

# ECO2011 Basic Microeconomics

Mankiw Chapter 21 (The Theory of Consumer Choice)

Pindyck Chapter 3 (Consumer Behavior)

2023

# 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.....

# 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

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.

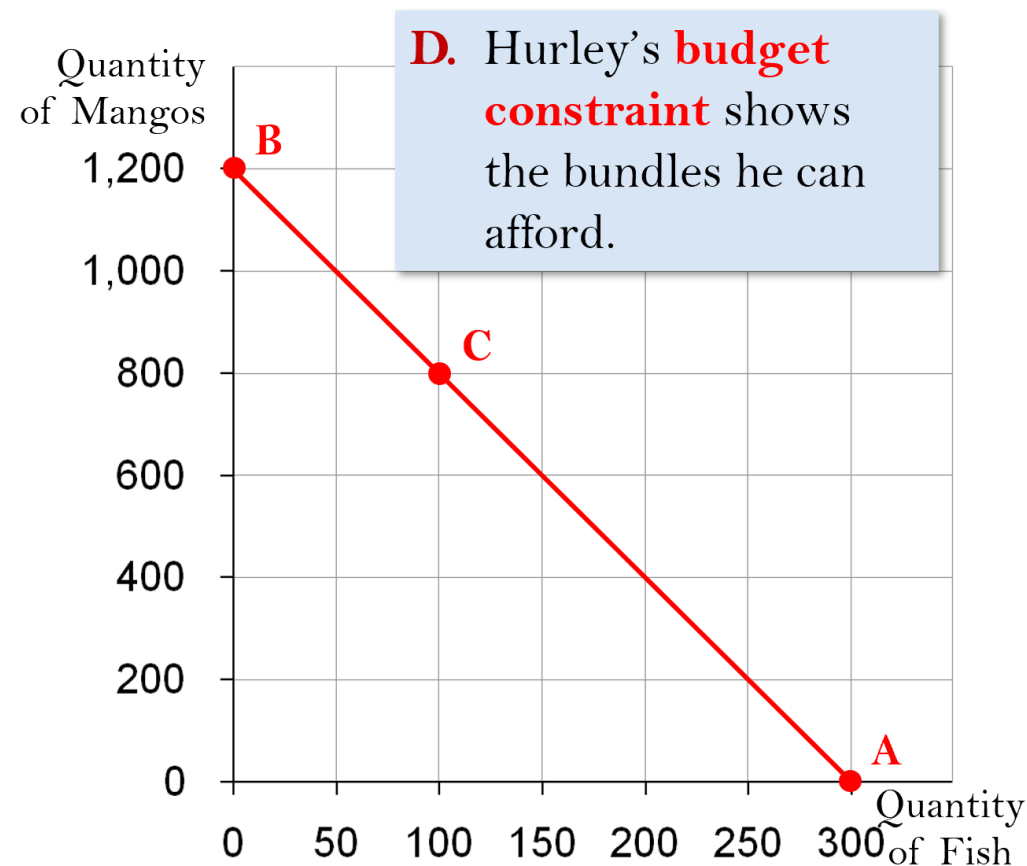
# Active Learning

# Answers

A.  $\$1200/\$4$   
 $= 300$  fish

B.  $\$1200/\$1$   
 $= 1200$  mangos

C. 100 fish cost \$400,  
\$800 left buys 800 mangos



# Active Learning Constraint

# The Slope of the Budget

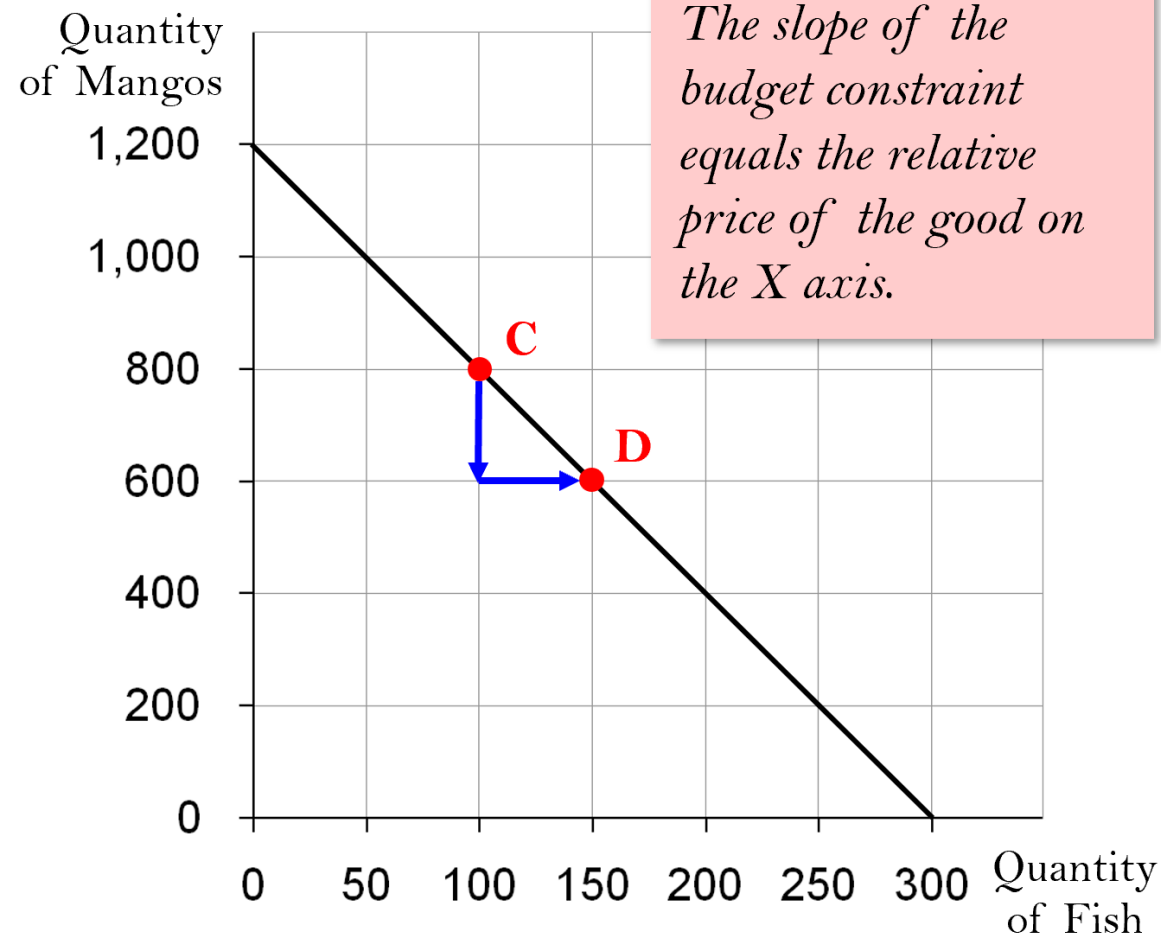
From **C** to **D**,

“rise” =  $-200$  mangos

“run” =  $+50$  fish

Slope =  $-4$

Hurley must give up 4 mangos to get one fish.



