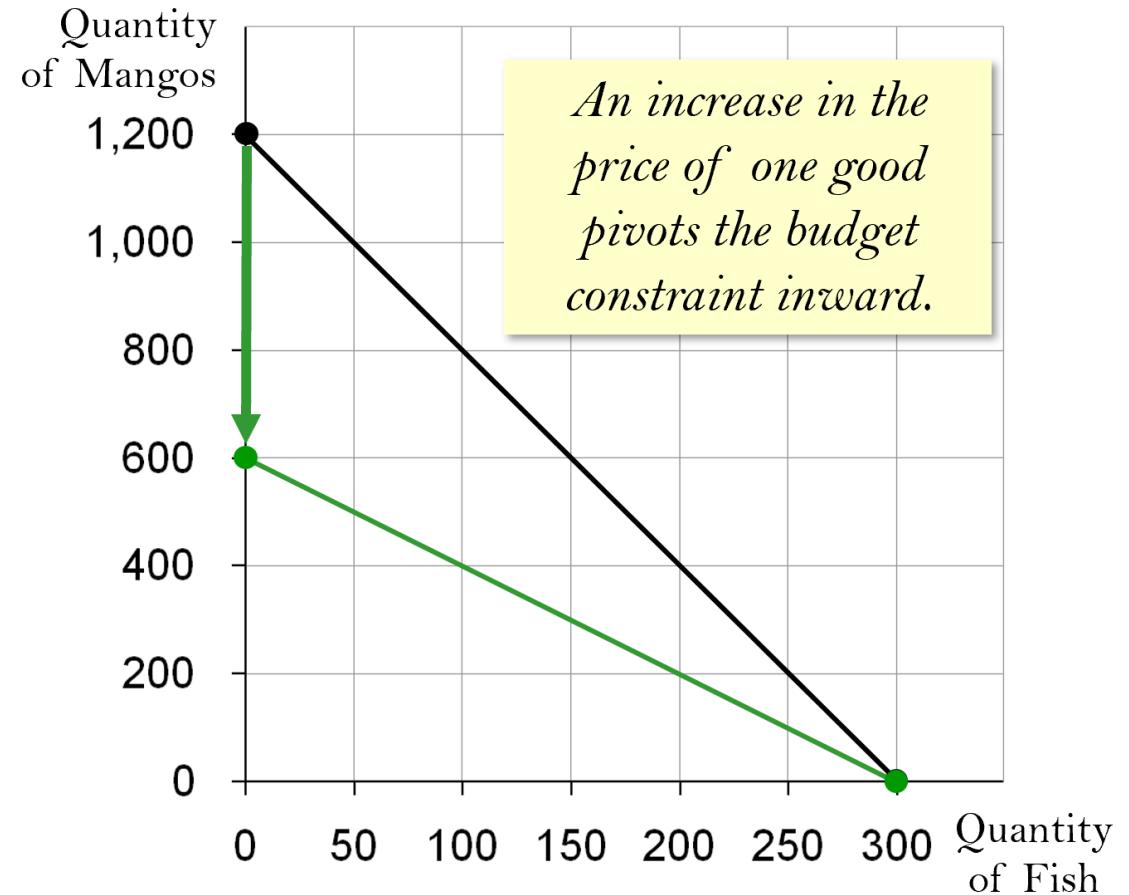
# Active Learning

Hurley can still buy 300 fish.

But now he can only buy  
 $\$1200/\$2 = 600$  mangos.

Notice: slope is smaller, relative  
price of fish is now only 2  
mangos

## Answers, Part B

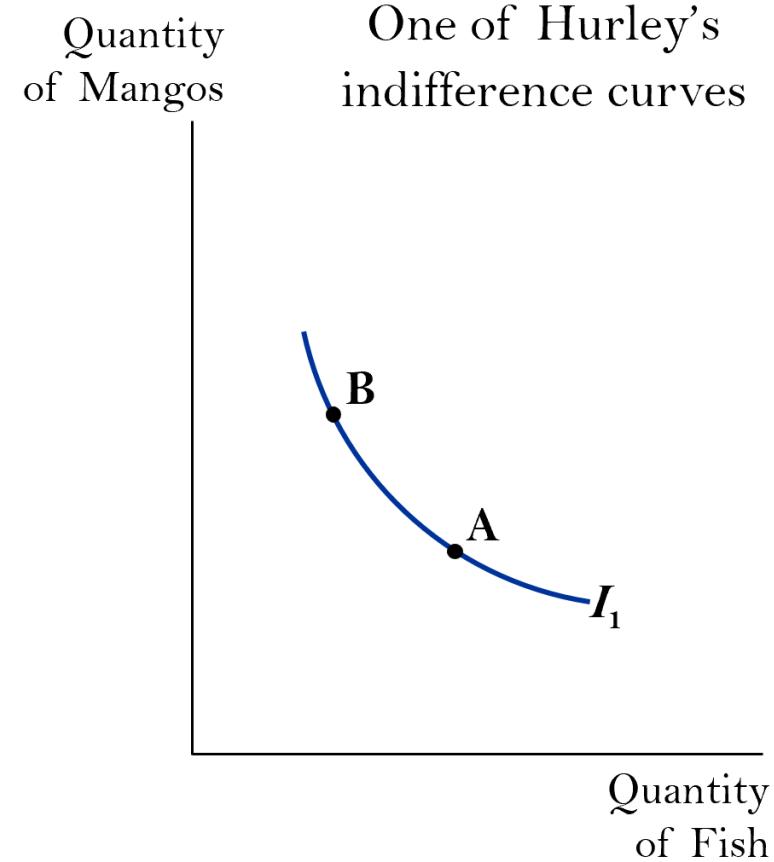


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# Preferences: What the Consumer Wants

- Indifference curve: shows all consumption bundles that give the consumer the same level of satisfaction
- A, B, and all other bundles on  $I_1$  make Hurley equally happy: he is *indifferent* between them.



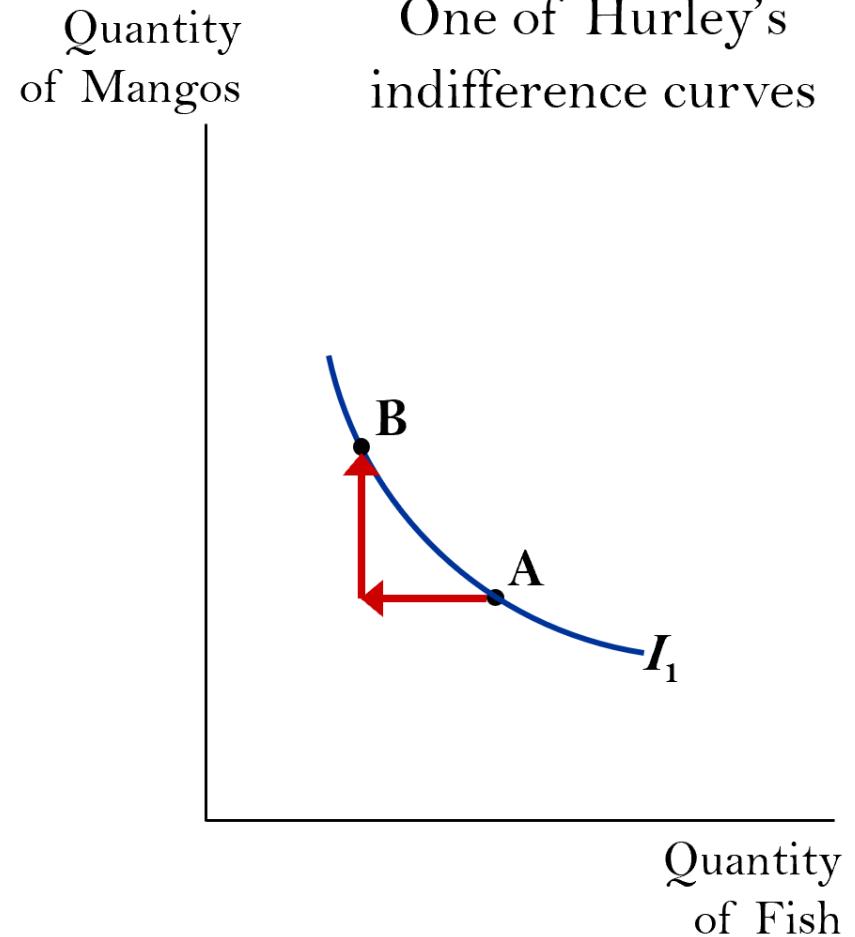
# Some Basic Assumptions about Preferences

- Completeness: consumers can compare and rank all possible baskets:  
Prefer A to B, prefer B to A, or indifferent between the two.
  - Note that these preferences ignore costs.
- Transitivity: Preferences are transitive. If prefers A to B and B to C, then must prefers A to C. Transitivity is normally regarded as necessary for consumer consistency.
- More is better than less: Goods are assumed to be desirable—i.e., to be good. Always prefer more of any good to less. Never satisfied or satiated; more is always better, even if just a little better.