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:

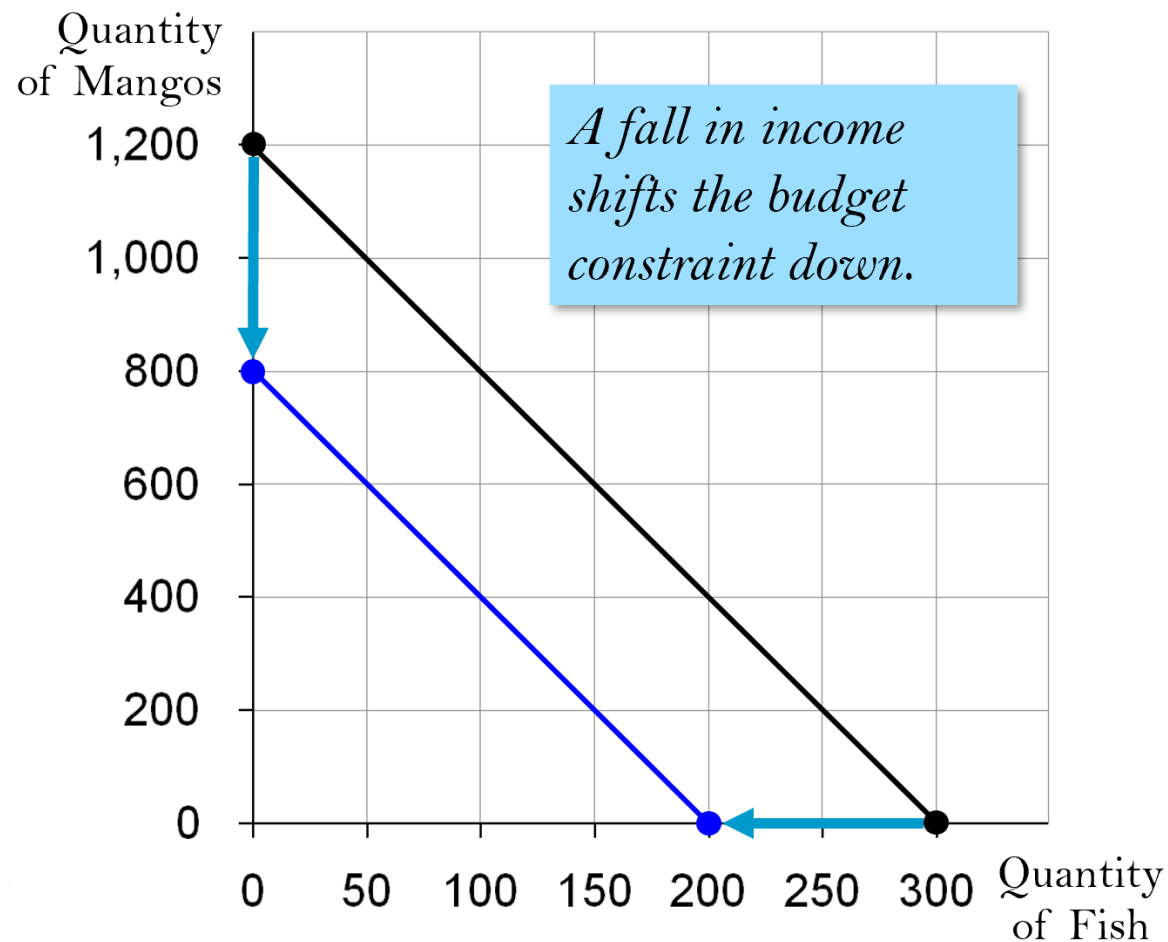
**A.** His income falls to \$800.

**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.





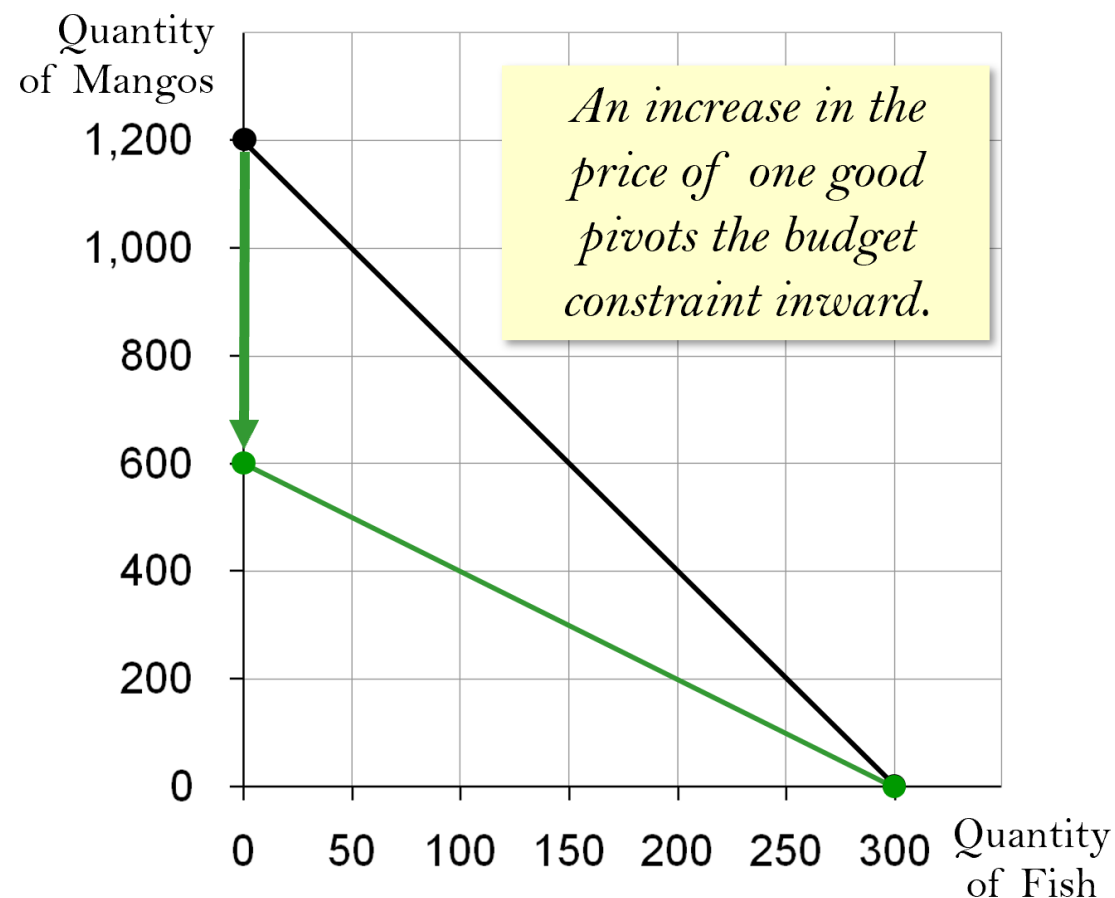
# Active Learning

# Answers, part B

Hurley can still buy 300 fish.

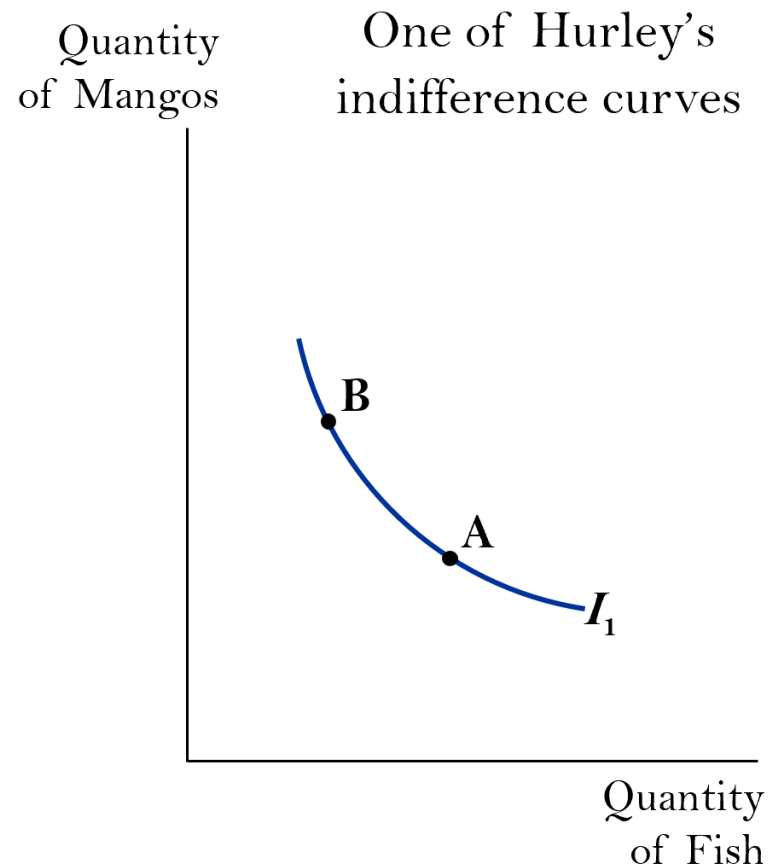
But now he can only buy  
 $\$1200/\$2 = 600$  mangos.

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



# 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.



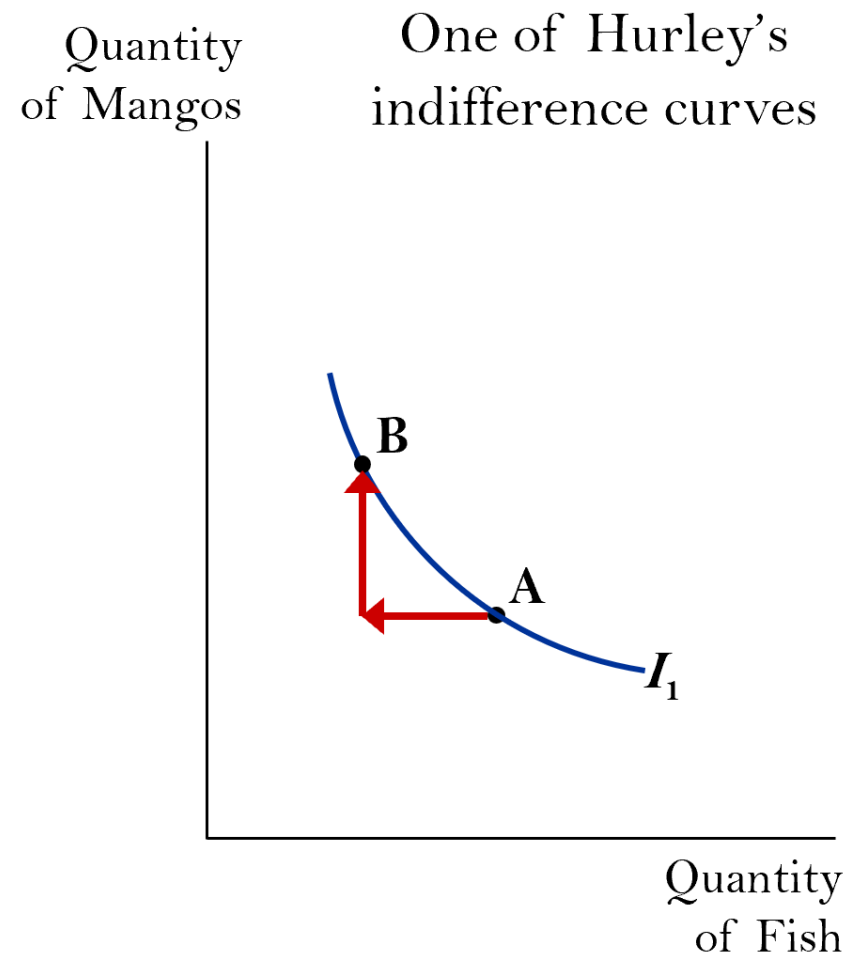
# Some Basic Assumptions about Preferences

- 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 prefer 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.