# Four Properties of Indifference Curves

## 1. Indifference curves are downward sloping.

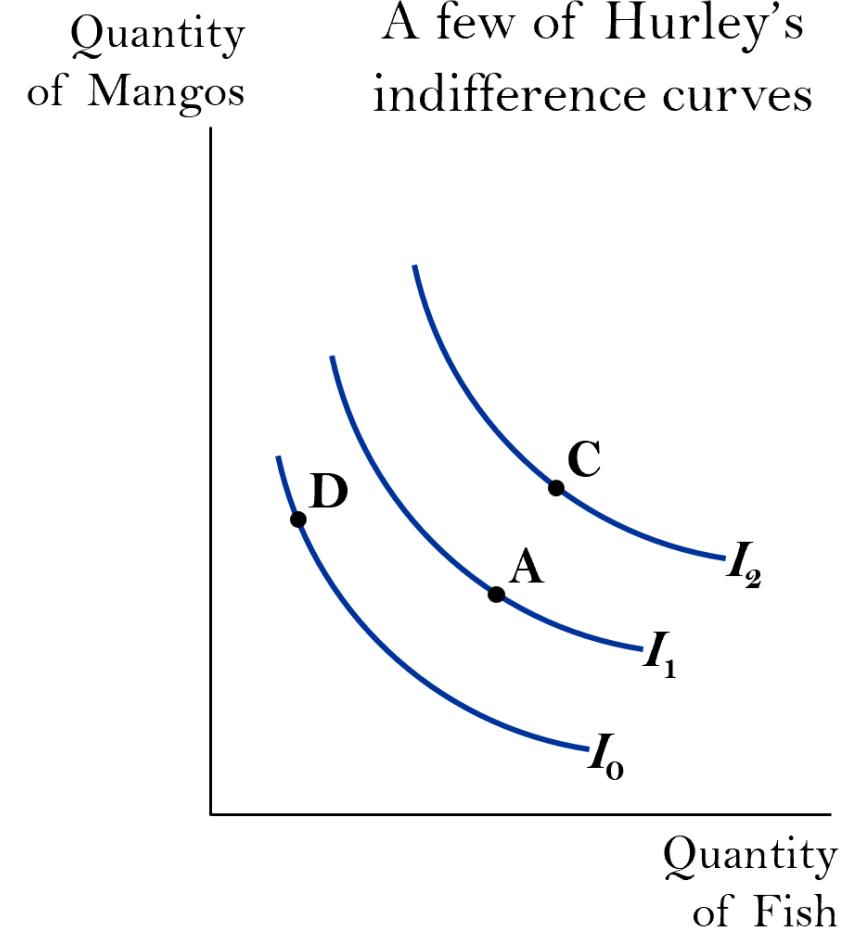
- If the quantity of fish is reduced, the quantity of mangos must be increased to keep Hurley equally happy.



# Four Properties of Indifference Curves

## 2. Higher indifference curves are preferred to lower ones.

- Hurley prefers every bundle on  $I_2$  (like C) to every bundle on  $I_1$  (like A).
- He prefers every bundle on  $I_1$  (like A) to every bundle on  $I_0$  (like D).



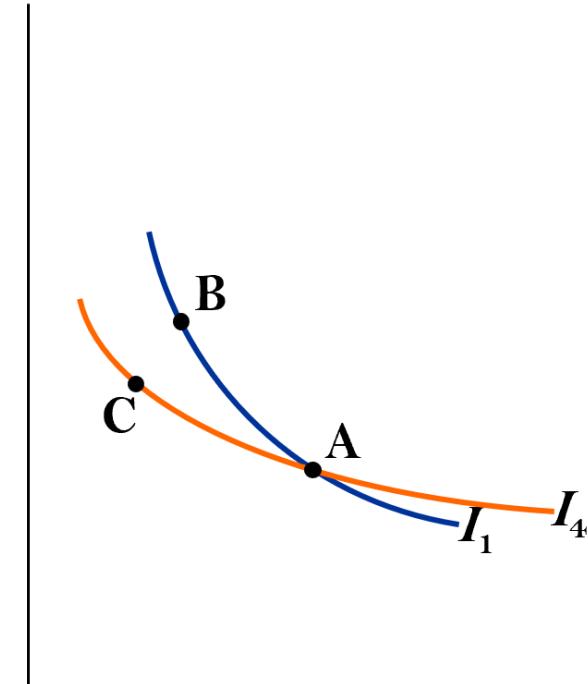
# Four Properties of Indifference Curves

## 3. Indifference curves cannot cross.

Suppose they did.

- Hurley should prefer **B** to **C**, since **B** has more of both goods.
- Yet, Hurley is indifferent between **B** and **C**:
- He likes **C** as much as **A** (both are on  $I_4$ ).
- He likes **A** as much as **B** (both are on  $I_1$ ).