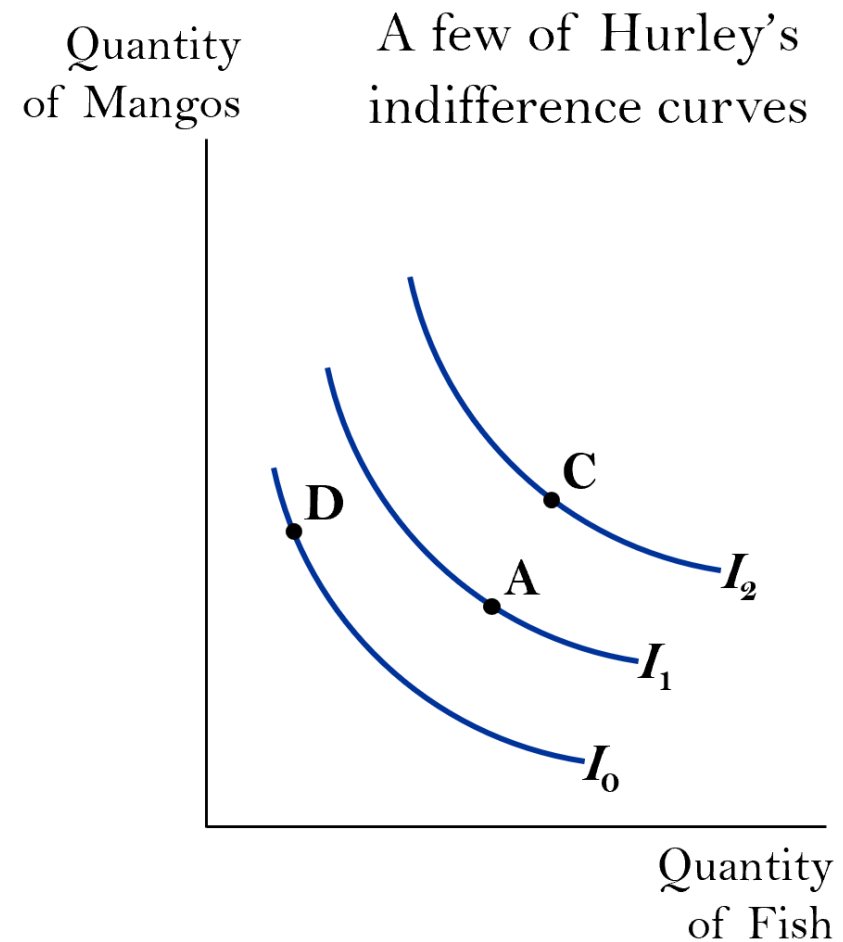
- If the quantity of fish is reduced, the quantity of mangos must be increased to keep Hurley equally happy.



# 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**).

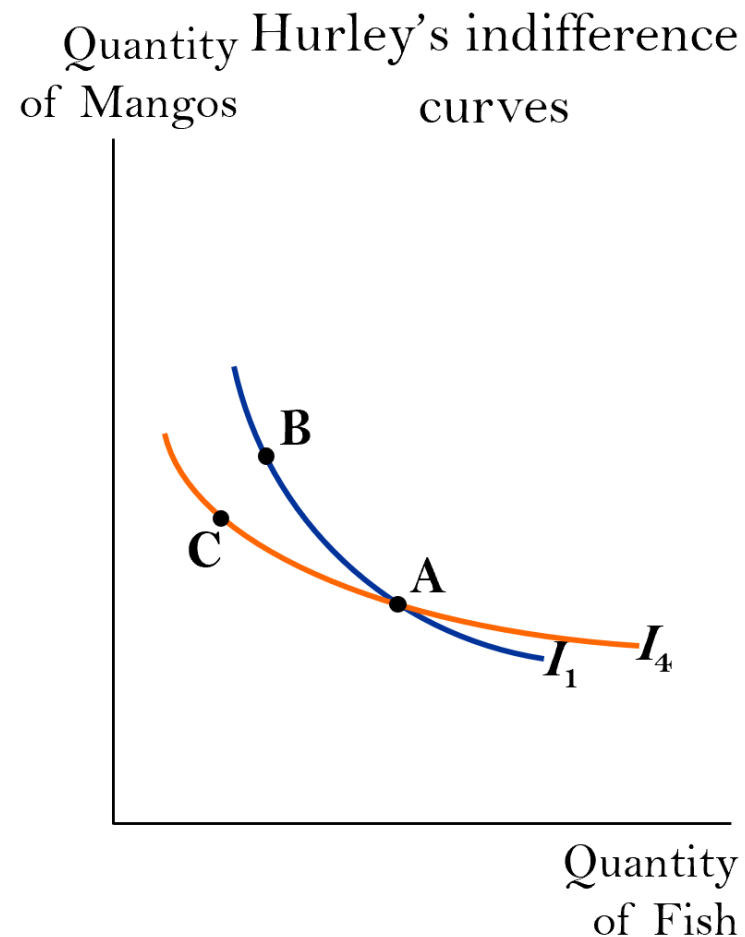


# Four Properties of Indifference Curves

## 3. Indifference curves cannot cross.

Suppose they did.