Quantity of Mangos  
Hurley's indifference curves

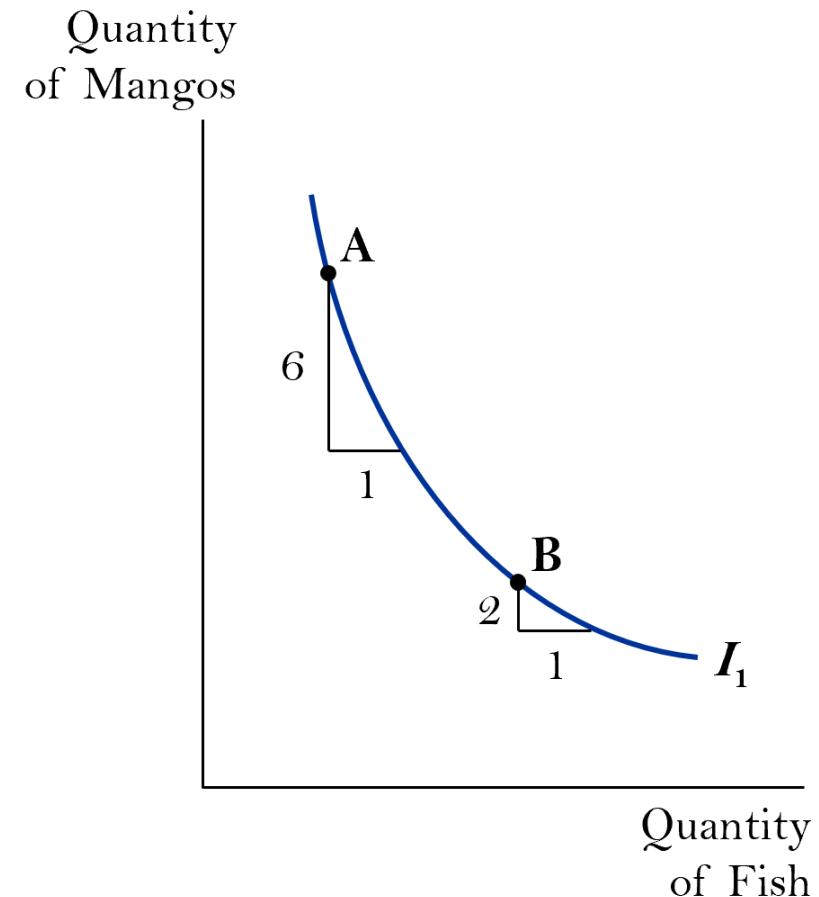


Quantity of Fish

# Four Properties of Indifference Curves

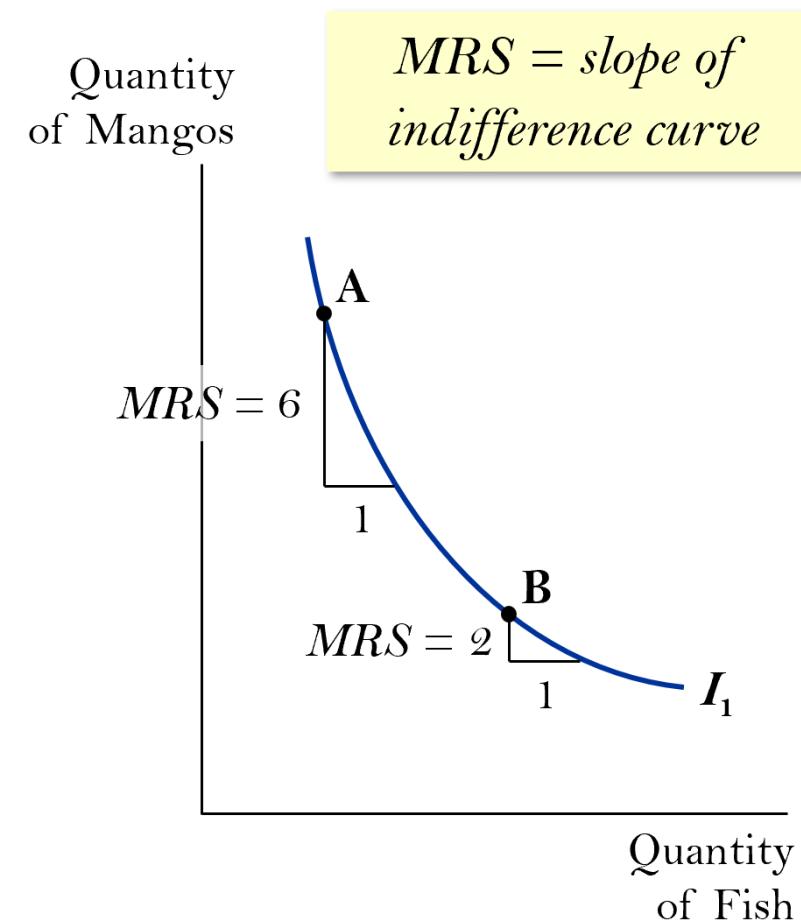
## 4. Indifference curves are bowed inward.

- Hurley is willing to give up more mangos for a fish if he has few fish (**A**) than if he has many (**B**).



# The Marginal Rate of Substitution

- **Marginal rate of substitution (MRS):** Maximum amount of a good that a consumer is willing to give up in order to obtain one additional unit of another good.
- Hurley's MRS is the amount of mangos he would substitute for another fish.
- MRS falls as you move down along an indifference curve.

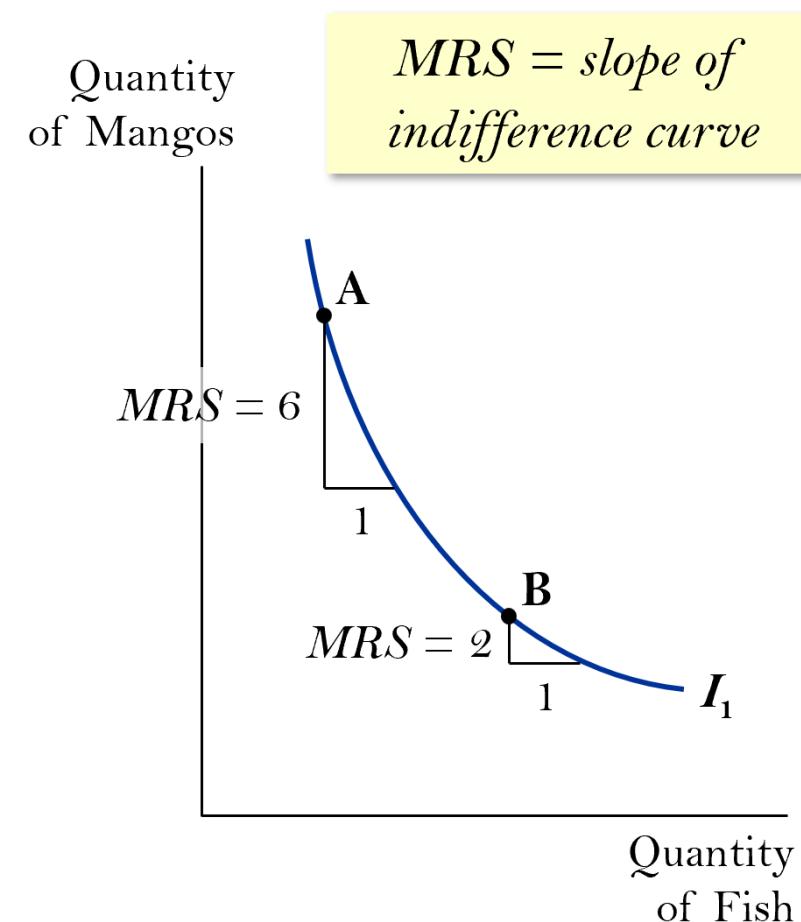


# The Marginal Rate of Substitution

## ■ Convexity

Observe that the MRS falls as we move down the indifference curve. The decline in the MRS reflects our fourth assumption regarding consumer preferences: a diminishing marginal rate of substitution. When the MRS diminishes along an indifference curve, the curve is convex.

## ■ Why do we assume diminishing MRS?

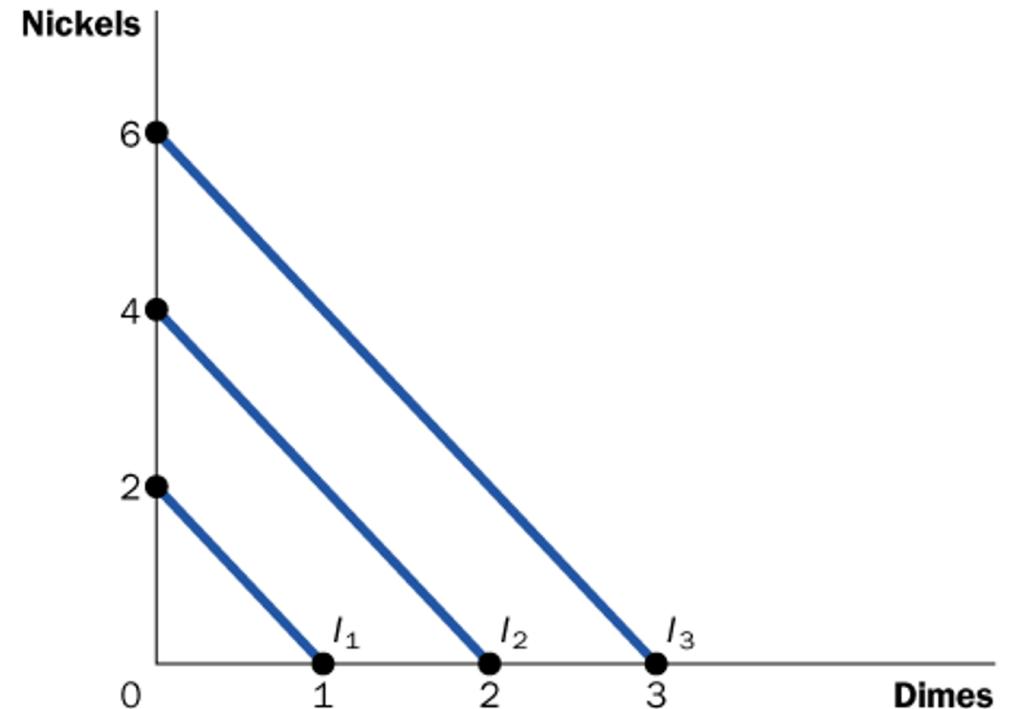


# One Extreme Case: Perfect Substitutes

**Perfect substitutes:** two goods with straight-line indifference curves, constant MRS

Example: nickels and dimes

- Consumer is always willing to trade two nickels for one dime.