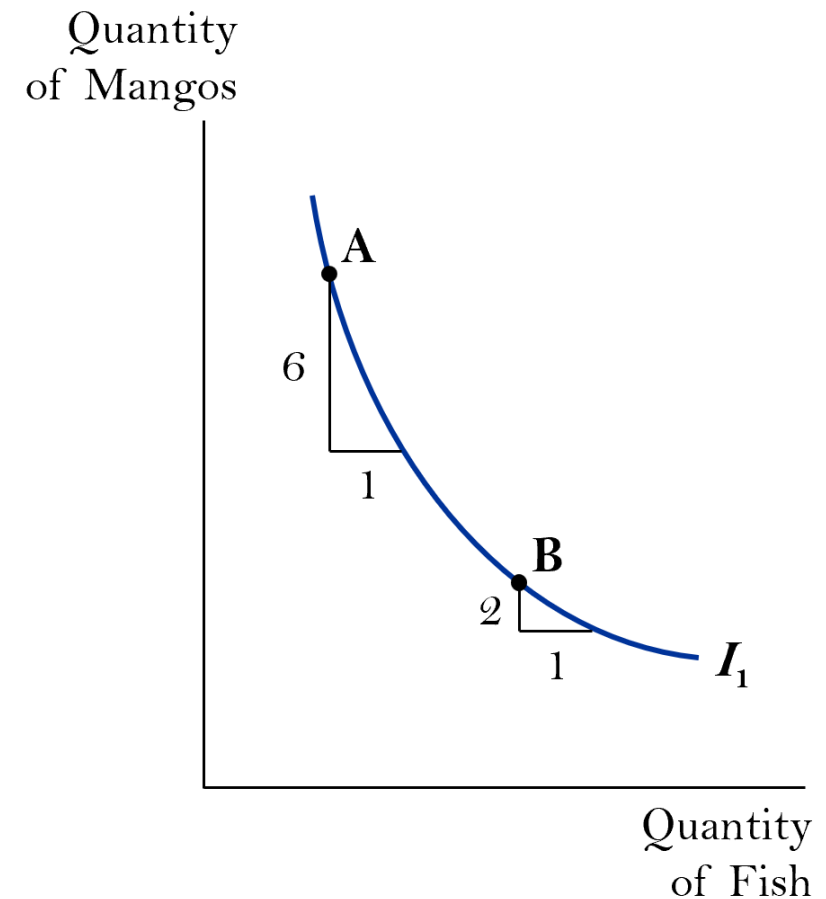
- Hurley should prefer **B** to **C**, since **B** has more of both goods.
- Yet, Hurley is indifferent between **B** and **C**:
- He likes **C** as much as **A** (both are on  $I_4$ ).
- He likes **A** as much as **B** (both are on  $I_1$ ).



# Four Properties of Indifference Curves

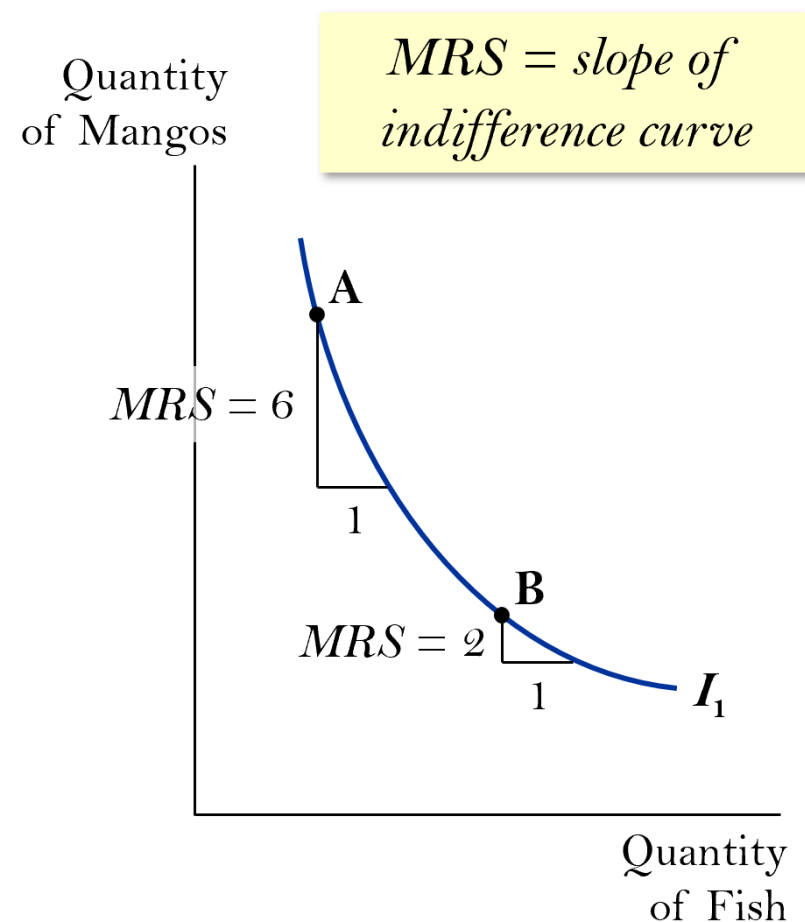
## 4. Indifference curves are bowed inward.

- 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.