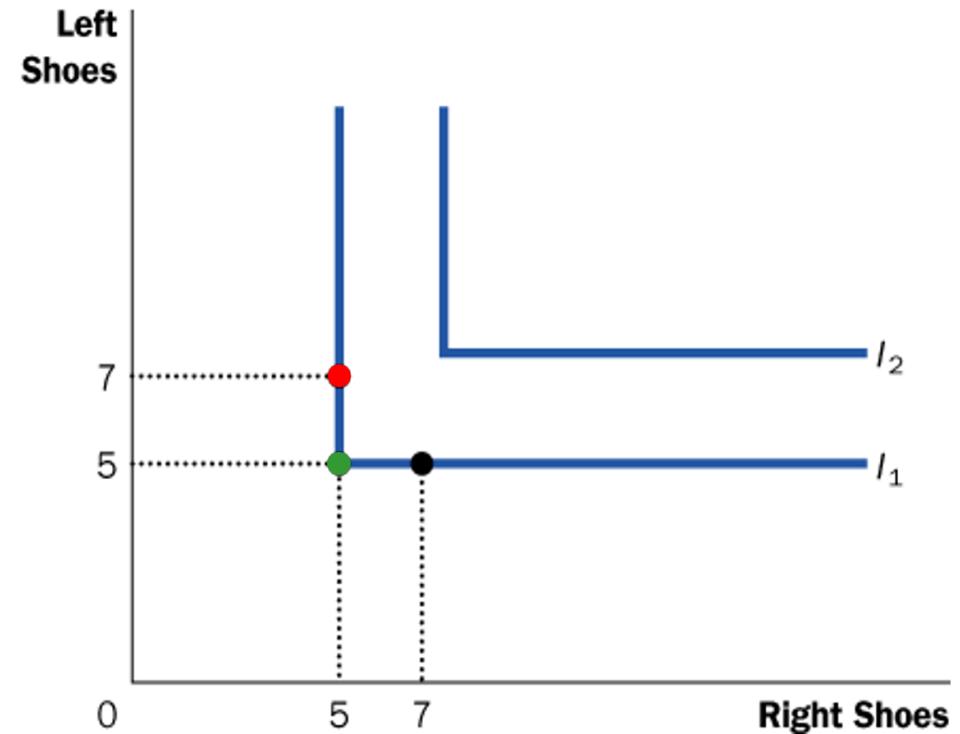


# Another Extreme Case: Perfect Complements

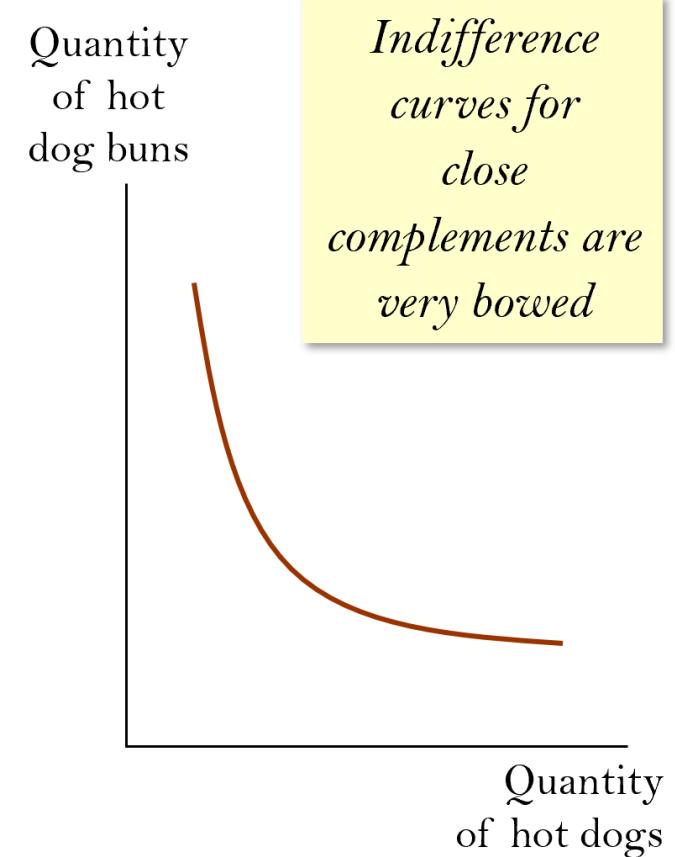
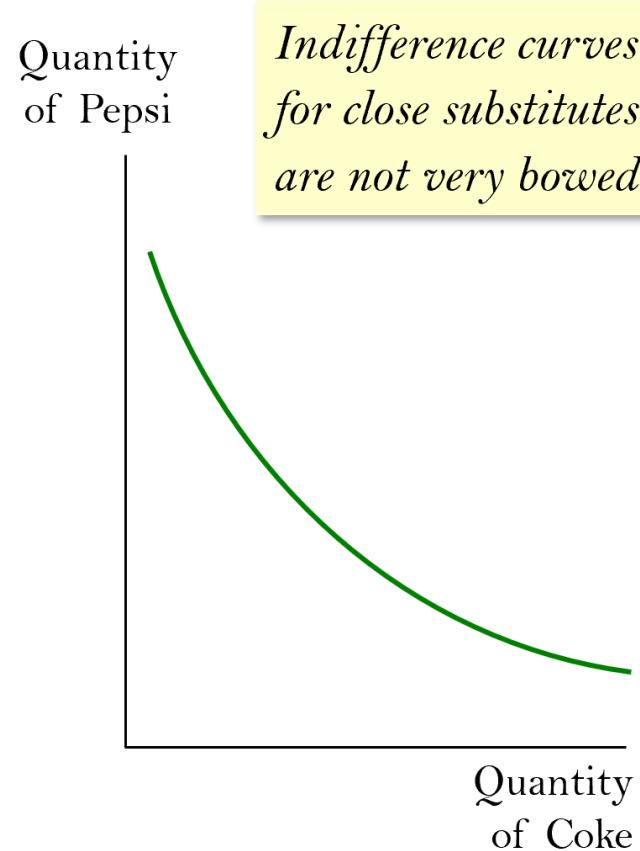
**Perfect complements:** Two goods for which the MRS is zero or infinite; the indifference curves are shaped as right angles.

Example: Left shoes, right shoes

- {7 left shoes, 5 right shoes} is just as good as {5 left shoes, 5 right shoes}



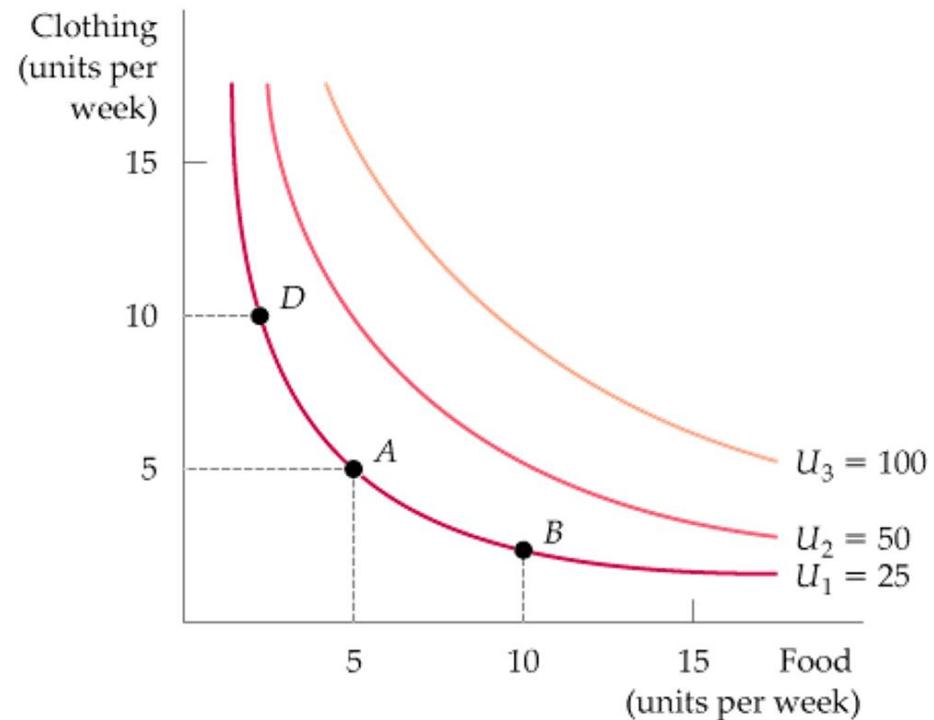
# Less Extreme Cases: Close Substitutes and Close Complements