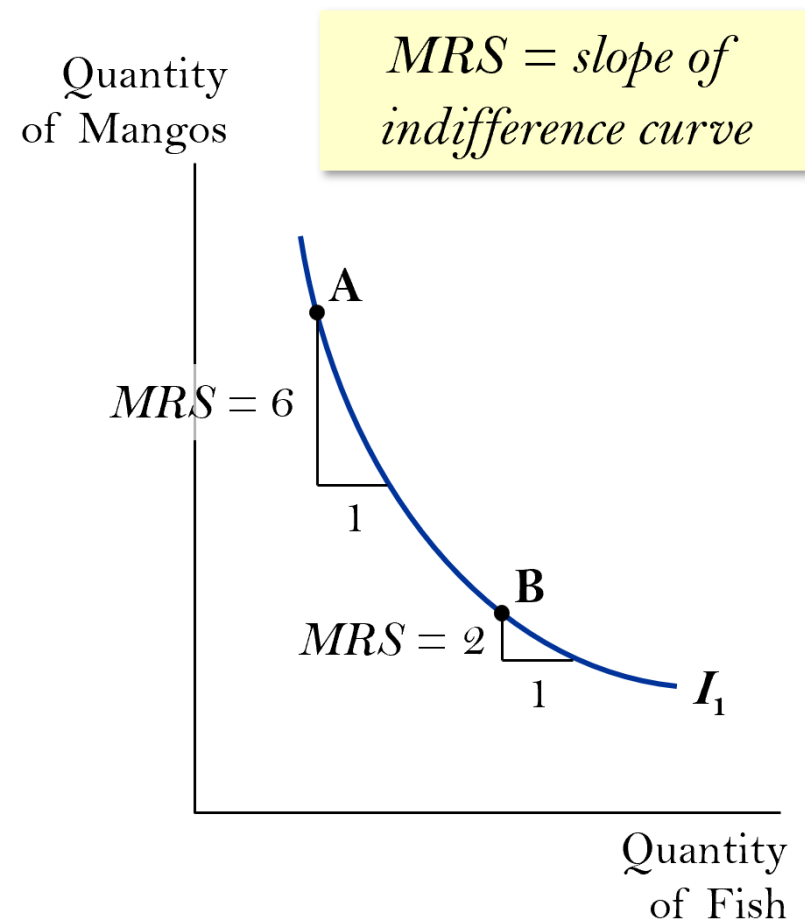


# The Marginal Rate of Substitution

## ■ 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?

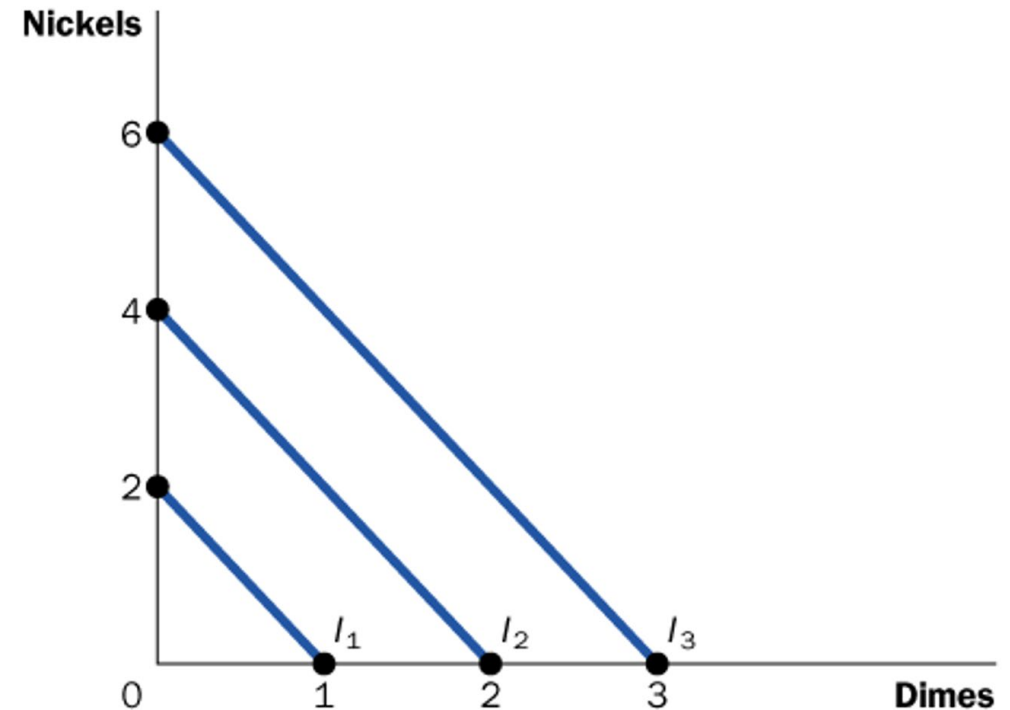


# One Extreme Case: Perfect Substitutes

**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.

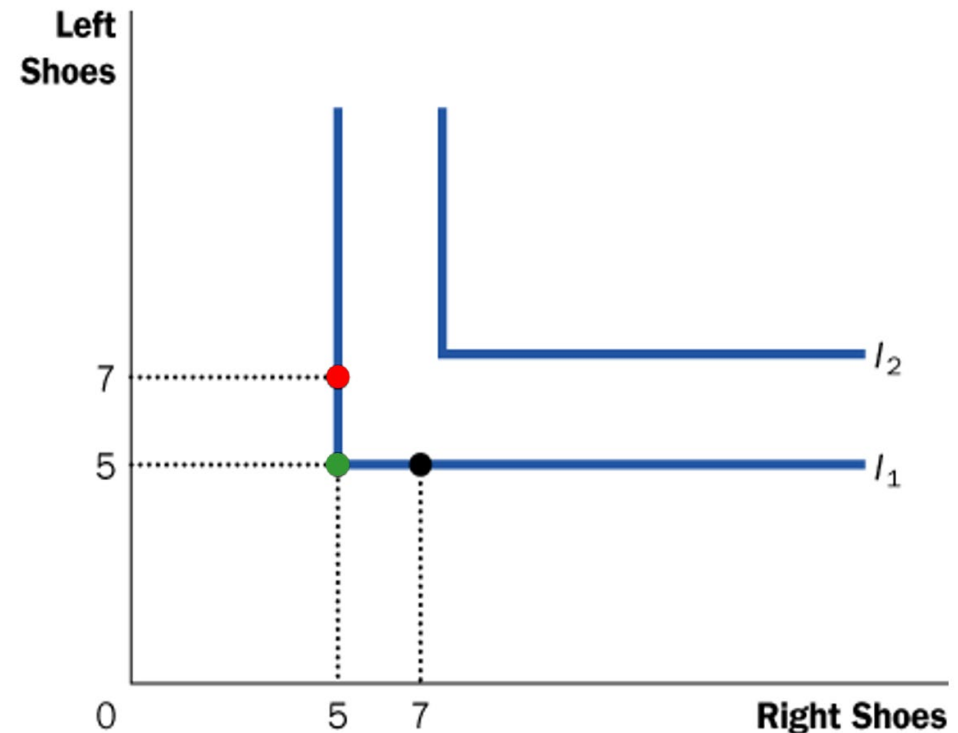


# Another Extreme Case: Perfect Complements

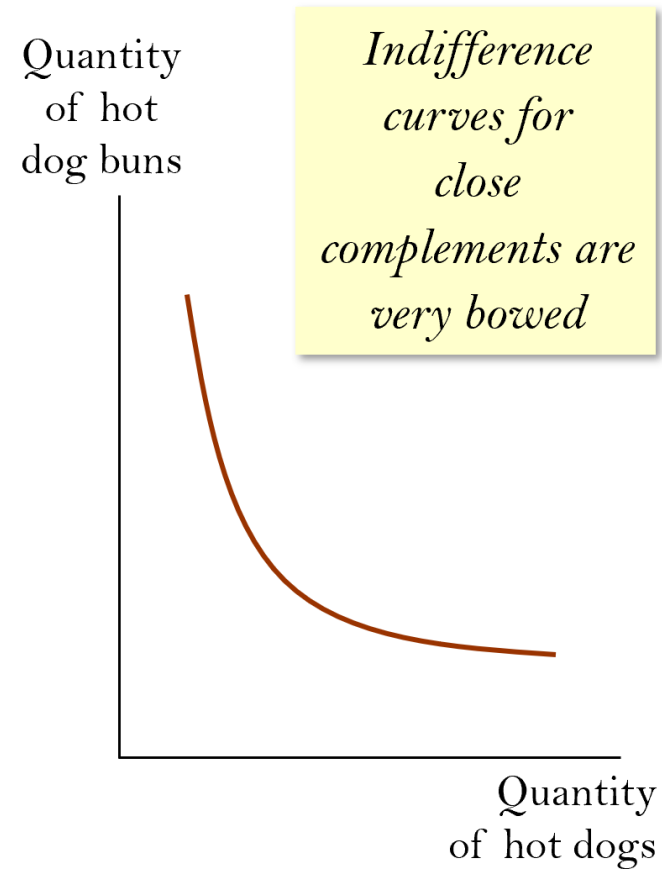
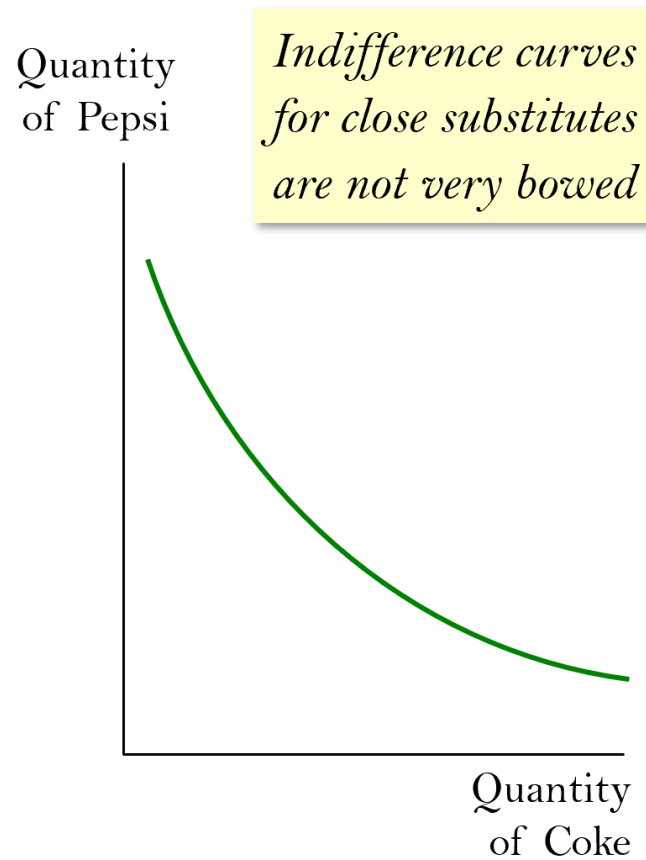
**Perfect complements:** Two goods for which the MRS is zero or infinite; the indifference curves are shaped as right angles.

Example: Left shoes, right shoes

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



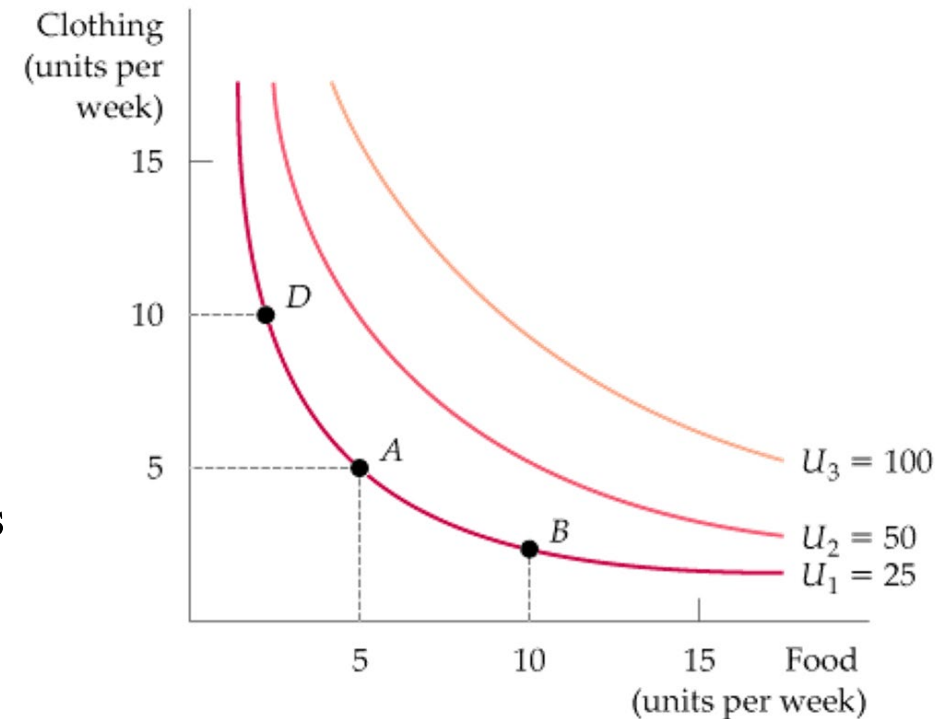
# Less Extreme Cases: Close Substitutes and Close Complements



# Utility and Utility Function

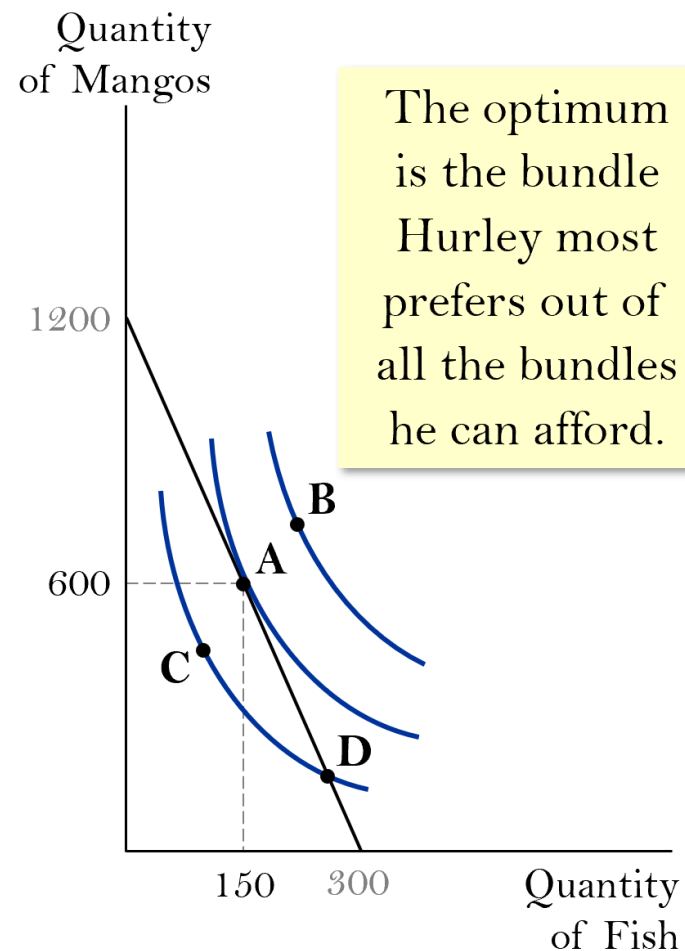
- Utility: Numerical score representing the satisfaction that a consumer gets from a given bundle.
- Utility Function: Formula that assigns a level of utility to individual bundles.
  - A utility function can be represented by a set of indifference curves, each with a numerical indicator.
- The figure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