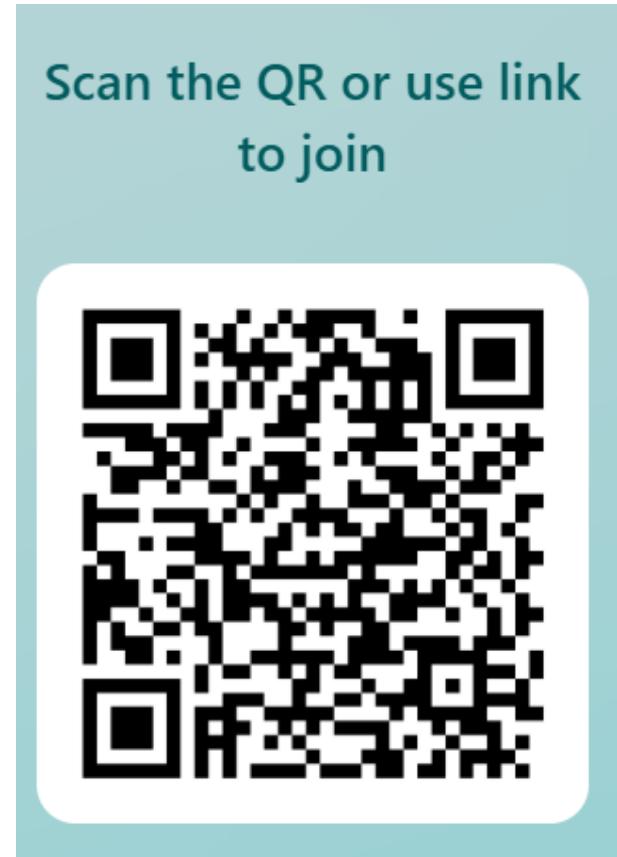
# Utility and Utility Function

- Utility: Numerical score representing the satisfaction that a consumer gets from a given bundle.
- Utility Function: Formula that assigns a level of utility to individual bundles.
  - A utility function can be represented by a set of indifference curves, each with a numerical indicator.
- The figure shows three indifference curves (with utility levels of 25, 50, and 100, respectively) associated with the utility function:

$$u(F, C) = FC$$



# Let's Do Some Practices Together!



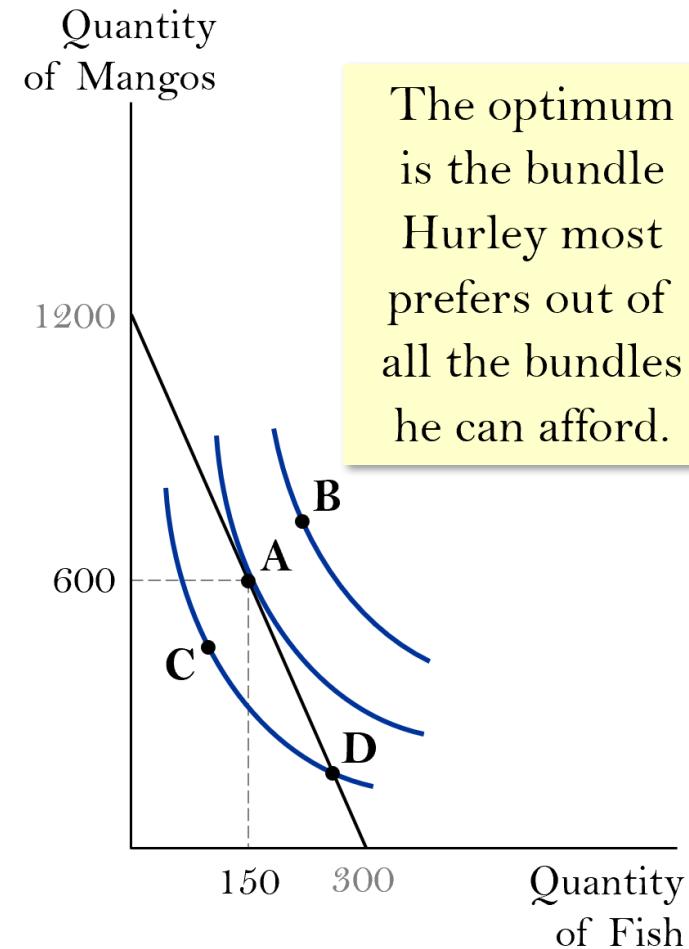
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# Optimization: What the Consumer Chooses

- A is the *optimum*: the point on the budget constraint that touches the highest possible indifference curve.
- Hurley prefers B to A, but he cannot afford B.
- Hurley can afford C and D, but A is on a higher indifference curve.



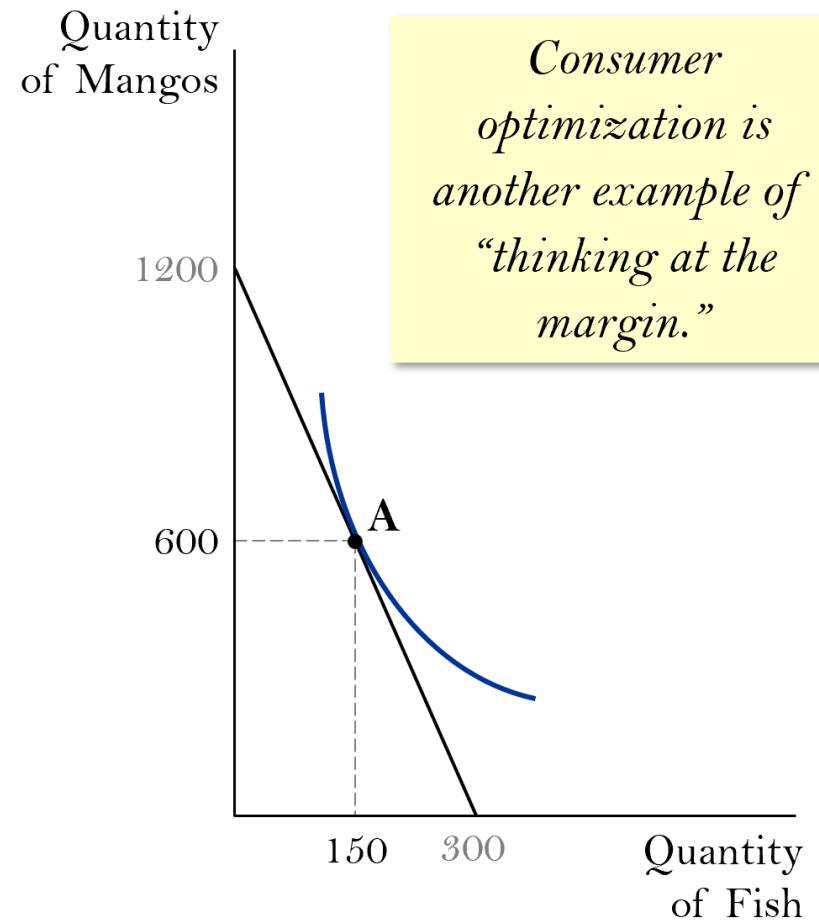
# Optimization: What the Consumer Chooses

- At the optimum, slope of the indifference curve equals slope of the budget constraint:

$$MRS = P_F / P_M$$

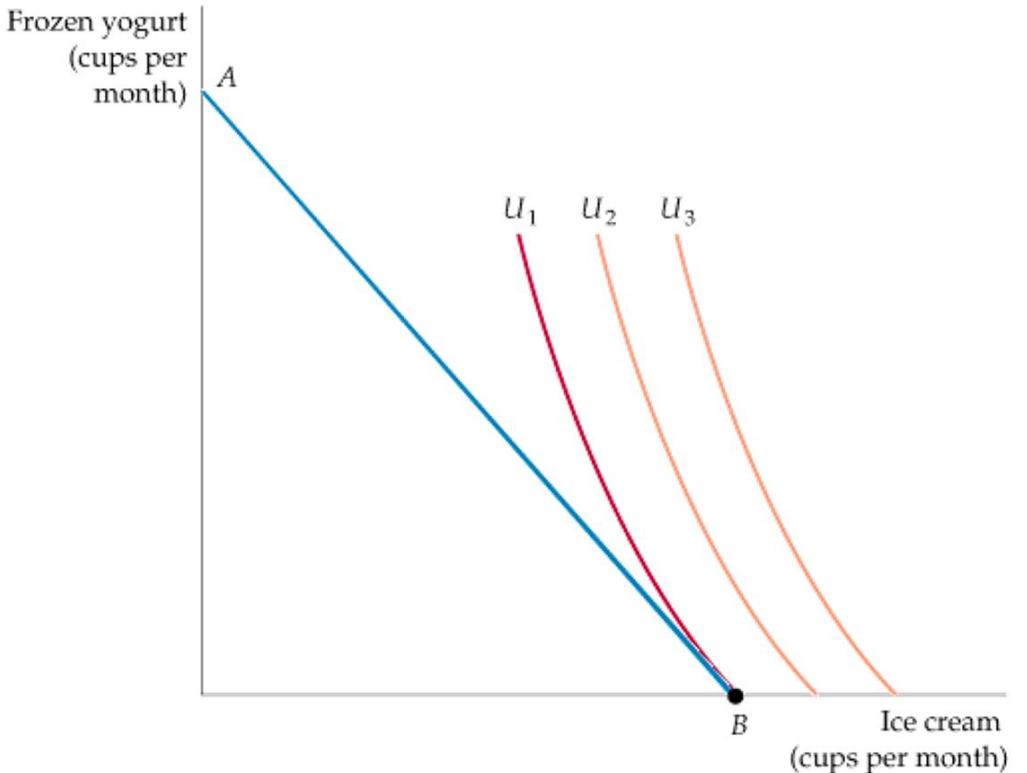
/  
marginal  
value of fish  
(in terms of  
mangos)

\  
price of fish  
(in terms of  
mangos)



# Corner Solutions

- corner solution: situation in which the marginal rate of substitution for one good in a chosen market basket is not equal to the slope of the budget line.
- When a corner solution arises, the consumer maximizes satisfaction by consuming only one of the two goods.
- Given budget line AB, the highest level of satisfaction is achieved at B on indifference curve  $U_1$ , where the MRS (of ice cream for frozen yogurt) is greater than the ratio of the price of ice cream to the price of frozen yogurt.



# Marginal Utility and Consumer Choice

- marginal utility (MU): Additional satisfaction obtained from consuming one additional unit of a good.
- diminishing marginal utility: Principle that as more of a good is consumed, the consumption of additional amounts will yield smaller additions to utility.

$$0 = \mathbf{MU}_F(\Delta F) + \mathbf{MU}_C(\Delta C)$$

$$-(\Delta C / \Delta F) = \mathbf{MU}_F / \mathbf{MU}_C$$

$$\mathbf{MRS} = \mathbf{MU}_F / \mathbf{MU}_C$$

$$\mathbf{MRS} = P_F / P_C$$

$$\mathbf{MU}_F / \mathbf{MU}_C = P_F / P_C$$

$$\mathbf{MU}_F / P_F = \mathbf{MU}_C / P_C$$

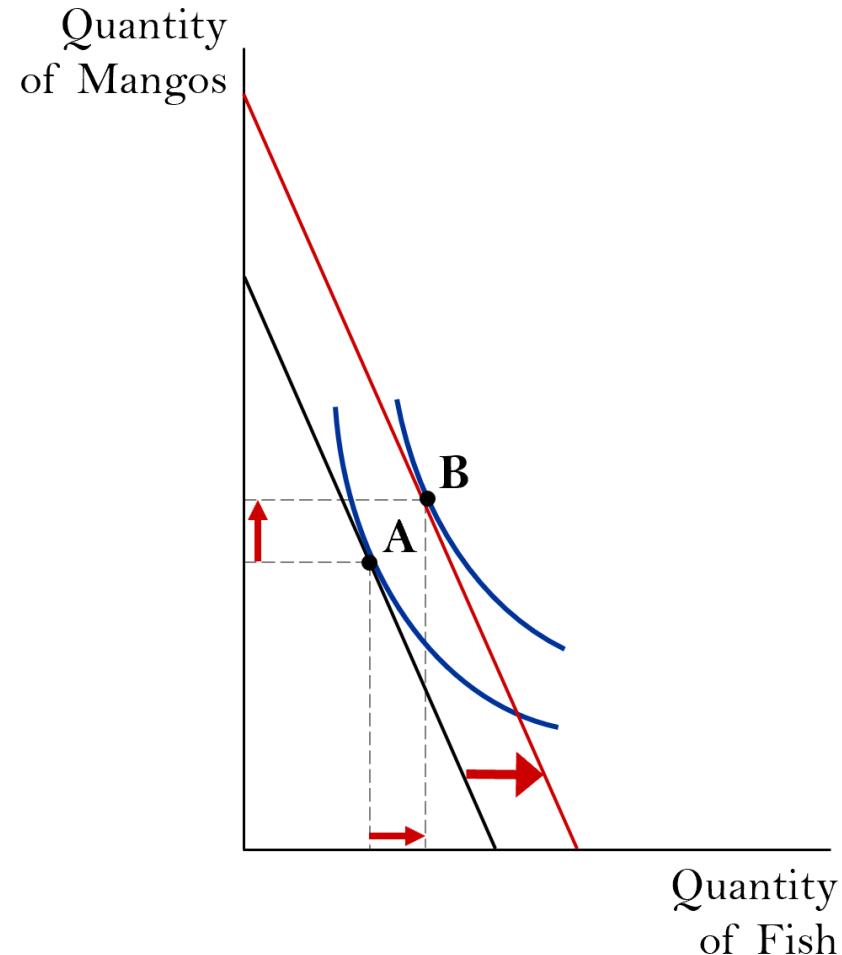
# Marginal Utility and Consumer Choice

$$\text{MU}_F / P_F = \text{MU}_C / P_C$$

- equal marginal principle: principle that utility is maximized when the consumer has equalized the marginal utility per dollar of expenditure across all goods.

# The Effects of an Increase in Income

- An increase in income shifts the budget constraint outward.
- If both goods are “normal,” Hurley buys more of each.