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



# 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.



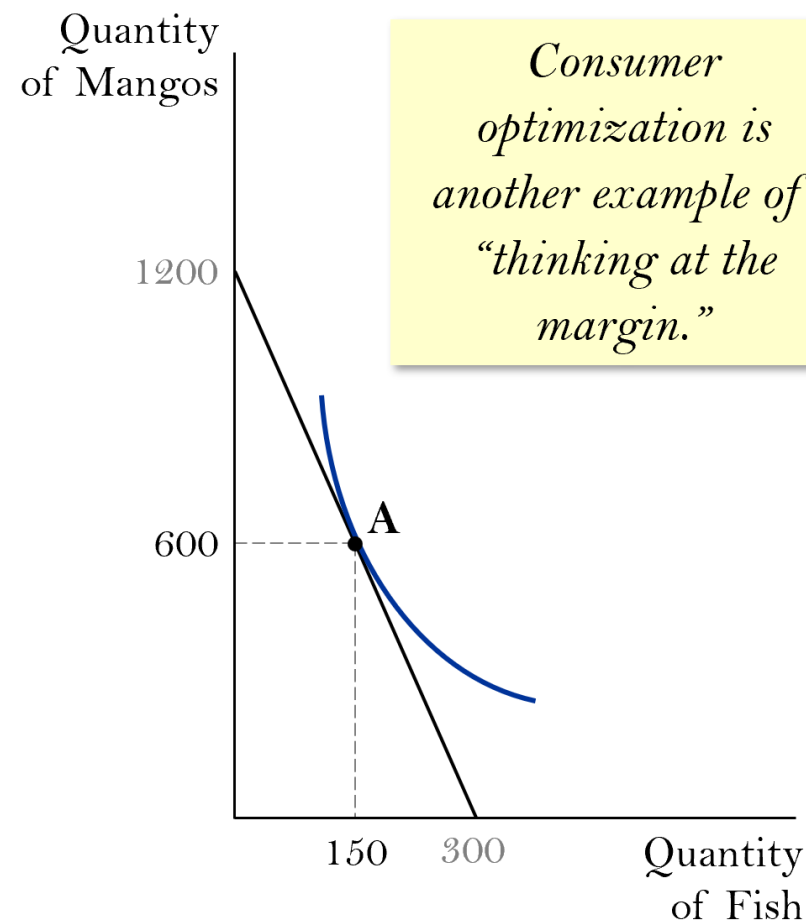
# Optimization: What the Consumer Chooses

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

$$\text{MRS} = P_F / P_M$$

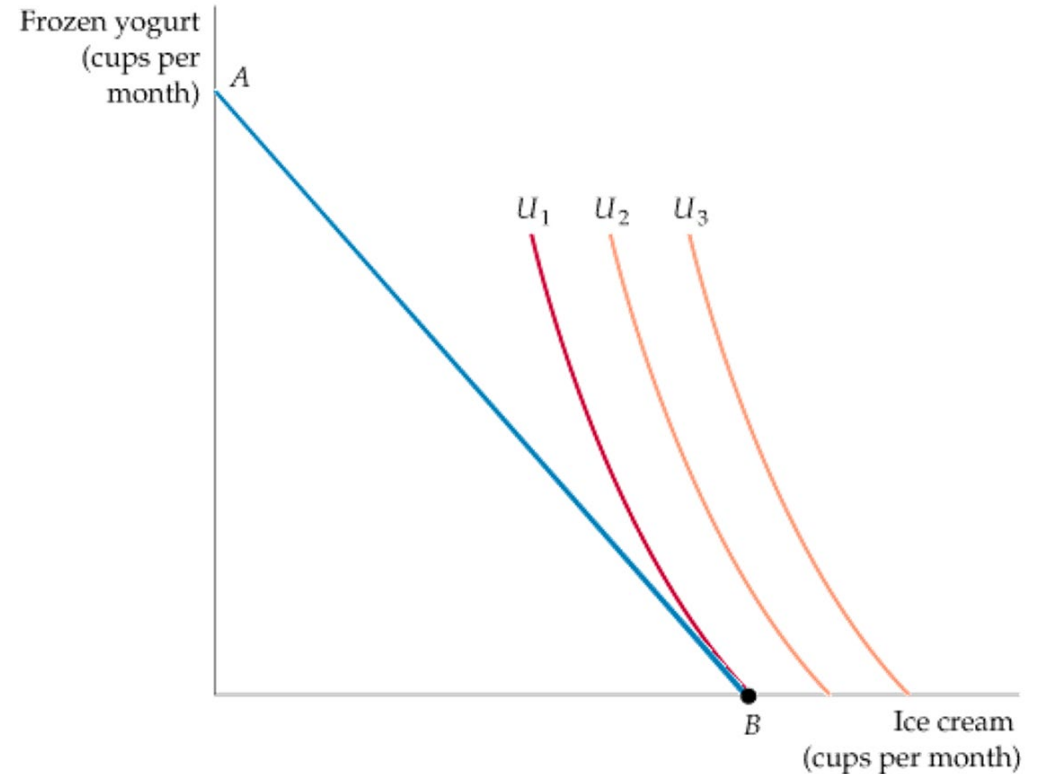
marginal  
value of fish  
(in terms of  
mangos)

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.

$$0 = MU_F(\Delta F) + MU_C(\Delta C)$$

$$-(\Delta C / \Delta F) = MU_F / MU_C$$

$$MRS = MU_F / MU_C$$

$$MRS = P_F / P_C$$

$$MU_F / MU_C = P_F / P_C$$

$$MU_F / P_F = MU_C / P_C$$

# Marginal Utility and Consumer Choice

$$MU_F / P_F = MU_C / P_C$$

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

# 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.

# 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