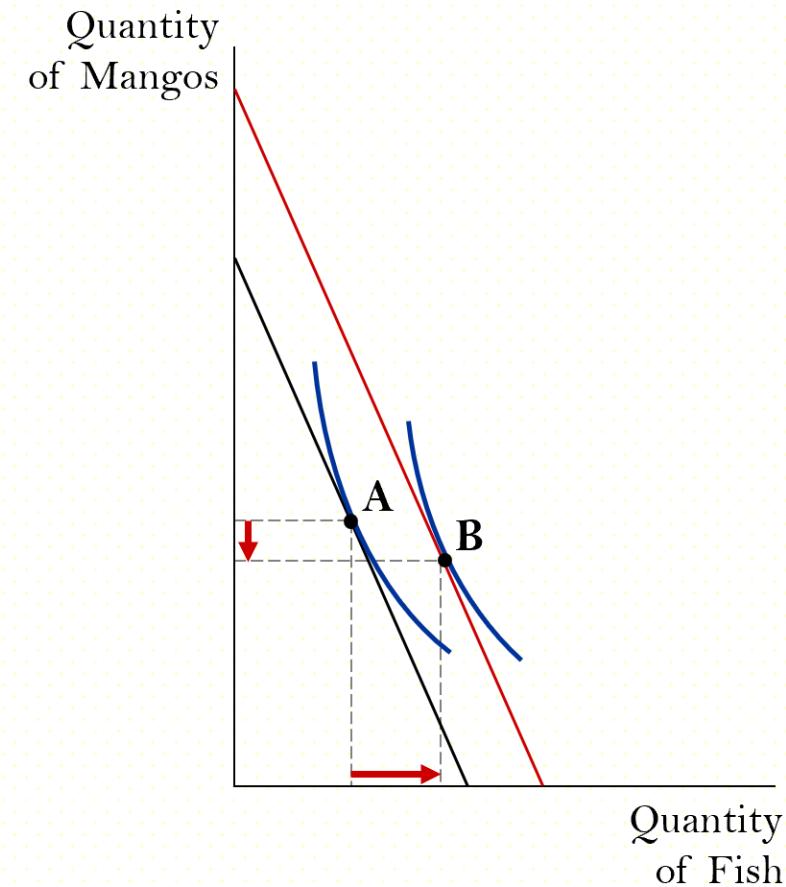


- An increase in income increases the quantity demanded of normal goods and reduces the quantity demanded of inferior goods.
- Suppose fish is a normal good but mangos are an inferior good.
- Use a diagram to show the effects of an increase in income on Hurley's optimal bundle of fish and mangos.

# Active Learning

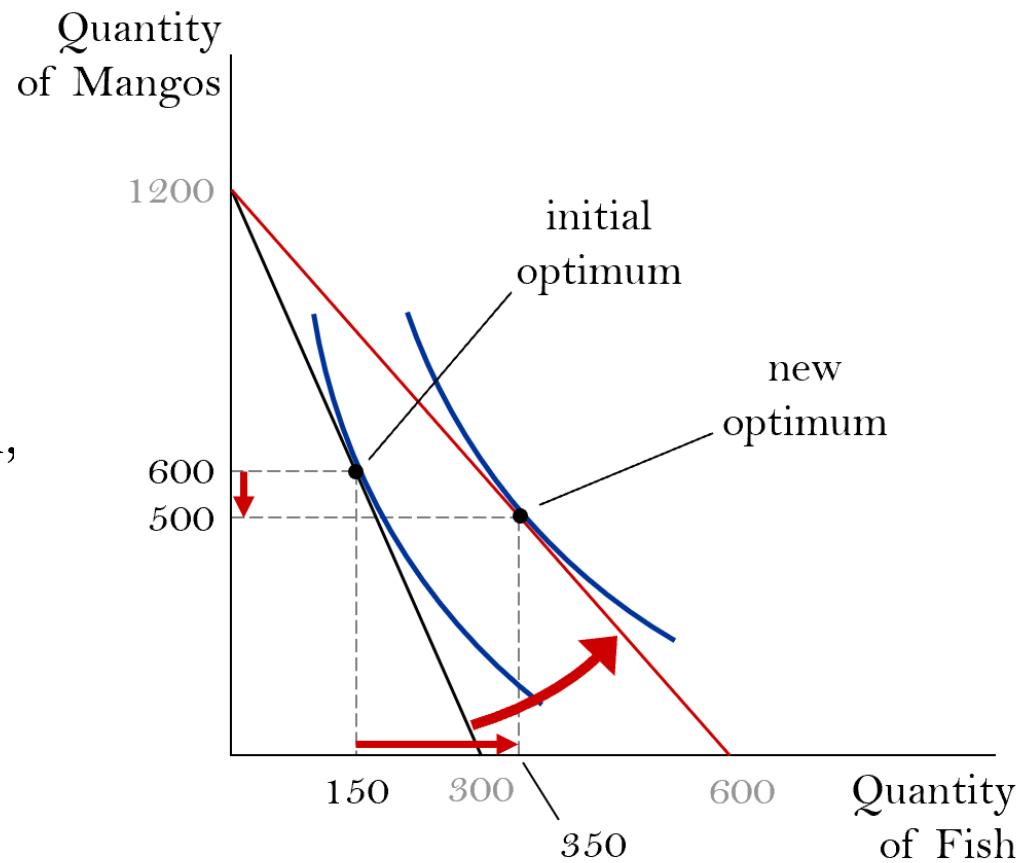
# Answers

- If mangos are inferior, the new optimum will contain fewer mangos.



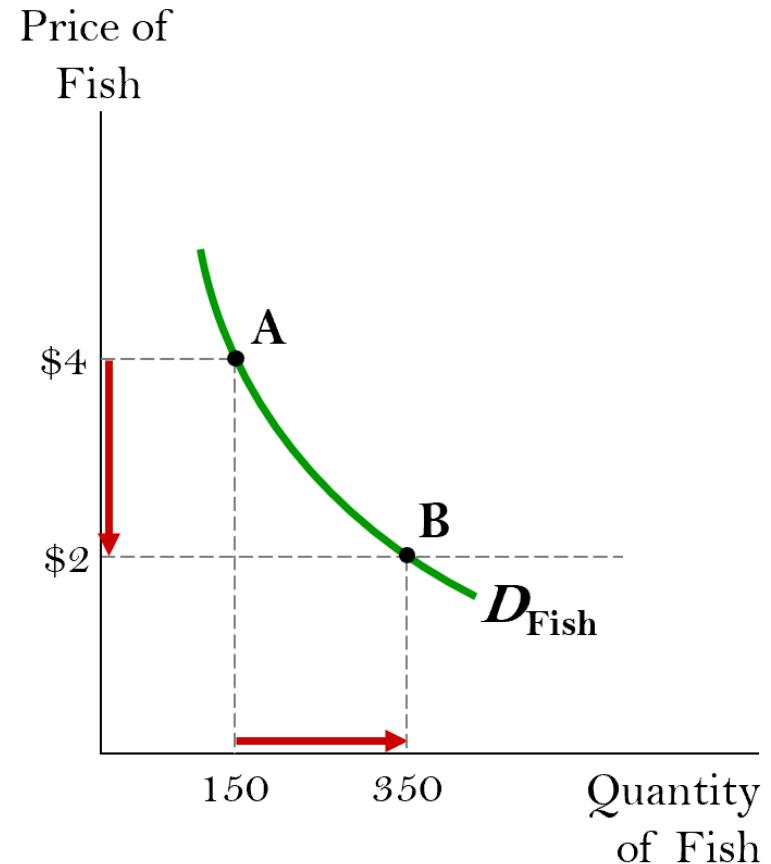
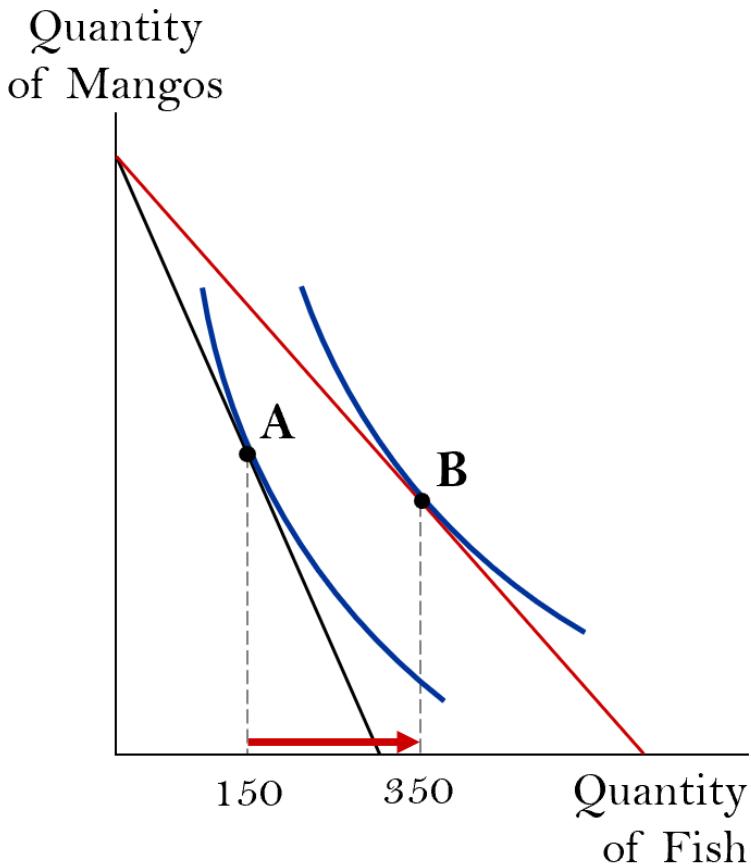
# The Effects of a Price Change

- Initially,
  - $P_F = \$4$
  - $P_M = \$1$
- $P_F$  falls to \$2
  - budget constraint rotates outward, Hurley buys more fish and fewer mangos.



# Deriving Hurley's Demand Curve for Fish

- A: When  $P_F = \$4$ , Hurley demands 150 fish.
- B: When  $P_F = \$2$ , Hurley demands 350 fish.



# Do People Really Think This Way?

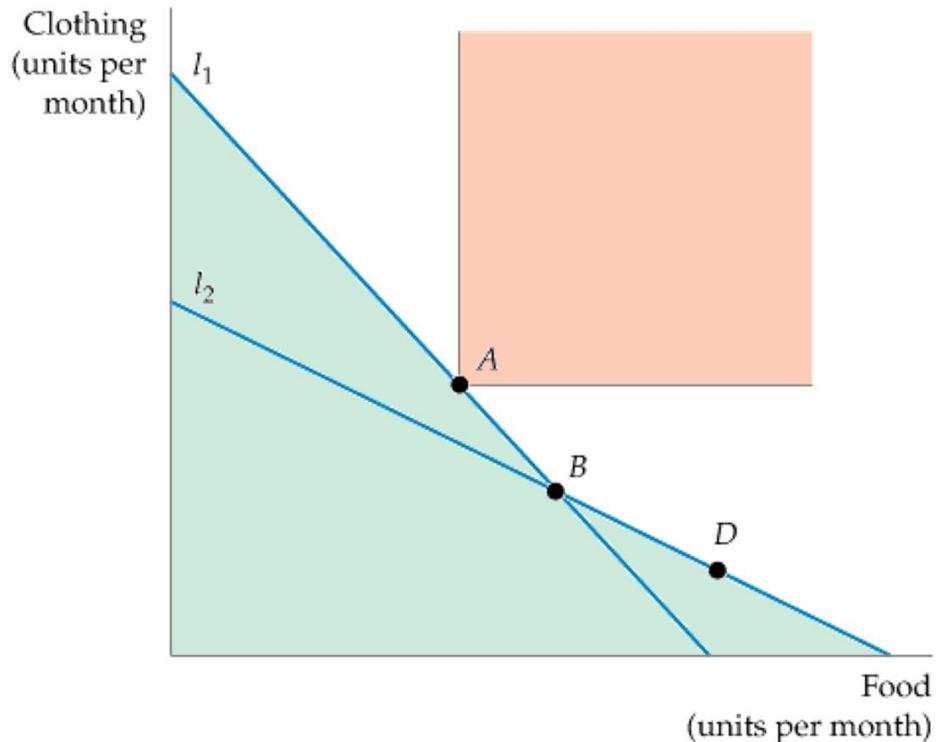
- People do not make spending decisions by writing down their budget constraints and indifference curves.
- Yet, they try to make the choices that maximize their satisfaction given their limited resources.
- The theory in this chapter is only intended as a metaphor for how consumers make decisions.
- It explains consumer behavior fairly well in many situations and provides the basis for more advanced economic analysis.

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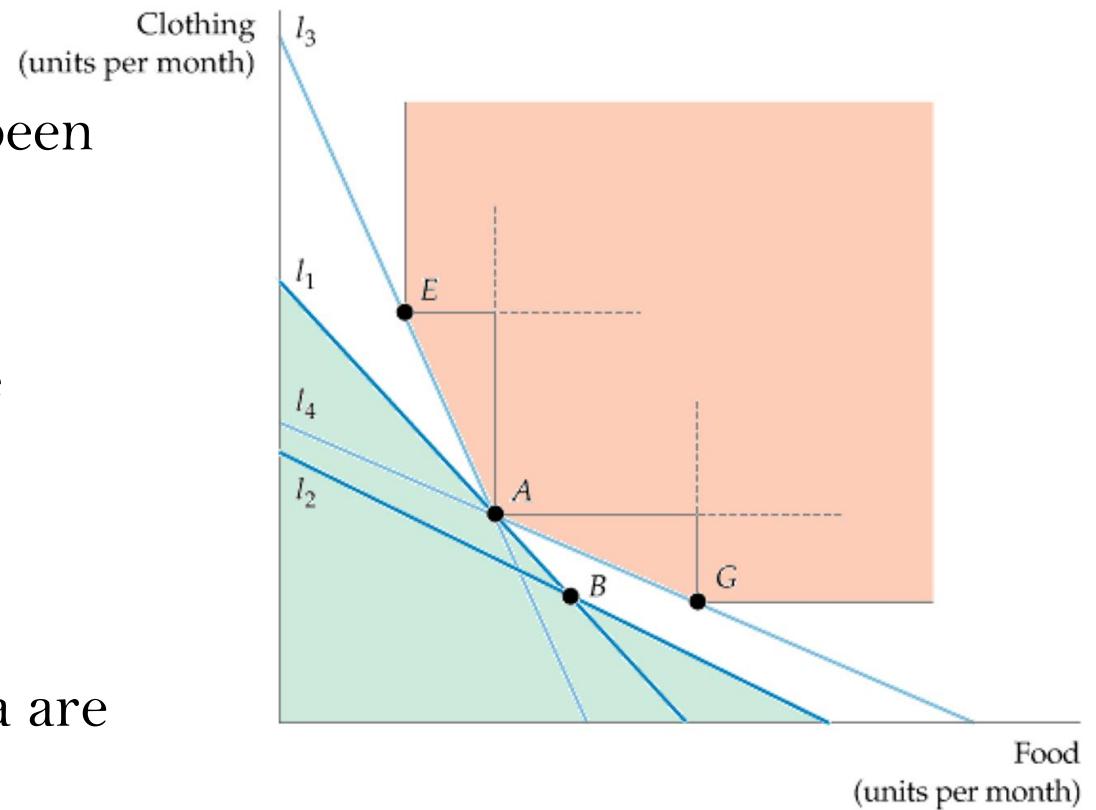
# Revealed Preference

- If a consumer chooses one market basket over another, and if the chosen market basket is more expensive than the alternative, then the consumer must prefer the chosen market basket.
- If an individual facing budget line  $l_1$  chose market basket A rather than market basket B, A is revealed to be preferred to B.
- Likewise, the individual facing budget line  $l_2$  chooses market basket B, which is then revealed to be preferred to market basket D.
- Whereas A is preferred to all market baskets in the green-shaded area, all baskets in the pink-shaded area are preferred to A.



# Revealed Preference

- Facing budget line  $l_3$ , the individual chooses E, which is revealed to be preferred to A (because A could have been chosen).
- Likewise, facing line  $l_4$ , the individual chooses G, which is also revealed to be preferred to A.
- Whereas A is preferred to all market baskets in the green-shaded area, all market baskets in the pink-shaded area are preferred to A.



# Can You Answer the Following Questions?

- How does the budget constraint represent the choices a consumer can afford?
- How do indifference curves represent the consumer's preferences?
- What determines how a consumer divides her resources between two goods?
- How does the theory of consumer choice explain decisions such as how much a consumer saves, or how much labor she supplies?

# End